Towards a Managerial Engineering of Coopetition
The findings of the study of the management of GMOs in the French grain merchant industry

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Abstract

Even if academics and practitioners identify coopetition as a winning strategy, a coopetition relationship appear to be difficult to sustain. Coopetition is relied to be a paradoxical and unstable interfirm relationship related with tensions. Academic works begun to study the causes and nature of tension in coopetition relationship but little is known about the way those tension is managed. The aim of this paper is to investigate, via in depth case studies, the management tools used to manage coopetition at the inter-organizational level. Through multiples case studies in the same industry (the French grain merchants industry), we reveal the existence of differing management tools of the coopetition relationships. Some tools found by our research (tacit conventions, mediation arenas, coopetition inducers) seem particularly novel in the coopetition literature. The use of tacit convention and social pressure epitomize the embeddedness and the social construction of the coopetition relationship. It shows that inter-firm coordination can exist in a direct and informal way, without being locked into a rigid structure and without collusion. Moreover, we found that an external party can induce the coopetition and bring rival firms to consider a coopetitive relationship. This finding reveals that some tools can change inter-firms dynamics and rationalities giving rise to coopetition. Those findings lead us to reveal the perspective of a managerial engineering of coopetition and to suggest some embryonic basis to open the way for its development.

Keywords: *Coopetition; Engineering; Management tools; Biotechnology; GMO; Cases studies; Collective strategies; Inter-organizational relationships*

1. Introduction

Awareness of the ambiguous nature of inter-organizational relationships brings a new perspective on contemporary inter-firm relations and the traditional dichotomy between competition and cooperation seems no longer appropriate for understanding inter-organizational relations (Yami et al, 2010). The concept of "coopetition" and its first developments focus on the definition and understanding of the nature of this ambiguity and to date, the coopetition concept is the only one which really tackles the core of the problem, which is the paradoxical, simultaneous combination of cooperation and competition. But this concept suggests many questions which require study. One of the key ones is how rival firms can coordinate themselves and construct collective actions without losing their individual competitiveness and flexibility. In other words, how can a manager simultaneously behave competitively and yet cooperatively towards the same organization? What are the tools is use to set and manage a partnership with a rival firm without endangering one's own business?

Those question are the purpose of this paper. The novelty of this study is that it addresses not only how coopetition transform inter-organizational tools (contracts, third party, convention, social norm….) but also how coopetition tools transform inter-organizational relationship. For this purpose we have made multiple case studies in the sectors of grain merchant in France. Our findings shows that in the same country and institutional framework, in the same industry differing tools are used to drive coopetition relationship. Moreover, some tools seem to be able to change the competitor rationalities' bringing them to cooperation. Those findings lead us to reveal the perspective of a

managerial engineering of coopetition and to suggest some embryonic basis to open the way for its development.

This article is divided into six sections. The first section introduces and emphasizes the relevance of the study of management tools in the coopetition research field. The second section reach the matter of management tools and frames its definition. The third section presents the case study context whereas the fourth section presents the methodology used. The fifth section presents the case then the sixth section discusses those results and theoretical and managerial implications on the management of coopetition relationships. Finally, the conclusion makes some suggestions for a research agenda.

2. The Relevance of Studying Coopetition Management Tools

Brandenburger and Nalebuff (1996) have defined coopetition quite largely, such as a value-net involving the focal firm's interplay with customers, suppliers, complementors, and competitors. Bengtsson and Kock (2000) then Gnyawali and Park (2011) define coopetition more precisely with a focus on interplay between firms that compete and cooperate with each other simultaneously. In this paper we adopt this last definition which define coopetition "as a simultaneous pursuit of collaboration and competition between firms" (Gnyawali and Park, 2011).

Although coopetition in itself is beneficial (Hannachi and Coleno, 2015), a coopetition relationship can be difficult to sustain and balance (Bengtsson and Johansson, 2012). Coopetition involves the simultaneous existence of cooperation and competition, which by definition are opposites. This antonymous opposition is not incoherent. The dialectical paradigm is based on the Hegelian conception that, within the context of organizations, dialectical forces compete to shape organizational features (Faems et al 2010). Zeitz (1980) has already indicated the relevance of applying this view in the context of inter-organizational relationships. In the literature on business alliances, several scholars have therefore relied on such a dialectical approach to better understand interorganizational processes (Hamel, 1991; Madhok and Tallman, 1998; Das and Teng, 2000; Zeng and Chen, 2003 ; Heiman and Nickerson, 2004 ; De Rond and Bouchiki, 2004). Through this paradigm, managers and thus organizations internalize the dialectical forces.

This approach is influenced by the social philosophies of Hegel, predicting the collision of coexisting but contradictory social forces so as to produce a new social order. Through this approach dialectical forces compete for scarce resources and managerial attention, undermine organizational features which in turn produces organizational arrangements (Das and Teng, 2000). According to Das and Teng (2000) theses forces are cooperation vs competition, rigidity vs flexibility, short-term vs long-term. De Rond and Bouchiki, (2004) propose to add design vs emergence, trust vs vigilance, expansion and contraction, and autonomy vs control.

Consequently, coopetition is attended with tensions (Fang et al, 2011; Wilhelm, 2011). Those tensions arise from the coexistence of two behaviors (cooperation and competition) usually considered as opposite. Those tensions explain why alliances between competitors are more unstable than alliances between non-competitors (Das and Teng, 2000; Park and Russo, 1996).

Authors generally distinguish three levels of coopetition tensions: inter-organizational level (De Rond and Bouchikhi, 2004), intra-organizational level (Luo et al., 2006) and inter-individual level (Tsai, 2002). Different sources of tensions appear within each level (Tidström 2014). At the inter-organizational level, managing coopetitive tensions it is quite challenging to balance and manage competition and collaboration and the inherent contradictions between them. Gnyawali and Park (2009) suggest that "managers will confront higher level of tension in managing co-opetitive relationship due to high competitive tension, high risks of knowledge loss, and potential of partners to become stronger competitor".

Managers have to prevent those tensions from turning into conflicts as well that they have to convert them to a source of competitive advantage. The question then is how to manage coopetitive tensions? Contractual governance offers interesting insights to manage cooperative and competitive forces in strategic projects (Cassiman et al, 2009). However, a legal framework offers little help as the relationships are evolving over time and have multiple dimensions (Fernandez et al, 2014).

Despite the surge of scholarly interest on coopetition and its drivers and outcomes, less attention has been paid to the management tools associated to coopetition. Academic works begun to study the causes and nature of tension in coopetition relationship (Tidström 2014) but little is known about the way those tension is managed (Fernandez et al 2014). Consequently, the analysis of the ways of managing tension and the tools used is critical to develop the coopetition research field (Chen, 2008; Gnyawali and Park, 2011). Previous research on these questions has been mainly theoretical (Das and Teng, 2000; De Rond and Bouchikhi, 2004; Chen, 2008; Gnyawali and Park, 2011).

Empirical studies are very rare (Bengtsson and Kock, 2000, Fernadez et al, 2014) and numerous academics (Ireland et al, 2002; Linnarsson and Werr, 2004; De Rond and Bouchikhi, 2004; Easterby-Smith et al, 2008, Tidström 2014; Fernandez et al, 2014) call for in-depth case studies on this topic.

In this paper we will focus on this gap in the coopetition research field and the purpose of this study is therefore to explore via in-depth case studies how managers actually handle this co-operation–competition dilemma and what are the management tools used to this end

3. Studying Management Tools

This interest in management tools appeared in the 1960s where tools (Chandler 1977, Berry et al, 1978) and engineering (Girin, 1981; Hatchuel and Weil 1992) have proliferated in the firm's everyday life. A prolific research field has arisen on the study of those tools and their expected and unexpected effects on individual and collective actions (Chiapello and Gilbert, 2013). Academics in management science (Berry, 1983; Hatchuel and Weil, 1992; Moisdon, 1997; David, 1998; Miller and O'Leary, 2007) have studied the effects and uses of tools on organized action and on the development of capabilities.

At the meso-level, the study of interaction between the rationality and the tools used started with the contribution of Cyert and March (1963), which introduced a behavioral approach of the firm. Through this perspective, firms are considered as coalitions of individuals or groups whose behavior is guided by the execution of routines. Those routines are resulting from the past experiences and considered as the behavioral expression of the firm. They are a constant, predicable and "visible" reaction of the firm to a management problem.

Since the 1970s, in parallel with those works, some researchers have focused on the "invisible" reaction of firms with a micro-level approach (Berry, 1983, Aggeri and Labatut, 2010). This invisible reaction of groups and individuals is unpredictable and induced by the management tools used. But this reaction remain rational and depends on the local environment where the management tool is applied (Berry, 1983, Moisdon, 1997). Thus, through in depth case studies, management research works have demonstrated that sometimes tools can induce actions and strategies. For Moisdon (2005) management tools have prescriptive role. That is to say that tools not only makes behaviors visible but it also guides and disciplines it. The same authors argue that sometimes management tools engender new actors and assigns roles to them and defines how the actors shall coordinate with others (Moisdon, 2005). Therefore, in management science a management tools is generally defined as *"a formalization of organized activity, of what it is or what it will be (all the reasoning and knowledge needed to inform the trilogy: plan, decide, control)"* (Moisdon, 1997).

Through this perspective the present paper propose to explore via cases studies the management tools used at the inter-organizational level to handle the coopetition tensions. In other words: how coopetition is institutionalized? What are the tools used to manage coopetition partnership? What are the effects of the coopetition tools on actor's rationality? And thus is a managerial engineering of coopetition feasible?

For this aim, we propose to analyze the case of the management of the coexistence between genetically modified and non-genetically modified production in the French grain merchant industry. After a liberalization of their markets which has increased the competition in their industry, French grain merchants have seen, during the last ten years after the introduction of GMOs(Note 1), a thorough overhaul of their industry which put all the operators in a strong interdependence situation: at the farmland level, the conduct of an operator who cultivates or produces GMOs can affect the well-being of others who do not want to. So this situation required the setting up of collective strategies and the emergence of new forms of governance. These methods of governance must enable coordination between all the stakeholders and particularly between rival grain merchants.

4. The Case Study Context: A Technological Innovation Engendering Market Segmentation and Interdependencies between Competitors

Grown and marketed in the world since the 1990s, GMO (genetically modified organisms) are the subject of fierce controversy. In France, after a moratorium of three months, the government decided to prohibit the growing of GMO in 2008.

The main cause of this different treatment is the existence of two opposing approaches. Some countries have adopted a "product" approach, basing the analysis of risk solely on the principle of equivalence of substance: only differences identified in terms of their chemical characteristics can justify a degree of specific statutory constraint. Europe on the

other hand adopted a "process" approach to licensing the sale of GMOs. By virtue of this approach, there is a need to evaluate the harmlessness of GMOs to human health and the environment before such authorization is granted. Hence, while in several countries GM crops are not considered as a category in themselves and do not require a specific market, in Europe the consideration of scientific observations and potential uncertainties has led to the segmentation of the market and required a modification of the institutional guidelines.

Before the prohibition (so from 1999 to 2008), the regulation imposed at the European level and the French bill on GMOs established the principle of coexistence between the various types of crop and the segregation of GMOs in the supply chains, by proposing legislation which does not forbid the sale of genetically modified plants, but which enables those who so wish to avoid consuming them.

For agricultural lands, several problems are posed by coexistence. It is necessary to consider the risks of admixture during the handling of a given material for sowing or collection (Jank et al. 2006) and above all, the risk of admixture by cross-pollination (Note 2) (EC, 2003 a and b). For this purpose, it is possible both to set up isolation distances between plots of land (Byrne and Fromherz, 2003) and also to stagger production over time (Messean et al, 2006; Scipioni et al, 2005).

So the questions which arise concern the implementation of the forms of governance allowing the coexistence in the field of GMO and non-GMO crops, as well as how to collect the two types of crop. At this level, whether it is for seed or food production, the grain merchants occupy a key position. Their position upstream of and downstream from the farmers puts them in a strong position to manage the farmland. Those companies are suppliers (distributors of seeds, inputs), advisers (they provide technical support), and clients (they harvest, aggregate, stabilize and transform the product, then commercialize it) of the farmers. Also, they are the only companies authorized to define the spatial and temporal distribution of crops (in order to establish a spatial specialization or a temporal isolation of a GM crop). All these considerations put those companies in a strong position to manage coexistence. But in the farming regions there are a lot of grain merchants who are in competition, and the success of coexistence involves coordination between these rival companies (Coleno and Hannachi, 2015).

For these rival firms, coexistence gives rise to two kinds of constraint, those involving the segregation of products and those involving management of the risk of admixture. These constraints encourage rival grain merchants in a given region to collaborate and to coordinate their activities. The management of segregation requires a sharing of resources (division of the landscape or sharing of the machinery used for each crop). The management of the risk of admixture requires a sharing of information, such as the location of GM crops, between rival firms.

In this context, our research question is how do rival grain merchants coordinate themselves to manage coexistence when it was allowed(Note 3)? Therefore what are the tools used to balance between competitive action and cooperative action and how they internalize the dialectics of coopetition? What are the levers to establish or manage a simultaneous and dialectical coopetition relationship?

5. Methodology

In order to analyze these relations and collective strategies, we use the case study method. More precisely, "*embedded multiple-case designs"* (Yin, 2003). First we made an exploratory investigation at the national level, and then we chose to make three in-depth investigations on three maize production regions concerned by the coexistence problem, and contrasting in terms of market structure and relationships between grain merchants. So we have three case studies. In each case, according to case study principles, the method consisted of increasing the sources of data (Eisenhardt, 1989) and in using an item of information, according to the principle of research by triangulation, only from the moment it appears in at least in two sources of different nature. The data analyzed in this case were obtained from public secondary sources (newspapers, professional reviews), from private secondary sources (documents of the network studied: title deeds, activity reports) and from a series of semi-directive interviews. We needed access to very sensitive data, relatively inaccessible because of their strategic nature. So, in-depth interviews turned out to be the most suitable method to collect primary data. We had a series of semi-directive conversations lasting between 1 and 3 hours with various people (leaders of grain merchant companies, executives of professional organizations, researchers, technical institute staff, etc.). After every interview, a summary was made and sent to the participants who were asked to add their comments, sometimes leading to additional conversations. This work is thus based on a series of 41 semi-structured interviews (total 72h06 records) and some non-participant observations (7 management committee meetings). We have accumulated data until reaching "data saturation" (when no new or relevant information emerges with sampling more data) (Strauss et Corbin, 1990). The size of this dataset has

enabled data triangulation and the exploration of plausible rival hypotheses (Campbell, 1994).From all the collected data, a case history was drafted, following the method proposed by Dumez and Jeunemaître (2005), from which we pursued the analysis to establish "patterns" using the method proposed by Miles and Huberman (2003).

6. Results

6.1 The Alsace Region Case

Maize is the dominant crop in Alsace (75 % of the region's land area is used for cereals) thanks to the continental climate, favorable to the growth of this crop. Outlets are mainly directed to human foodstuffs and benefit from the proximity of farm-produce processing industries (starch and corn meal in France and Germany).

In 1998, at the introduction of GM production in France, the main clients of the grain merchants of the region echoed the aversion of French and German consumers to GMO and began to offer contracts with bonuses for maize guaranteed free from GMO. In response the managers of the leading grain merchants of Alsace had an informal meeting and decided collectively to refuse to market or harvest GM-production. They agreed a procedure to manage the absence of GMO from their region:

- First, they collectively decided to use lobbying and communication to convince all the operators of the agrofood production chain of Alsace.
- To influence the seed companies, every delivery to an Alsace grain merchant was sampled and checked using the Elisa(Note 4) test. If a trace of GMO was detected, the whole delivery was returned.
- To influence the farmers, all the farmers' deliveries are sampled and every day all the samples are mixed and an Elisa test is done. If there is a trace of GMO the grain merchant sends a mail to all the farmers. The mail contains the certificate of analysis and the list of names of the concerned farmers. There is no tax or sanction for the farmers. They just use the social pressure (between farmers) to manage the free-riders.

As a result of this collective strategy, and over time, the Alsace maize industry has acquired a reputation on the market from which all its members benefit.

Faced with a changing demand for non-GM products and having to manage such a proportion of maize in the region, the Alsace grain merchants took a regional collective decision only to produce non-GM maize, and they succeeded in convincing all their farmers. The process underlying the constitution of this collective strategy between grain merchants is informal: it arose from a direct dialogue between grain merchants' executives.

If the Alsace grain merchants had not chosen to refuse collectively to produce GMO maize, each of them would have been subjected to a risk of admixture and thus a loss of market. There would then have been much uncertainty about a key environmental variable, which an individual firm could do little to remedy. By means of several measures organized collectively, always via informal coordination, the results showed that the infringement of a 0.1 % threshold (of GM in non-GM) was always avoided(Note 5). This informal way of operating which characterizes the Alsatian industry is based on reliable relations and a very specific culture where dialogue is the normal practice. So the way the Alsatian system works is partly due to social and cultural features of the region in which it exists. It is about a region with a very marked identity and its own way of working.

So in this case the mechanism of coordination between rival firms is based on an informal direct dialogue between the managers: a sort of gentlemen's agreement.

6.2 The South-Western Case

The south-western region is the main French (and indeed European) region for grain maize production, with 600 000 ha of maize on average, so a third of the French grain maize area. The maize market is very segmented there and characterized by the presence of a large number of grain merchants in strong competition, severe problems with stalk borer (to which the GM maize is resistant) and a nearby demand for GM corn from the Spanish animal feed market.

At the introduction of GM production in France, the grain merchants of this region decided to hold a formal meeting. They agreed to negotiate and to establish a collective charter called the «big south-western maize quality charter» (BSWMQC). This charter establishes recommendations for practices and the organization of the space for the management of coexistence: definitions of acceptable distances between GM and non-GM crops, good neighborhood practices etc.

This agreement was made in 1999 on the initiative of several grain merchants in the south-west in response to some

of their clients who wanted guarantees on non-GM purity. In 2000 an association (BSWMQC association), was formed of approximately 140 grain merchants in the south-west. Membership was voluntary and the association is administered by an assembly of grain merchant companies. The association has succeeded in federating all the grain merchants of the region then other stakeholders (seed companies, farmers' unions, etc.) were invited to participate as associate members. To manage the other operators of their cluster, those grain merchants use contracts and market mechanisms.

In 2004, the association published a "Guide to Good Hygiene Practices", a technical reference book written collectively. As well as the GM problem, the charter takes into account all the pest and disease problems of the maize grown. The association also created a standard making it possible to identify the goods produced under their specification. The use of this mark by the signatories of the agreement is authorized subject to strict conformity with the measures established in the charter. To this end, the association has built up a partnership with the National Interprofessional Cereals Office to verify conformity with the requirements of the Charter by grain merchants' signatories. It has led to the "Class A standard quality corn", which is used by the south-western grain merchants as a market benchmark.

Their standard is based on a "best efforts obligation" approach and no result is guaranteed. By this standard and their union these grain merchants have succeeded in rejecting all their clients' requirements which were considered to be too restrictive and costly. They also succeeded in imposing their standard on their suppliers (the farmers) and their clients. This enables them to preserve all of their outlets (GM and non-GM) and the competitiveness of their product on the global market.

The grain merchants of the south-west region went even further: they share their silos to reduce the transport costs of their farmers and they also share the strategic access points to the global market (port infrastructure, canal basin, cargo terminal, goods railway station, etc.). This coordination has enabled them to improve access to the international market and the visibility of their products, given that on the market they share the same identity and the same selling price because of the system of regional marketing of cereals (Free On Board systems).

So in this region the grain merchants have established a working platform grouping together the various stakeholders in the corn industry, whose objective is to set up, guide and promote their approach.

In their context, in the event of accidental admixture of GMO and non-GMO grain, the system of traceability makes it possible to go back to the silo of the grain merchants, but it is impossible to go back any further (Luthy, 1999). Hence the grain merchants were in the position that if they did not take responsibility for organizing the crop and its segregation, they would have been held responsible for any mistakes, risking degrading the brand image of their products and losing market share. This situation of interdependence led to the emergence of this formalized system in order to attempt a collective management of coexistence. Moreover, in this region, some grain merchants share a geographic information system and collective database managed by a third party (a Certification firm) which allows them to zone crops before seeding and to evaluate and manage the risk of admixture during the harvest.

So in this case the rival firms formalize all their engagements and procedures. When coordination is needed, the rivals engage a third party (National Interprofessional Cereals Office, certification firm,…) or create a distinct organization (BSWMQC association). So the mechanism of coordination is formal and indirect.

6.3 The Isère Department Case

Maize is the dominant crop in the Isère department. The outlets are very diversified (livestock feeding, starch, corn meal, etc.) but in this regional demand fluctuates and there is no regular client for the Isère corn. On the north European markets, the Isère cluster is overtaken by the Alsace production and on the Mediterranean and international markets they have a serious threat from the south-west region.

At the introduction of GMOs in France, no grain merchants in the Isère department marketed GM product. Their region is topmost in terms of number of farms certified for organic(Note 6) production (14% of the region's land area is used for organic production). The organic market is very important for their region and the grain merchants have an interest in preserving this market(Note 7). There was neither coordination nor dialogue between grain merchants and it was a sort of collective herd behavior. But soon a "free rider" appeared: a small grain merchant sold GM seeds and prepared to harvest and to market GM productions. At that time, there was an obligation to notify every GM crop to the town council. So the news of the presence of GMOs in the Isère department leaked out. In consequence the demand for Isère corn has decreased and the whole Isère cluster were in crisis. Because of the fragmented field pattern and cross pollination, no one can guarantee the purity of his production or the absence of GMOs. This situation leads to significant market losses.

Faced with this crisis, those grain merchants were not able to coordinate themselves. The local context is characterized by a strained relationship between grain merchants and there is no market leader. So in this case there was a self-coordination failure.

At that moment, in the end of 2006, an independent third party (the Chamber of Agriculture(Note 8)), which seems legitimate to anyone in the Isère industry, intervened and created a sort of "mediation arena": the Strategic Council of the Isère Cereals Industry (SCICI). This council was situated in the Chamber of Agriculture headquarters and all the grain merchants and the farmers' unions were invited to join in. The first meetings were stormy and there were many absences. But with time a dialogue has emerged and the grain merchants started cooperating. In 2007, for the first time, they have decided to share information on GM crop locations in order to manage the risk of admixture. Then, for the long term, they decided to set up a collective strategy based on a non-GM specialization. So they have collectively invested in the local starch industry (the starch market, like all human food products, is a non-GM market in France). They have developed a local non-GM demand and they display a collective brand image on the European market as a non-GM supplier.

After the GMO crisis, the grain merchants took over the strategic council and started cooperating without the need of an independent arbiter nor formalism. Many collective actions have been launched without the Chamber of Agriculture. As an example they have decided to specialize in sunflower oil production and to drop non-oil sunflower (as for the GMOs, there are cross-pollination problems between oil and non-oil sunflower production). As another example, all the grain merchants have decided to launch coordinated actions to develop the local organic market (they have succeeded in increasing the market by 10 % in two years). In these examples the Chamber of Agriculture was bypassed and the grain merchants had direct and informal consultations.

So in this case we have an absence of coordination between rival grain merchants which lead them to a sectoral crisis. But with the intervention of a third party that had legitimacy in the eyes of all and the creation of a "mediation arena" the cooperation between rival firms has emerged. The relationship between competitors has evolved from a relationship without coordination, to indirect and formalized coordination, then to direct and tacit coordination.

7. Discussion

7.1 Differing Tools to Manage Coopetition Relationships

In this study, we have attempted to minimize the context variables. So in a given country and institutional framework, we distinguish different process. Those three groups of rivals develop and use differing tools to manage the coopetition "paradox" and we find different ways of coopetition institutionalization.

7.1.1 Tacit Convention and Social Pressure

As shown in the Alsace case the tensions of coopetition can be managed through an informal mode, based on tacit agreements. These agreements become management tools of the collective good shared between operators. This coopetition is institutionalized by a set of rules socially accepted as a sort of social institution**,** i.e. a mechanism of social order and cooperation governing the behavior of a set of individuals within a given community.

The firms are interacting together in a social system. Over time, actions or mental representations of each other's actions eventually become habituated into reciprocal roles played by the actors in relation to each other. When these roles are made available to other members of the community to enter into and play out, the reciprocal interactions are institutionalized. The rules which become a collective management tool are built and maintained by interactions. This form of coopetition rests on a strong embeddedness of the competitive relations (Granovetter, 1985). The social and historic embeddedness provides a decisive advantage to the firms who cooperate "spontaneously" without the need for contracts or market mechanisms (Uzzi, 1997).

This embeddedness favors the emergence of collective strategies and natural parallelisms. The reactions of an operator to the actions of the others are no longer directly connected but entangled in a complex social fabric which is implicitly absorbed by firms (Emery and Trist, 1965). The main form of coordination is by personal contact. The survival of the collective strategy does not depend on economic penalties but on social sanctions. The free-rider is excluded from the strong social links which connect the players. He pays for his divergent behavior by being mistrusted.

7.1.2 Formalism and Third Party Involvement

As shown in the south-western case, sometimes the rivalry and the nature of the trust between firms seem to prevent any direct coordination. Collective action has to rely on a third party and on formal agreements. The competitors do

not wait for the intervention of this "trusted third party"; they engage him and fix his functions. This formality and the involvement of the third party allow them to establish trust between competitors. Then they institutionalize their cooperation by a formal structure and create a third shared organization. So this form of coopetition is less dependent on embedding. It rests on contractual relations and legal sanctions are used to control and preserve the collective strategy. The creation of the code of conduct is negotiated collectively in a formal framework with the presence of the third party. In this configuration firms create collective management tools and a common system of reference (standards, good neighborhood rules, etc.).

7.1.3 Coopetition Inducer and Arena of Mediation

As shown in the Isere department case, sometimes the operators are not able to generate collective actions or to coordinate themselves. However, by the intervention of a legitimatized third party and the setting up of a "mediation arena" at the disposal of the firms, the rationalities of the concerned actors evolve and dialogue and trust emerge. Afterwards, the firms appropriate this mediation arena which becomes a management tool of the community of interacting firms.

In that process, initially there is no embeddedness, no shared culture structuring the interactions and no common goods. But later we see the relations between firms "artificially" embedded through the mediation arena. The organizations start sharing faith, recipe and jargon (Spender, 1989) and they collectively build and defend the common goods.

In the coopetition literature, this process is particularly novel. It is not unusual to find coopetition interactions institutionalized in the hands of public authorities (Le Roy, 2008; Depeyre and Dumez, 2010) or in the hands of the competitors (Bengtsson and Kock, 2000; Roy and Yami, 2009; Czakon, 2010). In those situations, the institutionalization and the setting up of the collective management tools (whether they are public or private) follow the emergence of the coopetition strategy. However in this form of emergence, as highlighted in the case of the Isère grain merchants, the institutionalization of the cooperation between rivals precedes the cooperation itself. The setting up of the management tools allows the emergence of the coopetition.

Otherwise, the literature abounds in empirical evidence of the use of formalism and third party involvement or creation of a third shared organization for the management of coopetition relationships. (Browning et al, 1995; Bengtsson and Kock, 2000; Fjeldstad et Al, 2004; le Roy, 2008; Gueguen, 2009; Roy and Yami, 2009; Czakon, 2010; Gnyawali and Park, 2011).

The use of tacit conventions and social pressure epitomizes process akin to "unlawful agreements" or cartels such as observed for example in the American cement industry (Dumez and Jeunemaître, 2000). These ways of working, based on tacit agreements and herd behavior, are generally less studied because of their intangible nature but also because they are considered illicit and thus should not exist. Nevertheless informal coordinations really do exist, and as shown in the case of the Alsace grain merchants, they do not always aim to collude or to abuse of a dominant position. They can emerge to protect a public interest(Note 9).

7.2 The Multiple Uses of the Third Party Driver

The role of the third-party in the management of coopetition strategies has been empirically investigated (Bengtsson and Kock, 2000; Rindfleisch and Moorman, 2003; Madhavan et al., 2004; Depeyre and Dumez, 2010). For Bengtsson and Kock (2000), according to the separation principle, the third-party can be entrusted to manage one dimension of coopetition *i.e.* the collaboration. Rindfleisch and Moorman (2003) show that the control by a third-party can reduce the perverse effect of coopetition on the market orientation of the partners. Many works shows that the third-party is acting like a broker in a strategic network, helping partners to manage coopetition (Madhavan et al., 2004). These findings are corroborated by our empirical observation in the grain merchant industry. As shown in the south-west case where rivals involve certification firms or national and joint-trade organization offices. Organizations can also create a third structure for the maintenance of the coopetitive relationship, such as the "BSWMQC association" in the south-west case, or that described by Bengtsson and Kock (2000) (Note 10) But sometimes there no need for a third party (Cf. Alsace case).

Moreover, the literature often considers coopetition as a preexisting phenomenon neglecting that coopetition can also be an emergent process (Mariani, 2007; Depeyre and Dumez, 2010, Pellegrin-Boucher et al., 2013). Some original researches show that the regulator can influence the market structures to favor the emergence of competition or cooperation (Mariani, 2007) and in the case of a monopsony the single customer can influence the firm's behavior with inducements to competition or to cooperation; indeed to a definite mix of both (Depeyre and Dumez, 2010). These vision of emerging coopetition seems to be opposed to the vision of coopetition as a deliberate strategy. Ours

work on grain merchant industry enables to overpass this dichotomy: in the south west and Alsace cases, we find that the institutionalization of coopetition and the setting up it's management tools have follow the deliberate decisions (and thus the emergence) of coopetition strategies. But in the same industry, our empirical observation on Isère grain merchants cluster, the institutionalization of the cooperation between rivals can precede the deliberate decision to opt for cooperation. In our observation in the Isere case, there isn't a dominant actor forcing the firms to coopetition. But the setting up of the management tools by a third party (which is not a public authorities) allows the emergence of the coopetition behavior.

So the role that third parties can take on can be considered in two ways:

- They can take on the role of a "facilitator", i.e. someone who intervenes in the mechanisms of coordination to manage critical tasks or tasks which are considered as too sensitive by coopetitors (e.g. the role of the third party in the south-west case).
- They can also be the one who induces the coopetition. That means that they participate in developing a shared rationality and persuading the competitors to consider cooperation (as in role of the third party in the Isere department) but we can also envisage that they may cause partners to compete.

So this research shows that an external party can induce the coopetition and bring rival firms to consider a coopetitive relationship despite unfavorable past and present circumstances. This point leads to the prospect of a managerial engineering of coopetition.

7.3 Matching Tools with the Natures of Trust and Rivalry

It is important to emphasize that the two first ways of working find in this study (the Alsace and south-west cases) do not differ in the degree of trust or the level of rivalry between firms but in the differing natures of trust and rivalry.

Trust and distrust (Lewicki et al, 1998), rivalry and partnership (Lado et al, 1997) are generally seen as opposite ends of a continuum. But those visions of trust and rivalry are disputed in the literature (Hoffeman et al, 2010; Dagnino et Padula, 2007).

In the case of trust, some scholars consider trust as generic variable which can be measured and, all other things being equal, can be compared (Dyer, 1997; Bigley and Pearce, 1998; Das and Teng, 1998; Das and Teng, 2001). For example, in the Transaction Cost Economic perspective, trust can be interpreted as a positive expectation regarding the degree of opportunistic behavior and this variable shape the inter-organizational structure and contract design (Gulati and Singh, 1998; Poppo and Zenger, 2002). But research has showed that the opportunism-mitigating role of trust denotes a restricted view of trust because it focuses on opportunism only (Mollering, 2006). The role of trust is reduced to avoid the negative consequences of opportunistic behavior, whereas positive effects of trust on organization (as better coordination and communication) are neglected (Lindenberg, 2000). Other academics (Luhmann, 1979; Robinson et al, 1991) demonstrated that trust and distrust are beliefs and cannot be reduced to simple opposites. These authors have showed that trust and distrust allow rational actors to contain and manage social uncertainty and complexity, but they do so by different means.

In the case of rivalry, organizational researchers have viewed rivalry mostly from the perspective of the structure of the environment. Many scholars consider that rivalry is a continuous variable environmentally determined. (Mason 1974; Porter, 1980; Degryse and Ongena, 2005). But works have demonstrated that rivalry is an "endogenous product of managerial minds" (Porac et al., 1995). This perspective underlines the importance of "local sensemaking" and the "open-endedness of industry models" in the definition of the rivalry. Through this cognitive behavioral-based research, the rivalry appears as a local social construct.

In our study, in view of the results presented and the type of mechanisms of coordination chosen, we would have thought that those who work with direct tacit agreements (the Alsace case) have more trust and less rivalry among competitors than those who need formalities or intermediaries to enable collective action (the south-west case). Nevertheless in the south-west case the competitors go as far as mutualizing infrastructures between competitors, which is not the case with the competitors in Alsace.

Moreover, for a grain merchant, harbor silos represent the major investment. In the south-west all the harbor silos are shared by the grain merchant of the region in order to benefit from economies of scale. In Alsace, the harbor silos are individually owned and their high cost is accepted as an element of the competitive game. According to the Alsatian managers, it is "totally unthinkable" to share a harbor silo with a competitor. This shows that trust and rivalry do not always express themselves on the same objects in the same way, and that is what influences the inter-organizational way of working. So to be efficient the tools used to simultaneously carry out competition and cooperation need to be

adapted to the nature of trust and rivalry. These two attributes are intersubjectively shared (Burrell and Morgan, 1979) by competitors and strongly linked the social context.

7.4 Managing Coopetition Strategies at the Inter-Organizational Level

The economic view on strategies as rational choices has long been criticized for its undersocialized view of human behavior (hofferman, 2010). In behavioral decision theory, the "game environment" is devoid of real context information, and the incentive structure in place predetermines behavior (Johnson-George and Swap, 1982; Lewis and Weigert, 1985; Pearce, 1974; Tardy, 1988). But firms and transactions are frequently embedded in social relationships and the unsocialized view of human behavior limits the scope and validity of an economic analysis of strategies (Granovetter, 1985). However, the organizational literature gives limited attention to social context and relationship dynamics (Parac et al, 1995; hofferman et al, 2010). We can attribute this gap on the role of social context on organizational behavior to the fact that our understanding of interfirm relationships is still in its infancy (Greenhalgh, 1995; McAllister, 1995; Porac et al, 1995; hofferman et al, 2010).

Our in-depth study on coopetition practices in the grain merchant industry in France shows that coopetition strategy is grounded in shared interpersonal concern (McAllister, 1995). It refers to shared expectations, understandings and values. A sort of a common language and a common view of the world (Uzzi, 1997; Rousseau et al., 1998; Mollering, 2006).

We find that this social constructivist view of interfirm relations is important to understand the diversity of coopetition phenomenon reveled by his study. This social constructivist view appear also important to engage and manage a coopetition relationships. We find that some tools can impact the firm rationalities and change the social construction dynamics of interfirm relationship.

Porac et al (1989) have shown that competitive groups are “cognitive communities” i.e. they share faith, recipe and jargon (Spender, 1989) but also a mental model about competition. This supposes that in a given community of interacting firms, there are individual rationalities but also a shared rationality (figure 1). When the shared rationality prevails, firms develop collective herd behavior. The competition dimension can express itself in a frame defined collectively. So the coopetitors socially construct tools, rules and social representations to preserve and maintain the coopetition relationship (such as tacit agreements and the territory brand image in the Alsace case). When strong individual rationalities coexist with a strong collective rationality, firms set up an inter-organizational devices to manage the coopetition relationships, preserving the individual logic and enabling collective actions by an externalization of a part of the coopetition paradox (appeal to trade association, holding company, R&D consortia, other third parties or use of formalism, standards, charter, etc.). When the individual rationalities predominate, coordination and collective action fail and the “free-riders” proliferate. In this context the intervention of a third party and the setting up of a mediation arena can change the rationalities and enable and reinforce collective action and reason. So those are efficient tools to induce coopetition.

Table 1. Coopetition Management Tools and the Collective and Individual Rationalities

		The Collective Rationality	
		Weak	Strong
The Individual Rationalities	Weak	Peaceful and sterile coexistence (No coopetition. Avoidance behaviors and strategies)	Social institution, social pressure, tacit convention and shared social representations
	Strong	Mediation arena and coopetition inducer	Formalism and third party involvement, shared standard or holdings

In fact, this cognitive community doesn’t go by itself: a manager who wants to establish or pursue a coopetitive relationship must maintain it by formal institutions (e.g. a trade association or other formal structure where coopetitors enter into dialogue) or by informal institutions (tacit agreement, social pressure for conformity, shared symbols and social representations etc.). We can also favor its emergence and construction by putting a mediation arena (or collective tools for the management of the group) at the disposal of the competitors.

8. Conclusion

Despite the surge of scholarly interest on coopetition and its drivers and outcomes, less attention has been paid to the management tools associated to coopetition and how coopetition is institutionalized at the inter-organizational level. We have focused on this science gap and through several case studies on the management of GMOs in the French grain industry, this study demonstrates the existence of different tools to manage collectively coopetition at the inter-organizational level. Some tools find by our research (tacit conventions, mediation arenas, coopetition inducers) seem particularly novel in the coopetition literature. The use of tacit convention and social pressure in the Alsace case epitomize the embeddedness and the social construction of the coopetition relationship. The Isere case reveals that some tools can change interfirms rationalities and dynamics giving rise to coopetition.

As managerial implication, this study shows that inter-firm coordination can take place in a direct and informal way, without being locked into a rigid structure and without collusion. Moreover it shows that an external party can induce coopetition and bring rival firms to consider a coopetitive relationship. This point leads to the prospect of a managerial engineering of coopetition which can enable the setting up of a coopetition relationship despite unfavorable past and present circumstances. This point leads us to propose some tools and drivers to set up and manage coopetition relationships.

The qualitative methodology used in this research limit the generalizability of the empirical results to other cultural contexts and to other industries. It would be particularly interesting to investigate if it exists and works in other industries and contexts. It would also be interesting to study the efficiency of those mechanisms. Where are they relevant and where are they useless? In environments where the economic actors are not embedded in a dense network of relationships, are the effects that rely on social embeddedness less prominent? What should we do when individualism and competition become keener? In this case should we encourage more flexibility or more rigidity of the inter-organizational relation? Future studies should seek other mechanisms for coopetition management with a multilevel approach (individual, organization, inter-organization and network levels). Such work could give rise to a managerial engineering of coopetition.

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Notes

Note 1. A Genetically Modified Organism is an organism whose genetic material has been altered or modified using genetic engineering techniques. Those organisms can be used to produce food, fibers or pharmaceutical drugs.

Note 2. Cross-pollination, also called allogamy occurs when pollen is delivered to a flower from a different plant. In the case of GMOs, the result is that a farmer who sows non-GMO seeds may harvest a GM product.

Note 3. In French the only GMO authorized was the Bt maize and it is prohibited since 2008. By the way our studies is focused on the period where GMO was grown in France so from 1999 to 2008.

Note 4. Enzyme-linked immunosorbent assay (ELISA), is a biochemical technique used mainly in immunology to detect the presence of an antibody or an antigen in a sample, so it can detect GMOs.

Note 5. All the grain merchants apply the same procedure: they refuse to distribute, to harvest and to market GM production, they set up Seeds control (ELISA Test), And they try to control of the farmers using communication and ELISA Test to control purity.

Note 6. Organic foods are foods that are produced using methods that do not involve modern synthetic inputs such as synthetic pesticides and chemical fertilizers, and which do not contain genetically modified organisms.

Note 7. The local market benefit by a brand image as an organic supply. The presence of GMOs can damage this collective reputation.

Note 8. Body responsible for the agricultural interests of a department. A sort of consultative body created in France by a national act at 1924 and constituted by local members who are elected by universal suffrage at the department.

Note 9. Here the rival coordination does not aim to exclude competition, but to enable a better and profitable management of the coexistence and everyone of the Alsace maize industry seems to benefit from this collective strategy (each level of the supply chain get bonuses) (Hannachi et al, 2010).

Note 10. Bengtsson and Kock (2000) underline in a study of the Swedish and Finnish industries that in some cases where individuals may be involved in both cooperative and competitive activities, an intermediate actor (a collective association in their case) is needed.