



Strategizing and Managing coopetition : Sharing, protecting and/or capturing knowledge

Sea Matilda Bez

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THÈSE POUR OBTENIR LE GRADE DE DOCTEUR DE L'UNIVERSITÉ DE MONTPELLIER

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Strategizing and Managing coopetition *Sharing, protecting and/or capturing knowledge*

Présentée par Sea Matilda Bez
Le 22 novembre 2017

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et Stéphanie Dameron

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“Make the most of the useful knowledge out there”

Henry Chesbrough,

Video Interview, Open Innovation between competitors, Labex, 2017

Strategizing and Managing Coopetition

Sharing, protecting and/or capturing knowledge

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Montpellier, 2017

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ABSTRACT

We investigate how a focal firm strategizes and manages coopetition through the specific lens of knowledge sharing. Based on two case studies of two firms considered as masters in the management of coopetition, we identify three ways to create and pursue the focal firm's current and future advantage in a coopetitive project. The two first ways confirm the dominant research approach of coopetition which argues that a focal firm should reduce the coopetitor's internalization of the knowledge shared. Or, even obstruct it totally (i.e. reduce or restrict totally the focal firm's knowledge transparency). Indeed, the value creation of a coopetitive project's success can be jeopardized by the fear of knowledge sharing between competitors. The reduction or restriction of its knowledge transparency is a key organizational solution to overcome this fear of knowledge sharing and thus this fear of collaborating with a competitor. Alternatively, we identified a third way of strategizing and managing coopetition which goes one step further. By building on our empirical results, Deutsch's theory of conflict resolution and Nonaka's organizational knowledge creation theory, we argue that the creation and pursuit of current and future advantage for a focal firm in a coopetitive project can also consist of implementing a strategy and management based on greater and freer transparency. In that case, the dominant coopetitive knowledge sharing adages of "protecting" or even "sharing and protecting" shift into "sharing and enabling for constructive capturing." This third way opens academic research opportunities based on broader theoretical roots than Hamel's approach of inter-firm relationships in which the strategic intent is a learning race and one of the key organizational elements is minimized transparency. This third way also has managerial contributions. Indeed, it increases top management analytical capability by generating a new counter-intuitive insight: enabling a competitor in a coopetitive project can be strategic tool to create and pursue current and future advantages for themselves. Moreover, our integrated framework can be reused to train top managers' analytical coopetitive capabilities by making them aware about three ways of strategizing and managing coopetition.

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Introduction

Imagine two discoveries generating \$100 billion. This is not fiction. It is the global revenue generated by two discoveries of the pharmaceutical company Sanofi¹. However, to reach this level of revenue, Sanofi did not do it on its own. It was achieved by involving one of its main American rivals in the processes of developing and commercializing the two discoveries. Carlin et al. (1994) would say Sanofi succeeded by “sleeping with the enemy”(p.9). But, Sanofi did not just “sleep with the enemy.” Sanofi and its rival Bristol-Myer Squibb enabled each other. Through this collaboration between rivals, they learned strategic knowledge from each other and strengthened each other’s status. For example, Sanofi learned how to obtain an American marketing authorization and created a status of a strong company able to develop qualitative blockbusters in America. Sanofi’s rival, increased its efficiency in accessing the European market and strengthened its status of a big pharmaceutical company in Europe. This empirical fact acknowledges that competitors can simultaneously engage in competition and cooperation with each other and that these relationships can generate huge current and future advantages for the focal firm. Thus, the focal firms are not only capable of acting against their automatic impulse of ignoring, avoiding or fighting their competitor (Carlin et al., 1994), but they can even go one step further by enabling their competitors with their own strategic knowledge. This fact is a puzzle as it violates the traditional business practice of being in a win/lose relationship with a competitor (Brandenburger & Nalebuff, 1996).

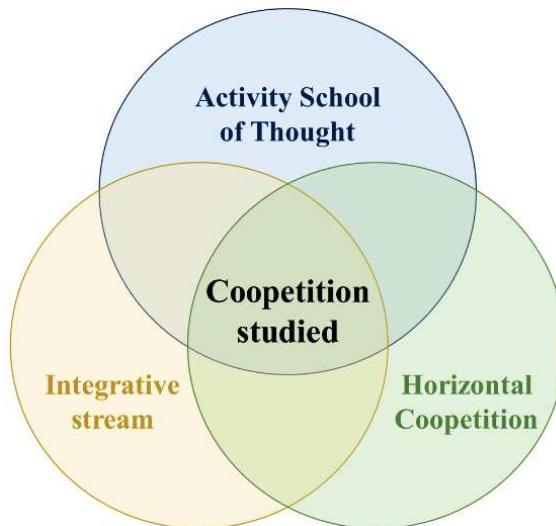
The research object

Since the late 90s, the term “coopetition” has been used to refer to these business relationships which are characterized by the simultaneity of cooperation and competition (Brandenburger & Nalebuff, 1996; Dowling, Roering, Carlin, & Wisnieski, 1996). If the neologism seems very simple to understand at first glance, the reality is much more complex. Indeed, defining coopetition is a complex task due to the wide variety of existing definitions which refers to different streams of research: the actor school of thought (i.e., coopetition can be a network context) *versus* the activity school of thought (i.e., some direct simultaneous cooperative and competitive interactions); the vertical coopetition (i.e., occurs with non-direct competitors) *versus* horizontal coopetition (i.e., occurs with direct competitors), the integrative stream (i.e., explain the simultaneous pursuit of competition and cooperation with

¹ We obtain this amount by summing the sales of the two drugs on Sanofi’s annual accounting document.

a greater focus on value creation) *versus* interplay stream (i.e., explain the influence of cooperation or competition on the other dimension and with a greater focus on value capture). In this doctoral research, we define coopetition as the simultaneous commitment of a focal firm in cooperative and competitive activities with its direct competitor. This definition results from the overlap of three streams: the activity school of thought, the horizontal coopetition and the integrative stream (cf. Figure 1).

Figure 1 ~ Our definition of coopetition



Source: See Matilda Bez doctoral research, 2017

This definition of coopetition highlights the idea of commitment. Although, the commitment in competitive actions is obvious since the partners are direct competitors, the commitment in cooperative actions between competitors is more challenging. Gnyawali and Charleton (2017) have already emphasized that the commitment of strategic resources for co-creation is likely to impact firm performance. They even consider the commitment of strategic resources as one additional conditions to characterize a coopetitive relationship. However, the outcomes of committing strategic resources are not unanimously positive. It can generate the erosion of the current or future competitive advantage. This erosion is called “outbound spillover rent” (Lavie, 2006) or “negative reverse-impact” (Ghobadi & D’Ambra, 2011; Loebecke, van Fenema, & Powell, 1999). One of the main reasons of this erosion is that the idiosyncratic superior resources are firm’s ‘*raison d’être*’. These strategic resources need to be shared for the success of the project. But by sharing them, they take the risk that the competitor internalized them. Thus, they are directly contributing to weakening their competitive advantage (Bouncken, Fredrich, Ritala, & Kraus, 2017; Fernandez & Chiambaretto, 2016).

The interesting contribution of the term of coopetition is not that it emphasizes that competitors collaborate together. These collaborations date back to Roman times (Mira & Le Roy, 2014) and the reasons for engaging in this specific collaboration are well-known and multiple (Carlin et al., 1994). For instance, a competitor can be the only partner to have the resources needed to unlock the potential of the discoveries (e.g., assets, money or status) (Gnyawali & Park, 2011; Srivastava & Gnyawali, 2011). The interesting contribution of coopetition is that it invites the rethinking of the business relationship between competitors. These business relationships are not only competitive or collaborative. They are both simultaneously. As we explained, the success or survival of a focal firm can be paradoxically rooted in a sharing of strategic resources with a competitor. The firms can not only be competitive. Similarly, this sharing might lead to the erosion of its competitive advantage. The firm can neither only engage in collaboration with its competitor. Based on this acknowledgment, the coopetition performance relies on the focal firm's capacity to obtain a clear and accurate understanding of (1) the contradictions and dualities in coopetition, (2) the implication of these contradictions and dualities on firms' analytical capability (Gnyawali, Madhavan, He, & Bengtsson, 2016). As previous studies have focused on coopetitive tensions as a whole and show that coopetitive contradiction or dualities are multidimensional and can arise at different levels (Chiambaretto & Dumez, 2016; Fernandez, Le Roy, & Gnyawali, 2014; Tidström, 2014), Fernandez & Chiambaretto (2016) to call for deeper insights into one contradiction or dualities as the one concerning knowledge sharing with a competitor. **Thus, there is a practical and academic need to focus on one contradiction or duality due to coopetition.**

Research question

To fill these needs, we decided to look deeper into the research question of: “**How do firms strategize and manage coopetition through a knowledge sharing lens?**” To explain our choice of approaching the strategizing and managing process through the knowledge sharing, we need first to define the concept of knowledge and knowledge sharing. Defining it is key because knowledge is a multifaceted concept and its meaning changes depending on the research. A dictionary like the Oxford dictionary defines knowledge as a set of “facts, information, and skills acquired through experience or education; theoretical or practical understanding of a subject.” The idea behind this definition is that knowledge can be generated on its own (i.e., by practicing), or by interacting (i.e., theoretical). Based on our research interest which is the coopetitive relationship, it is interesting to dig deeper into the

idea that through interaction it is possible to generate knowledge. By interacting on individual benefit from an analogy processes (Nonaka, 1994) This individual continuously compares what he observes or receives as information to initial belief concerning a situation or the act related to this situation. Each comparison creates knowledge by reinforcing their initial belief or restructure it to take into account the discrepancies. Based on these definitions knowledge cannot be shared, what is shared is a flow of information derived from the sender's belief.

These flows of information shift into knowledge for the receiver when it brings qualitative content that impacts the receiver's initial belief. There can be a huge amount of flow of information which does not impact the receiver's initial beliefs (e.g., the information received is secondary or obsolete). On the contrary, very narrow information can be shared, and this information can have a huge impact on the receiver's beliefs. For instance, information on a shift in their common environment that the receiver had not perceived yet can change all of the focal firm's strategy (Baumard, 2009). It is why, the strategic state of coopetition does not concern the quantity of information shared, it concerns its capacity to change the receiver's initial belief (Nonaka, 1994). Thus, when we refer to "knowledge sharing," we refer to this information sharing which impacts the receiver's initial belief and its ability to understand a situation and to act on it. This knowledge sharing of a sender is *a priori* to strengthening the receiver. Moreover, behind this definition of knowledge sharing there are two other ideas. Firstly, its conception is very broad, it can include assets such as technology or resources, or tacit knowledge such as know how or intuition. Secondly, this definition of knowledge sharing refers to a proactive and deliberate action, in contrast with knowledge leakage (Ritala, Olander, Michailova, & Husted, 2015). It relies on a deliberate flow of information coming from the beliefs of the sender to impact the receiver's belief. Thus, referring to knowledge sharing, or one of its components, excludes direct reflection about unplanned or unwanted leakage. To sum up, we define knowledge sharing as a deliberate action from a sender which strengthens a receptor by improving its understanding of a situation or its way of acting. Thus, when a focal firm is sharing knowledge in a coopetitive relationship, the focal firm is enabling its competitor. This definition of knowledge sharing stresses out the paradox of engaging in knowledge sharing with a competitor.

As we already highlighted in this introduction, several researchers have emphasized the risk of asymmetric knowledge sharing. Asymmetric knowledge sharing can end as an out-learning. These potential negative outcomes can jeopardize the collaboration and the sharing of knowledge considered as crucial especially in coopetition projects for radical innovation

(Fernandez, Le Roy, & Gnyawali, 2014). Indeed, Fernandez et al. (2014) highlighted a coopetitive project in which at the beginning of the collaboration the experts did not share the strategic knowledge and these actions jeopardized the project's success. The fear of allowing the coopetitor to internalize the strategic knowledge was a barrier to collaboration. In reaction to this paradoxical situation of sharing strategic knowledge with a competitor, different managerial solutions have been identified (Baumard, 2010a; Fernandez & Chiambaretto, 2016; Jarvenpaa & Majchrzak, 2016). Recently, Fernandez et al. (2017) even highlighted that depending on the strategic intent of the coopetitive project; the firms were not implemented the same project design: a separate project team for coopetition projects for incremental innovation and a coopetitive project team for radical innovation. Depending on the project design, the degree of knowledge sharing changes. In a radical innovation project, based on the coopetitive project team knowledge sharing is high. But, in an incremental innovation project knowledge sharing is low. They bring the empirical proof that knowledge sharing is possible between competitors, but the degree might change depending on the strategy of the firms. Thus, they confirmed Gnyawali et al. (2008) who argue that there are multiple ways of strategizing coopetition. Indeed, according to their work, coopetition strategy refers to "the ways in which firms simultaneously compete and cooperate in order to create and pursue current and future advantage for themselves" (p.386). By putting an "s" to ways, they open the door to the idea that they might be several ways to do it.

However, these two project designs do not explain the Sanofi case mentioned earlier in which both competitors enabled each other. in both project designs, the degree of knowledge transparency is low or restricted. The degree of transparency refers to a more or less permeable membrane between the two competing firms. The more the membrane is permeable, the more the coopetitor is able to internalize the knowledge share. Reciprocally, the less the membrane is permeable; the less likely the coopetitor is able to internalize the knowledge. In both the separate project team and the coopetitive project team, the management creates proactive barriers to obstruct the coopetitor's knowledge internalization (Fernandez & Chiambaretto, 2016). Thus, the current project designs, identified by the coopetition literature, cannot explain the strategic intent behind enabling the competitor. In addition they do not characterize a project design which could allow this counter-intuitive enabling action. So, this opens a research opportunity.

By apprehending why actors act differently than what is predicted by the literature of coopetition, our doctoral research brings a more comprehensive and nuanced understanding of the strategizing and the managing of coopetition (i.e., why does the focal firm enable the coopetitor when the literature of coopetition predicts that the firms are going to share their knowledge in a way that obstructs the appropriation of the knowledge shared?).

Research inquiry

To reach this comprehensive goal, we engaged an abductive inquiry on the focal firm use of knowledge transparency in successful coopetition strategy. The total process consists of three main loops

The first loop confronted the prediction for the coopetition literature to an exploratory research and one first case study in the pharmaceutical industry. This confrontation led to the discovery of a puzzling observation: the pharmaceutical company Sanofi was sharing intensively and extensively its knowledge with its competitor Bristol Myers-Squibb. The sharing was such that they were even teaching each other how to become stronger. This empiric observation was in opposition to the prevailing management of knowledge sharing in the coopetition literature which argues that firms should minimize the sharing to the strict minimum and use safeguards against any internalization of knowledge by the competitor (Baumard, 2010a; Faems, Janssens, & Van Looy, 2010; Fernandez & Chiambaretto, 2016).

The second loop consisted in confirming and deepening our understanding of this puzzling observation. To do so, we chose to do a second case study of the oil and gas company Total. Total was an interesting case study because it had more than 90 years of coopetition relationships and in the 70s , Total decided to shift from restricted and safe knowledge sharing with competitors to a more extensive and intensive knowledge sharing. This second loop confirmed the existence of a scientific problem (i.e., a tension between scientific knowledge and ignorance).

The third loop consisted of attempting to solve the scientific problem. To do so, we went back to the case study on Sanofi and dug deeper into how this counter-intuitive transparency was implemented. In addition, we looked for theories outside of the coopetition literature which could give a relevant explanation. The theory of conflict resolution (Deutsch, 2011) and the dynamic theory of organizational knowledge creation (Nonaka, 1994, 2011) seemed particularly relevant. Both theories gave one theoretical explanation of why it might be

another way to manage the knowledge sharing incooperative relationships than the current dominant one. This, confirms the need to rethink the management of coopetition and coopetition in itself.

The results

Our main result is the identification of three ways of strategizing and managing coopetition compared to past research on coopetition (Fernandez et al., 2017). The two first are following up on the two project designs already identified by the literature of coopetition: the separate project team and the competitive project team. On the contrary, the third project design is different and even in contradiction on some organizational elements to the dominant literature. Indeed, we identify firms which intend to create and pursue current and future advantages for themselves by sharing extensively and intensively some strategic knowledge with their competitors in a competitive project. Their sharing is such extensively and intensively that it can consist in enabling the competitor with its own strategic knowledge. It counter-intuitively relies on unlocking and pursuing the value capture process by sharing knowledge openly knowledge with a competitor. Here the strategic intent shifts from “protection” or “sharing and protecting” to “sharing and enabling for constructive capturing.” One specificity of this third way that we called “open coopetition team” is that although the experts are duplicated as in a competitive project team, they stay co-located in their parent firm. The strategic intent is to ensure that the parent firm benefits and even internalizes the knowledge learned in the competitive project and reciprocally that the project benefits from the large knowledge base of the two competitors.

Theoretical contributions

These results have huge implications for the research on coopetition and on the management of coopetition. Firstly, we confirm that there are multiple ways in which firms simultaneously cooperate and compete in order to create and pursue current and future advantage for themselves (Fernandez, Le Roy, & Chiambaretto, 2017; Gnyawali et al., 2008). Thus, our doctoral research reinforces the need to dig deeper into the question of strategizing and managing coopetition.

Secondly, the results question the current theoretical roots of coopetition and management of coopetition literature. Indeed, the dominant literature of managing coopetition is based on Hamel (1991) competitive approach of collaboration. This approach predicts a learning race between the competitors which requires key organizational elements as strong learning intent

coupled with low transparency and high reciprocity. But if our first two identified ways of strategizing and managing coopetition which confirmed Hamel's approach, we also found one that contradicts this approach. We found that coopetitors can enabling each other to increase each other's value capture. Thus, this doctoral research calls for revisiting the theoretical basis of the coopetition literature and the management of coopetition literature. Extending its theoretical roots to external existing theories, as Deutsch theory of conflict resolution and Nonaka's organizational knowledge creation theory, justifies the implementation of a project design that enables the coopetitor. By doing so, this doctoral research calls to rethink the business relationship between competitors even inside a coopetitive project.

Thirdly, by building on the empirical results and Deutsch theory of conflict resolution and Nonaka's organizational knowledge creation theory, we argue that the focal firm implements this project design's intent is to enable each other, which we have named "open coopetitive team." Furthermore, we argue that this "open coopetitive team" is relevant when (1) their strategic intent is to renew their internal knowledge base, (2) they perceive that their spiral of knowledge creation is positively related to its competitors spiral of knowledge, (3) they consider that obstruct transparency is a self-fulfilling destructive process.

The last contribution is also a call for future research. Through this doctoral research, we proved that it is possible to try to develop a more integrative framework for strategizing and managing coopetition. By integrative framework, we refer to a framework that can simultaneously explain a more competitive orientation to a more cooperative one inside the coopetitive project. We highlight that it is possible to build that types of integrative framework for knowledge sharing and more precisely transparency. Indeed, we build an integrated framework which identifies five transversal variables which can be used to characterize a continuum of ways to strategizing and managing coopetition.

Managerial contributions

This doctoral research has two main managerial contributions. Firstly, it opens the top managers understanding of the different ways to strategizing and managing coopetition. More concretely, it highlights that for the current and future advantage of the focal firm, top managers might need overcome their intuitive reaction of protecting the company's strategic knowledge and accept to enable the competitor. Second, we created an integrating framework which can be used to develop top managers understanding of coopetition. More concretely, this integrated framework helps to understand the different value they can pursue by engaging

in a coopetitive relationship (i.e., a technological efficiency, an enhanced innovation capability or an amplified spiral of knowledge), the operational choice mandatory to unlock these values (e.g., specific project designs, specific knowledge sharing and specific reaction to opportunism) and the analytical capability on which these strategies rely on (i.e., capacity to perceive the positive interdependence and the destructive value outcome of competitive action as reducing the transparency).

Architecture of the doctoral research

This doctoral research is structured in three parts:

Part 1 ~ The programmatic research

The first part presents the programmatic research behind our narrow research on the knowledge sharing in coopetition. We begin by a first chapter presenting the bigger story behind coopetition and which justifies more research on this phenomenon. Indeed, we highlight that the term of coopetition is a consequence of a shift in our way of conceptualizing the business relationship between competitors. This shift is real and deeply rooted as we were able to find it in three different theoretical backgrounds: the game theory, the resources and competence based view and the theory of cooperation and competition. We end this chapter by doing a state of the art of coopetition which leads us to justify the existence and the need to dig deeper into the black box of knowledge sharing in a coopetitive project.

Then, in a second chapter, we dig deeper into the knowledge sharing in coopetition. We present the traditional and dominant knowledge sharing of the coopetition literature which is rooted in Hamel (1989,1991) and consists of looking for a safe and restricted sharing (i.e., a simultaneous sharing and protecting intent which minimize transparency to the strict necessary). Then, we will revisit this traditional and dominant way of thinking by looking at the predicted effects of two theories outside the coopetition literature (i.e., a sharing and enabling for constructive capturing which maximize transparency).

Part 2 ~ Research design and manuscripts

The second part presents, through a first chapter, our research design. Our doctoral research is a comprehensive research which aims to understand why focal firms act differently than what is predicted by theory (i.e., why they are more transparent than predicted by the coopetition literature). Thus, our first chapter presents the abductive research inquiry to respond to our comprehensive goal, and then the data collection which nurtures our inquiry.

This chapter is followed by the three manuscripts which are considered as the results on which this doctoral research is based on. For the record, in addition to the three manuscripts, there are also two published book chapters which had a key role in this doctoral research and are located in the annex of this document.

Part 3 ~ The knowledge claimed from this doctoral research

The third part begins by doing a synthesis of the main results. We identify three different ways of strategizing and managing coopetition which can be placed along a continuum of degree of transparency. More precisely, we identified three-organizational designs which fit the two polar ends of a transparency continuum (i.e., low and high transparency) and one in-between (i.e., a restricted and controlled transparency). Furthermore, our results highlight that each of the three managerial choices are related to different strategic intents and different ways of conceptualizing the relationship between competitors: “protecting”, “sharing and protecting” and “sharing and enabling for constructive capturing.”. Thus, this doctoral research does not only contribute to the management of coopetition but also to the literature on strategizing coopetition.

Then, as each research project is characterized by its contributions and its boundaries conditions, the synthesis of the results is directly followed by the main theoretical, managerial and methodological contributions. We finish the part 3 by presenting the limits and the research opportunities offered by these limits.

List of manuscripts

	Title	Authors	Journal	Status
Manuscript 1	Coopetition et innovation radicale : Partager ses ressources avec son concurrent pour innover	BEZ, S.M LE ROY, F DAMERON, S.	Management International FNEGE: Rank 2 Strategy CNRS: Rank 3 International Strategy	In Publication process: 2nd round submission September 2017 <i>Previous versions</i> <ul style="list-style-type: none">• <i>1st manuscript submitted to Management international and accepted with major modification June 2017</i>• <i>AIMS Conference June 2016</i>• <i>Writing workshop l'AEGIS Sept 2015</i>
Manuscript 2	La coopétition technologique: pourquoi et comment partager sa technologie avec son concurrent	BEZ, S.M	Innovations FNEGE: Rank 4 Innovation CNRS: Rank 4 Innovation	Accepted for publication September 2017 <ul style="list-style-type: none">• <i>Previous versions:</i>• <i>The manuscript submitted to Innovations and accepted with minor modification in August 2017</i>• <i>The manuscript submitted to Innovations and accepted with major modification in May 2017</i>• <i>AIMS Conference June 2017</i>• <i>Berkeley Open Innovation seminar March 2017</i>• <i>Writing workshop l'AEGIS Sept 2016</i>

Manuscript 3	Managing coopetition: when the fallacy of transparency between competitors becomes a reality	BEZ, S.M LE ROY, F DAMERON, S.	Long Rang Planning FNEGE: Rank 2 Strategy CNRS: Rank 2 International Strategy	Awarded as the best article with managerial implication at AIMS 2017 (French conference in Management Strategic) Going to be submitted for the special issue of LRP on coopetition (dead line decembre 2017) <i>Previous versions:</i> <ul style="list-style-type: none">• <i>AIMS Conference June 2017</i>• <i>Berkeley Open Innovation seminar March 2017</i>• <i>“Ateliers de Thésée” in Paris January 2017</i>
Annex 1	Le Patient anglais : lorsque l'alliance Sanofi et BMS donne naissance à une innovation médicale majeure	BEZ, S.M LE ROY, F DAMERON, S.	Book chapter Edition: Pearson	Published 2014, In the book « Coopétition s'allier à ses concurrents pour gagner », Directed by Julien Granata & Pierre Marquès p125-153
Annex 2	Coopétition : comment conjuguer protection et partage d'informations	BEZ, S.M LE ROY, F DAMERON, S.	Book section Edition: Pearson	Published 2016, In the book « S'informer, se protéger, influencer », Directed by Alice Guilhon and Nicolas Moinet, p193-206

Part 1 ~ Programmatic literature review

**Leverage through knowledge sharing the opportunities
of being simultaneously in cooperation and competition
with a competitor**

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Introduction Part 1

“Collaboration between competitors is in fashion” is the first sentence of Hamel’s article written in 1989. Thirty years later and this fashion is still ongoing. This fashion even became the dominant logic for many industrial sectors (Baumard, 2009a). This omnipresent and growth of collaboration between competitors calls for a shift in the representation of the relationship between competitors. Firms are not only competitors. Their relationship is much more complex. A firm’s survival and competitive advantage are more and more interdependent to its ability to integrate external resources including the knowledge belonging to its competitors (Brandenburger & Nalebuff, 1996; Dyer, Singh, & Kale, 2008). Thus, the focal firm’s relationship with its competitor is filled with multiple cooperative activities and competitive activities. These cooperative activities and competitive activities do not only co-exist. They are intermeshed. This intermeshing is ambiguous because it is simultaneously intended and feared. It is intended because it can have a leveraging effect on the opportunities of the collaboration and the rents extracted from this collaboration (Gnyawali et al., 2008). This is feared because it increases the opportunities of the competitor to internalize the focal firm’s strategic knowledge (Park & Russo, 1996). To understand and be able to manage these complex relationships, it is crucial to dig deeper into the intermeshing between cooperation and competition.

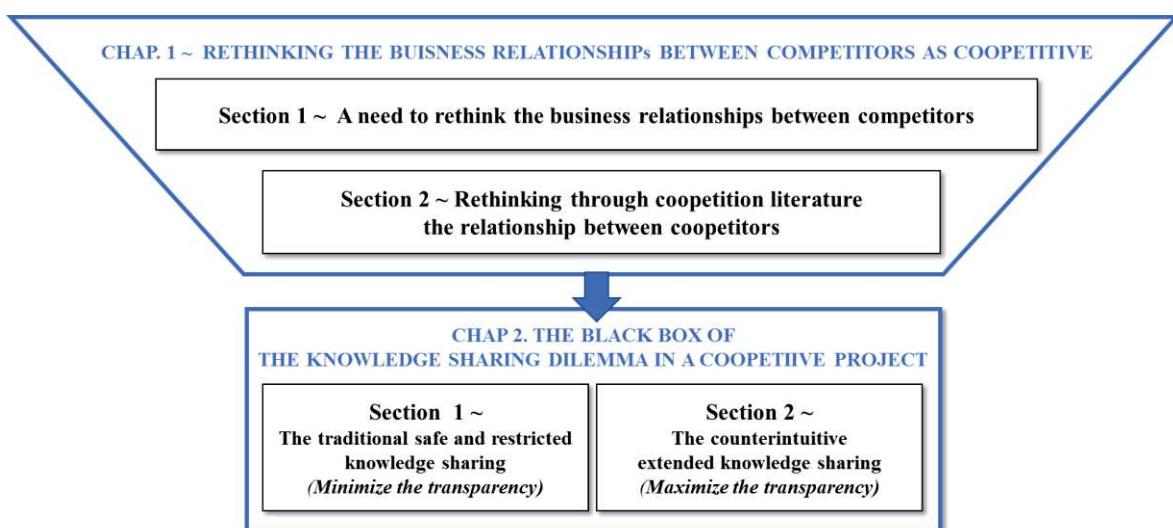
Understanding the intermeshing between cooperation and competition has bigger implications than providing insights on how to manage the collaboration between competitors. It allows the reconceptualization of the business relationship between competitors not only as competitive, but simultaneously cooperative and competitive. A specific stream of research is interested in this intermeshing between cooperation and competition. They have already made huge progress in understanding this unique and managerially important intermeshing (Ansari, Garud, & Kumaraswamy, 2016; Bengtsson & Kock, 2000b; Gnyawali, Madhavan, He, & Bengtsson, 2016; Le Roy & Czakon, 2016).

Thus, our first chapter aims to theoretically justify the need to rethink the business relationship between competitors and then do a state of the art of what the coopetition literature has already explained about the intermeshing between cooperation and competition

(cf. Figure 2). This first chapter ends by highlighting the need to integrate the paradoxical situation of being simultaneously in cooperation and competition. Indeed, if the focal firm does not manage to integrate it, the collaboration is jeopardized (Le Roy & Fernandez, 2015). Moreover, this chapter 1 highlights that looking more deeply into how to manage the knowledge sharing dilemma in the coopetitive project is a relevant “trojan horse” to answer our research question: *How do firms strategize and manage coopetition?*

The second chapter develops how a focal firm can integrate the knowledge sharing dilemma. This second chapter reveals two different ways to integrate the dilemma and thus to unlock and pursue the leveraging effect of the intermeshing of cooperation and competition. The value-added from this chapter is that it questions the roots of the traditional integration stress out by the coopetition literature and the inter-firm knowledge sharing-protecting. Maybe the competitive collaboration approach offered by Hamel (1991) is not always relevant and should be different (cf. Figure 2).

Figure 2 ~ Visual representation of our programmatic literature review



Source: Sea Matilda Bez's doctoral research, 2017.

Chapter 1 ~ Rethinking the business relationships between competitors as coopetitive

This doctoral research aims to dig deeper into the problematic of “*How do firms strategize and manage coopetition?*” and more precisely to answer this question; we focus on one strain and conflict which can jeopardize this value creation. Before getting into this very narrow research objective, this chapter 1 aims to stress out the significance of this research. Indeed, behind this research, there is a whole program of research.

This program of research aims to question our way of thinking about the business relationship between competitors. Indeed, these relationships are mainly from a competition perspective. The traditional view of the business relationship is “war” and the language associated is related to “capturing market share,” “making a killing,” “fighting brands” (Brandenburger & Nalebuff, 1996, p. 3). The relationships between competitors are a big chess match based on actions and responses to keep the competitors off balance until the final win. This way of thinking can persist even if competitors are engaged in the alliance. The alliances are only a temporary means to improve their competitive advantage (Hamel, 1991).

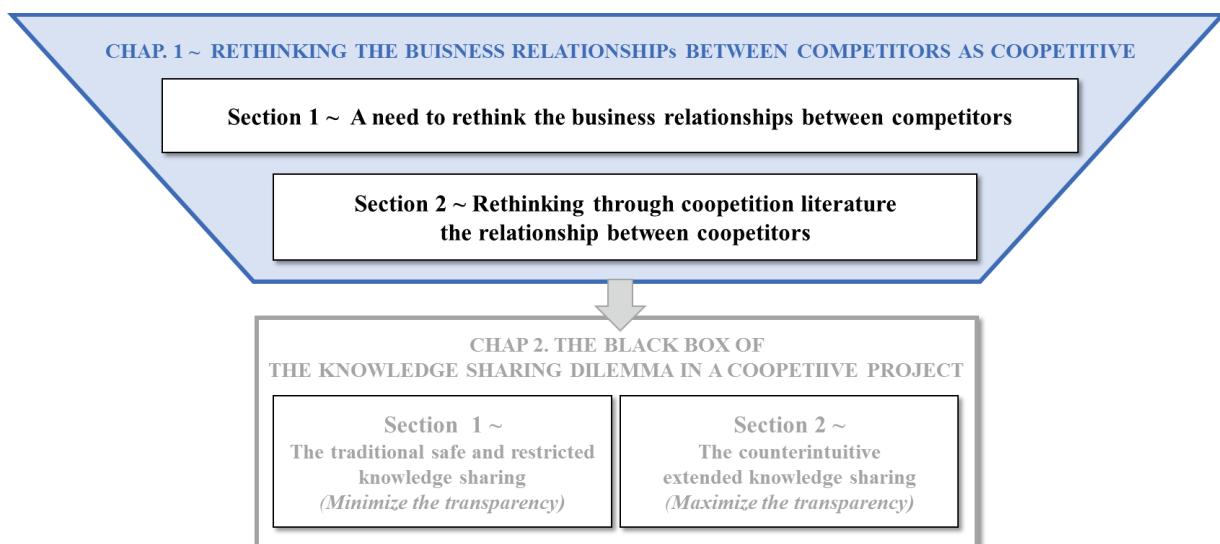
Could this representation of “business as war” be hazardous? Koenig (2010)’s answer is yes. We should be careful with this representation. It is an oversimplification of the interactions between competitors. It does not consider that the business relationship can be a positive sum game. Sometimes, competitors can have a common fate. For instance, even if actors are competing for scarce resources in the current system, they are also united in avoiding the destruction of the system. Thus, a representation of the relationships between competitors as only competitive can lead to deception and opportunity cost. There is a need to perceive the competitors as rivals but also “partners” (Koenig, 2010, p. 8).

If Koenig is right, the coopetition literature pursues a bigger goal than understanding why and how competitors collaborate. The coopetition literature generates insights into a shift in the business relationship between competitors. There is a need to rethink the relationships between competitors as not only competitive but simultaneously as cooperative and competitive.

The section 1 of this chapter aims to confirm this bigger story behind coopetition. To do so, we used three very different theoretical approaches. Despite their differences, they all reinforce with theoretical arguments why we need to rethink the business relationship between competitors. Thus, our section 1 aims to highlight the significance of our narrow research by highlighting the “bigger story” behind coopetition.

Then, the literature of coopetition is not new and even reaches a state where there are numerous special issues on the subject in high-ranking journals, several systematic literature reviews, a forthcoming handbook, etc. Thus, our section 2 highlights the significance of our narrow research by doing a state of the art of the coopetition contributions and highlighting how it does not completely answer the question *“How do firms strategize and manage coopetition?”*.

Figure 3 ~ Visual representation of our programmatic literature review



Section 1 ~ The “bigger story” behind coopetition

Our research on coopetition and knowledge transparency is a part of a “bigger story” which consists in rethinking the relationship between the competitors. Indeed, the fates of competitors are interdependent. But unlike the dominant logic which focuses only on negative interdependence (i.e., competition), their fates are also positively interdependent. The focal firm’s success or survival may depend on its competitors’ success. Based on this double and antagonist interdependencies, competitors need to rethink their business relationships. They are not only engaged in a competition relationship but simultaneously in cooperative and competitive relationships. These relationships characterized by the cooperation and competition are mostly called “coopetition.”

Considering coopetition as a new representation of the business relationship between competitors gives further impetus to the concept of coopetition. It is not possible anymore to interchange the concept of “coopetition” and “alliance between competitors.” It refers to a much deeper and significant business shift. Understanding this “bigger story” behind coopetition increases the significance of research on coopetition. Thus, this section 1 aims to justify our choice to deepen our knowledge on coopetition by going back to the theoretical foundations explaining the need to reconceptualize the relationship between competitors as simultaneously cooperative and competitive.

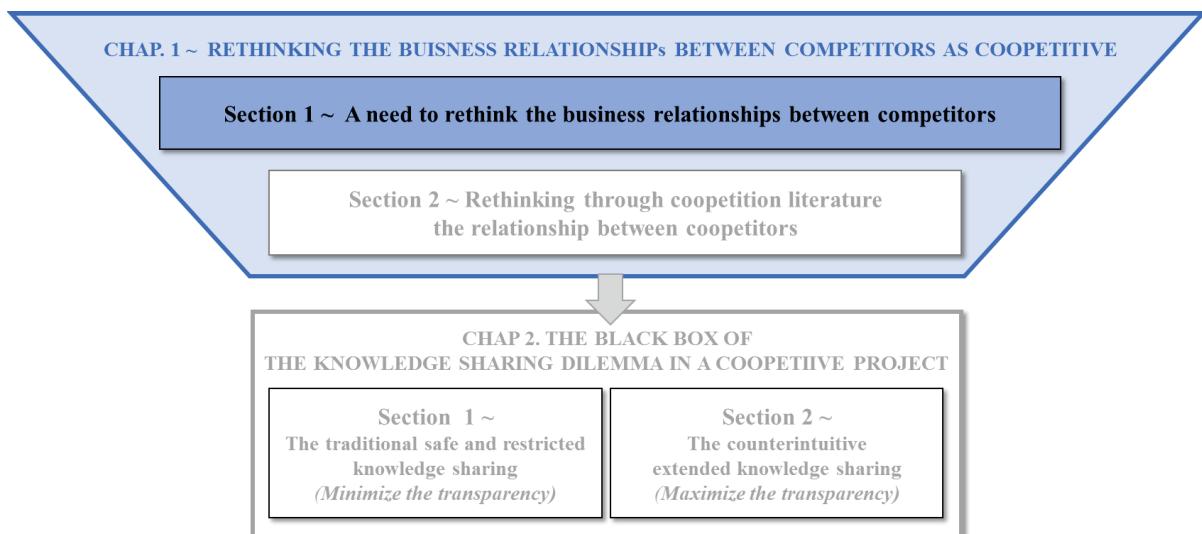
We rely on two commonly used theories in the coopetition literature to make sense of the shift the conceptualization of the business relationship between competitors. The first one is the game theory (*cf. subsection 1*). This theory was used initially used by Brandenburger and Nalebuff (1996) who popularized the concept of coopetition. Moreover, this theory has already been used to make sense of collaborative relationships between competitors (e.g. Faems et al., 2010; Gnyawali & Park, 2009; Quintana-García & Benavides-Velasco, 2004; Ritala & Hurmelinna-Laukkonen, 2009). However, this theory suffers from multiple limits which weaken its relevance. For instance, it does not take into account the organization or its management. Thus to make sense of collaboration between competitors, numerous researchers often extended the game theory or replaced it by conceptual arguments of a resource and competence based view (e.g. Clarke-hill, Li, & Davies, 2003; Fernandez & Le Roy, 2010; Gnyawali & Park, 2009). The resource and competence based view predicts cooperation between competitors at the organizational level. Coopetition allows developing

and leveraging resources. Thus the second theory developed to highlight the need to rethink the relationship between competitors is the resource based view (cf. subsection 2).

We could also have looked at other theories as paradox theory or the transaction cost theory. Both would have been interesting. The former argues that interdependent opposites as the conflicting logics of competition and cooperation are harnessed for superior outcomes (Chen, 2008; Gnyawali et al., 2016). Based on this perspective, it is also relevant to rethink the relationship between competitors to create conflicting logics. The transaction based theory could be used to highlight that the cooperation between competitors is one ways for skill acquisition (Hamel, 1991) and that cooperative agreement could be the most efficient form of organization (Hennart, 1988).

Instead, we decided to extend our argument by looking in the *sub-section 3* at a theory almost unused in the coopetition literature: the theory of cooperation and competition (Deutsch, 1949a, 2011). Surprisingly, none of these traditional lenses go back to the foundations and nature of each dimension composing coopetitive relationship (i.e. cooperation versus competition). Deutsch's theory of cooperation and competition offers this missing relevant dichotomic framework to rethink each dimension separately and highlights the potential intermeshing between them. It generates new interesting insights into the effects of rethinking the relationship between competitors as simultaneously cooperative and competitive.

Figure 4~ Visual representation of our programmatic literature review



1. Rethinking through game theory

The game theory is a tool to understand the interactive behavior of economic actors. It identifies the rational choice when the optimal choice depends on (1) its own preferences but also (2) on the choices that another is anticipated to make. More precisely, it predicts whether intelligent, rational economic actors are going to cooperate or not. This theory emerged in the economic field by researchers such as Nash (1952) or Von Neuman and Morgenstern (1944). In the strategy field, the game theory was used by Brandenburger and Nalebuff (1996) to increase our understanding of the business relationship and of whether competitors should collaborate to innovate together (Quintana-García & Benavides-Velasco, 2004; Ritala & Sainio, 2014).

In this doctoral research, we use the game theory to justify theoretically the need to rethink the business relationship between competitors as simultaneously cooperative and competitive. Indeed, the game theory brings the insight that when two interdependent actors can positively expand the game through cooperation (i.e., increase the value-creation potential and the size of prospective markets), both firms' rational behavior is to cooperate (Ritala and Hurmelinna-Laukkonen 2009). In this positive game situation, even competitors gain more payoff by collaborating than competing. To justify this insight, in the *subsection 1.1*, we recall that in a zero-sum logic firms are mainly engaged in competitive interactions. With the exception that even in a zero-sum logic sometimes there is positive interdependence between competitors that could justify letting competitors do well (i.e., not obstruct the competitor's success). Then in the *subsection 1.2*, we highlight that the positive-sum logic changes the rational behavior from competition to cooperation. It does not mean that the competition is reduced. On the contrary, the additional value created increases the fight for capturing this value and thus increases the competition. Based on the two first sub-sections, we synthesis why from the game theory there is a need to reconceptualize the market relationship between competitors as simultaneously cooperative and competitive (cf. *subsection 1.3*). In *subsection 1.4.*, we go deeper into the reflection and highlight the limits of the game theory which make it not able to explain coopetition on its own.

1.1. Thinking of the market relationship through a zero-sum logic

The game theory predicts that through a “backward induction process,” it is possible to predict rational actor decisions (Brandenburger & Nalebuff, 1996; Loebbecke, van Fenema, &

Powell, 1999). Indeed, the rationality drives economic actors' behavior and this rationality allows the anticipation of the many actors. Thus, an actor behaves in a way to maximize its utility and to not regret its actions based on the anticipatory action of the partner.

One of the main contributions of the game theory is to highlight that the rational private decision does not lead to the optimum situation. The interactions are mainly going to end with an “under-optimal” decision. It is an “under-optimal” decision because both economic actors could win more by behaving differently than their rational private interest (i.e., the economics say that the rational private interest called “Nash equilibrium” can be different from the optimum collective situation called “Pareto equilibrium”). The well-known example is the prisoner dilemma, two thieves are caught by the police for a major crime. If they trust each other and do not betray the other during the interrogation, they will serve one year in jail for minor crimes. If one betrays the other, but the other does not betray back, the traitor gets out free, and the other serves three years in jail. The last situation is that they both betray each other, in that case, they both go to jail for a longer period (cf. *Table 1*). Both of their best moves would be to betray the other because it is the only outcome where he can be free. However, if both pick their best move, they both go to jail. This ending does not equate the optimum situation which would be that neither of them betrays the other. In this interactive context, the game theory predicts opportunism and thus the absence of cooperation. Applied to our research object, competitors are going to compete and not collaborate. This outcome will be an under-optimal situation.

Table 1 ~ Prisoner's dilemma

Prisoner A	Prisoner B stays silent (cooperates)	Prisoner B betrays (defects/competes)
Prisoner A stays silent (cooperates)	Each serves 1 year	Prisoner A: 3 years Prisoner B: goes free
Prisoner A betrays (defects/competes)	Prisoner A: goes free Prisoner B: 3 years	Each serves 2 years

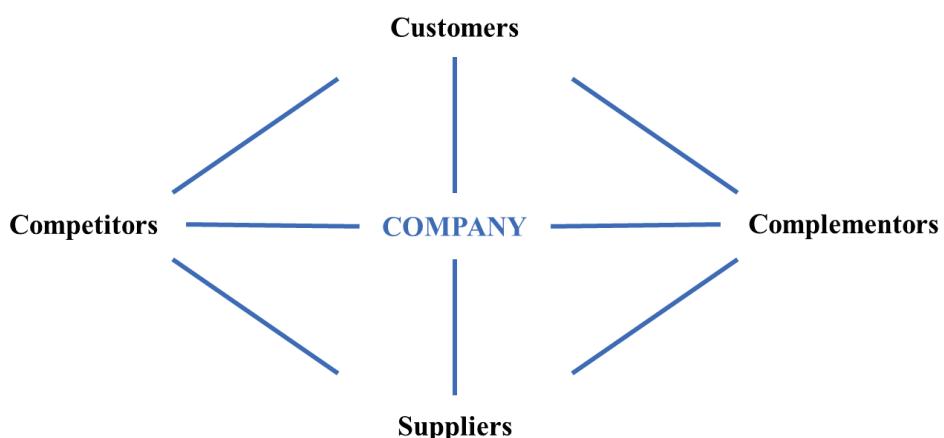
Source: reproduction with some adaptation of the initial formalization of the prisoner dilemma by Tucker (1950)

Although, the game theory can be used to highlight that the intuitive and rational reaction can be to defeat, it can also highlight that the intuitive and rational reaction is mainly an under-optimal situation. The prisoner's dilemma highlights how cooperation between competitors could avoid mutually destructive outcomes (Quintana-García & Benavides-Velasco, 2004). If we go back to our example of the two thieves: at the end it would be better

if both serve only one year (cf. Table 1). The game theory highlights that sometimes it is worth it to win a little bit less in order to secure the winning and not create a destructive situation (i.e., serves one year instead of goes free). For example, American Airline and Delta compete for passengers, landing slots, and gates but complement each other to build a new plane. If one of them stop doing well because the other takes all the passengers, the other will have no incentive to build a new plane. Paradoxically the focal firm’s sustainability depends on the competitor doing well.

To understand this risk of a destructive process Brandenburger and Nalebuff (1996) developed a schematic map called the “value-net” (cf. *Figure 5*). This map is designed to represent different actors including customers, suppliers, complementors, and competitors, as well as the interdependencies between them (Brandenburger and Nalebuff, 1996). The core idea is that no firm has a secure position, the sustainability of a firm relies not only on the firm but also on its value net network. A firm’s value creation depends on its ability to attract clients and suppliers (cf. *Figure 5- the vertical line on the maps*) The attractivity depends on two types of actors: the competitors and the complementors (cf. *Figure 5- the horizontal line on the maps*). The competitors are the ones that make the focal firm less attractive by their production or supplier relationship. On the contrary, the complementors are the actors whose existence and actions can increase the attractivity of the focal firm. For example, a player is a complementor when a customer values more the product of a focal firm if he can access the complementor’s product too. Or a player is a complementor when it is more attractive to a supplier to provide resources to both the focal firm and the other player than only to the focal firm.

Figure 5 ~ Brandenburger and Nalebuff’s (1996) value net framework



Source: (Brandenburger & Nalebuff, 1996, p. 17)

According to this schematic map, the sustainable performance might rely on the other players performing well, including competitors. Indeed, a competitor can have multiple roles, it can sometimes be a supplier, a customer, and even for some specific activities a complementor. In this complex context in which the competitor has multiple roles, its survival and success is key to the focal firm's own performance. An example of this complex situation is the relationship between Samsung and Apple. Although the two phone manufacturers are in a huge legal battle, Samsung is supplying to Apple's iPhone 7 the "DRAM chips"². Paradoxically, Samsung needs its competitor Apple to perform well to sell its chips.

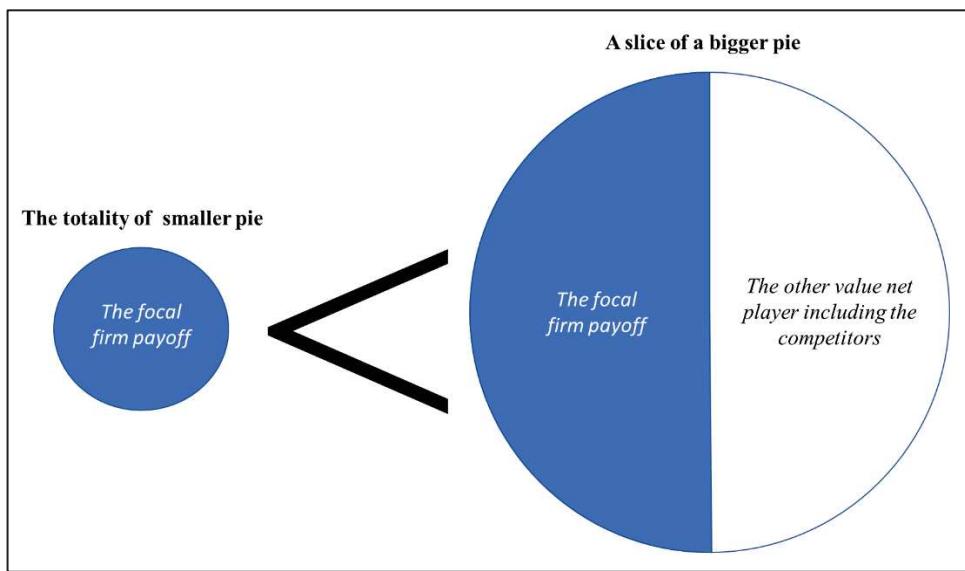
Using this lens, we understand that business relationships between competitors are much more complex than the win/lose relationship. Sometimes, the best way to succeed is to let others do well including competitors. In these complex relationships, a focal firm does well, if the competitor does well too. The reason is that (1) the competitor can have complementary products which increase the attractivity of the focal firm's own products, or (2) the competitor is a supplier and a client to the focal firm. These heterogeneous relationships between them links the fates of the competitors. If the competitor is eliminating, it might reduce the payoff of the firm. This insight is counterintuitive. It is in contradiction with the dominant paradigm that "business is war" and that to succeed you need the other to fail. There is no altruism behind cooperating or letting the competitor doing well. Rationality and private interest lead this behavior.

1.2. Rethinking the market relationship through a positive-sum logic

Brandenburger and Nalebuff's (1996) reflection based on game theory went further than only highlighting that it might be rational to let the competitor do well. Their idea is that firms need to shift from a "competitive focus" to an "expansion of the market focus." They call this expansion of the market: "creating a bigger pie." We are still in a game theory framework; the economic actors are intelligent and rational decision-makers. Thus, they decide to collaborate when the expected "payoff" of collaboration is higher than being in competition. Thus, the collaboration is not driven by the bigger pie, but by the capture of a potential slice of a bigger pie (cf. in *Figure 6 the blue slice of the bigger pie is bigger than the whole small pie*).

² Kang J.. (2017), *Samsung Will Be Apple's Top Supplier For iPhones Again In 2017*, Forbes.com [online December 16, 2016] <https://www.forbes.com/sites/johnkang/2016/12/16/samsung-will-be-apples-top-supplier-for-iphones-again-in-2017/#58cc1cd41fb0> (consulted July 23th, 2017).

Figure 6 ~ Increase of the payoffs through collaboration



Source: See Matilda Bez's doctoral research, 2017. visualization of Brandenburger and Nalebuff (1996)

The “stag hunt” is a game highlighting that the rational payoff choice of two hunters is to collaborate and hunt a stag together. They could hunt a rabbit alone, but the payoff regards food. However, the food quantity of a rabbit is less than having half of a stag. If both hunters agree to hunt a stag, neither of the hunters will be willing to defect. By defecting, their payoff will decrease (cf. *Table 2*).

Table 2 ~ Hunt Stag

Hunter B	Hunter A	Hunt a stag (cooperates)	Hunt a rabbit (competes)
Hunt a stag (cooperates)		Food quantity of hunter A: 4 Food quantity of hunter B: 4	Food quantity of hunter A: 0 Food quantity of hunter B: 1
Hunt a rabbit (competes)		Food quantity of hunter A: 1 Food quantity of hunter B: 0	Food quantity of hunter A: 1 Food quantity of hunter B: 1

Source: reproduction and adaption of the stag hunt visualization, Skyrms, 2004

Thus, applied to our business relationships, when firms can communicate and collaborate, they can go “hunt a stag” instead of a rabbit. They can look for a slice of a bigger market than the whole of a smaller market. The main difference between the prisoner dilemma and the stag hunt is that in the latter there is no rational payoff to betray and be competitive. Thus, the core idea is that the benefit gain through collaborating is higher compared with a situation in which they choose only to compete in the first place. Moreover, looking for win-win strategies is a sustainable shift (Brandenburger & Nalebuff, 1996) because it may offer less

resistance and does not force other players to retaliate. Thus, Brandenburger and Nalebuff (1996) highlight through the game theory that the right moves are not the ones that one makes intuitively. The right move could be to look for any partner, including competitors, that could create greater value than what the focal firm could do alone (Gnyawali & Charleton, 2017; Ritala & Hurmelinna-Laukkanen, 2009).

These insights from the game theory can be used to predict cooperative or competitive relationships between competitors for innovation purposes (Quintana-García & Benavides-Velasco, 2004; Ritala & Hurmelinna-Laukkanen, 2009)³. Based on the prisoner dilemma and the hunting choice presented earlier, Ritala and Hurmelinna-Laukkanen (2009) highlighted the roots of cooperation between competitors for innovation. Collaboration is rational when a focal firm cannot reach alone the same efficiency in the innovation process than in cooperation (cf. *Table 3*).

Creating new products/services or improving current ones through collaboration with competitors may increase the size of the current market or create a completely new one. The collaborating competitors are better off after the collaboration than before (e.g., Brandenburger & Nalebuff, 1996). Paradoxically the collaboration between two directly competing firms is a viable strategy to stimulate the development of new products and launch them into the market that they could not have done alone.

The prediction of the game theory is not that cooperation will replace the competition but that both are intermeshing and reinforcing each other. In the game theory, the economic actors are rational individuals taking a decision based on their utility function and the anticipated behavior of the other economic actors who are also rational. Thus, when an economic actor engages in cooperation, he does not do it based on a benevolent attitude or to create but on a private utility goal. Thus, when competitors collaborate to expand the pie (i.e., create value), they simultaneously want to capture a bigger slice of the pie by growing the entire pie. (i.e., capture of this value created). The competition consists of competing in order to take a maximum share of that cake. Paradoxically it is the expectation of the competition for a bigger slice that drives cooperation. In other words, the competitive incentive is critical because it's the competitive behavior of capturing the payoff that drives the cooperation.

³ A theory is strategic when it has implications for and applications to a wide range of problems and situations (D. Johnson & Johnson, 2011).

Thus, it is the simultaneous coexistence of cooperation and competition that drives the rent creation.

Table 3 ~ Game theory prediction on the business relationship between competitors

Theoretical framework	Prediction	Drivers	Condition	Outcomes
Prisoner's dilemma	The competitors are going to compete	Anticipated bigger payoff by doing it alone than in collaboration	Can develop the innovation without the help of its competitors,	Keep the whole “pie” to itself
Stage hunt	The competitors are going to cooperate	Anticipated bigger payoff for both players by collaborating than competing	Cannot reach alone the same efficient innovation process than in cooperation	A slice of a bigger pie

Source: See Matilda Bez’s doctoral research, 2017

1.3. Synthesis on the game theory insight

We used the game theory to rethink the business relationships and to encourage a dynamic perspective on business (Brandenburger & Nalebuff, 1996). This theory allowed a shift from a competition focus to an “expand the pie” focus. This shift underlines the idea that finding a better game to play does not have to come at the expense of others (Brandenburger & Nalebuff, 1996). Sometimes the best strategy can be to have multiple winners excluding competitors and not a win-lose relationship.

The risk of having only a competitive mindset is to ignore the potential for changing the nature of business relationships. The focal firm might stay in the competitive relationship, instead of looking for the potential for expanding the market or creating new profitable innovation. One way to do it is to accept that the other do well and even collaborate with all types of actors even competitors. Sometimes there is a need to move beyond the overly simple ideas of competition and cooperation to reach a vision that integrates the two. Representing the business relationship as simultaneous cooperation and competition strategy is a way to examine the potential of rent creation (Brandenburger & Nalebuff, 1996; Loebbecke et al., 1999).

Based on the game theory and the Brandenburger and Nalebuff (1996) value net framework, it is possible to understand why the business relationship is not only a competitive

or cooperative relationship, but simultaneously cooperative and competitive. Indeed, it highlights that in order to increase its payoffs it is sometimes more rational to let the other players do well including competitors. In these complex relationships, a focal firm does well, if the competitor does well too. The reason is that the competitor can have complementary products that increase the attractivity of the focal firm's own product, or that the competitor can be a supplier and a client to the focal firm. These heterogeneous relationships between the same competitors link their fates. If these specific competitors are eliminating, it might reduce the payoff of the firm. In this specific context, a too simplistic perception of the business relationship as only "competitive" can be hurtful.

The second insight is that to increase value creation firms priority should be to look for any partner, including competitors, that could create greater value than what the value that the focal firm could manage alone (Gnyawali & Charleton, 2017; Ritala & Hurmelinna-Laukkonen, 2009). Moreover, by collaborating to expand the market, they increase the competition. The potential booty to fight for is bigger after the collaboration. Thus, cooperation cannot be understood without looking at the role of competition in driving the cooperation; and reciprocally competition cannot be understood without looking at the key role of cooperation in the competition. Based on this theoretical framework our focus of inquiry is the simultaneous occurrence of competition and cooperation. Thus, competition cannot be understood without looking at the key role of cooperation in the competition, and reciprocally cooperation cannot be understood without looking at the role of competition in driving the cooperation. Thus, we can sum up the insight of the game theory by: "Cooperation and competition are highly tangled together when cooperation allows expanding the value-creation potential and the size of prospective markets." Thus, this insight relies on a huge boundary condition which is that to understand collaboration between competitors; we need to be able to do a backward induction on the anticipated payoff. Before developing how this acknowledge highlights a boundary condition, we want to add some of the nuances into these insights.

By emphasizing on the win-win opportunities of collaborating with the competitor, we do not mean to suggest that win-lose between competitors is not an effective approach. Win-lose relationships happen when the customers value the focal firm's product less when they have the other player's product than when they have the product alone. The goal of this framework is to highlight that sometimes the win-win is the most effective and that in business there can be multiple winners, the other is not required to fail. This is the main difference from chess,

poker, or competitive sports. Nalebuff and Brandenburger quote Bernard Baruch, a leading banker:” You don’t have to blow out the other fellow’s light to let your own shine” (p.4).

It is a real shift compared to the idea that to succeed; the others must fail. The real success comes from actively shaping the game the firms are playing in by increasing the pie.

1.4. Limits of the game theory: the missing management

The game theory creates interesting insights and confirms that the fates between competitors might be positively linked and that it makes sense to collaborate even with competitors. However, this theory suffers from several limits that reduce its usefulness to understand the empirical execution of the strategy. We will focus on two limits which justify why we did not use the game theory to answer our more narrow research questions about coopetition.

The first limit is the backward inductive process of the game theory. It involves being able to predict the outcomes. However, the outcomes, especially for innovation, are always uncertain. Thus, the reality can differ from the expectation in multiple ways. If we look at the stag hunt, the hunters can be hunting a stag; this strategy can lead them to find an unexpected heard of deer with the stag. Thus, the payoff will be much bigger than expected (e.g., a stag and a deer). Thus, the backward induction might not have considered this unexpected huge booty. On the contrary, if after two hours of hunting, they did not see a stag, the hunter might lose faith in their collective capacity to catch the stag. In that case, one of the hunters might prefer to secure a rabbit than going home with nothing. In this situation, the under-optimal situation might rise again. When we add the uncertainty of the outcomes in the game theory model, the rational motivation to collaborate and innovate can weaken the collaboration. The competition dominates in an uncertain situation. For instance, in the U.S. television industry, the incumbents of the television industry faced a dilemma concerning a disruptive innovation of the Digital Video Recorder invented by a startup (Ansari et al., 2016). The potential benefit of this start up commercializing this innovation could be high for the incumbent. But these benefits were uncertain whereas there were immediate negative effects. In this situation, the first reaction of the incumbents was to hinder the development of the startup. They initially choose the competition instead of the huge but uncertain benefit. In line, some authors go even further and argue that cooperation between competitors is not possible for innovation because the fear of opportunism will always prevail (Nieto & Santamaría, 2007). Competitors

are unlikely to collaborate without being sure that the collaboration will help their strategic priorities. (Gnyawali & Park, 2009). Thus, if this theory highlights the complexity of the business relationship, it does not answer how to deal with the risks and tensions of ‘sleeping with the enemy’ (Bengtsson & Raza-Ullah, 2016).

The second limit is that the game theory does not consider the organization and its managerial role. An organization can be proactive and not passive in the resolution of the game theory. An organization can influence the decision of others. For example, if we look again at the case of the Digital Video Recorder. The company which invented the disruptive innovation was proactively acting to gain the support of the incumbents. The actions consisted of developing a familiar face (e.g., hired an executive familiar with the media industry), making conciliatory gestures (e.g., not offering a commercial skip button), and engaging in discussions (e.g., forward-thinking executives within incumbent firms). Based on these actions, several key incumbents decided to overcome their desire to keep tabs on the threat and instead collaborated to passively influence the technology’s evolution in ways beneficial to them (Ansari et al., 2016). Moreover, through the management a focal firm can act on the effectiveness of cooperation or competition. It is not because competitors decide to cooperate that the collaboration is effective (Ghobadi & D’Ambra, 2011; Hamel, 1991). Indeed, there are multiple degrees of cooperation and competition that the numerical game theory matrix might be of limited use.

We need to nuance this second limit because the game theory gives some responses to the management of the other firm’s behavior. An organization can change the game and the partner’s behavior through a fair strategy based on repeated games and a capacity to retaliate any deflection (Axelrod & Hamilton, 1981). Axelrod and Hamilton organized a huge context and discovered that the strategy that accumulated the most payoff (even if they lost most of the battle) was the one formalized by one game theorist Anatol Rapoport. A strategy that they named the tit-for-tat strategy. The strategy always begins with optimist action: cooperation. Unless the partner defects, the focal firm will always be cooperative. Thus, even if it is an optimistic strategy, it is not a naïve strategy, retaliation always happens directly after a deflection. But what is interesting about this strategy is that although human beings are rancorous and it is difficult to gain trust again, in this strategy forgiveness is unconditional, from the moment that the partner cooperates, the response will be cooperation. The interesting insight is that the context and the past do not enter into account, that this is the deflection and capacity of a direct retaliation that drives the behavior. If the partner understands the patterns

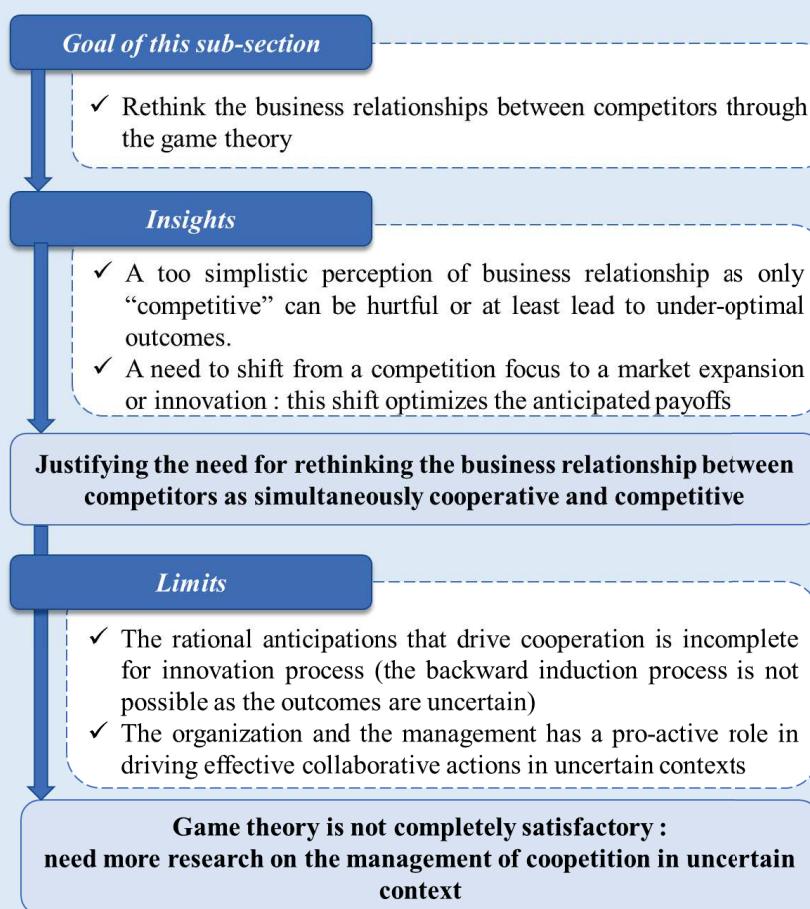
of action and fears the retaliation, he will have no incentive defect. Thus, it is possible to create a positive context for cooperation between competitors. A focal firm needs to introduce fair management principles and communicate the "rules of the game." Some authors were even more precise, based on the game theory they deduced that organization could create incentives to play cooperatively through (i) a governance mechanism that truthfully reveals whether defection has occurred and (ii) a credible third-party that can impose penalties in the form of fines (Faems et al., 2010).

Brandenburger & Nalebuff (1996) went further and argued that a focal firm can act on the game by changing players, changing the players' perceptions of the risk-return payoffs associated with the game, changing the rules of the game, and changing the scope of the game (Brandenburger & Nalebuff, 1996). By doing so, it shifts the relationship between competitors from a competition in a zero-game sum to a positive game sum. A focal firm can influence the game and the anticipated actions of the other actors.

Thus, understanding the rationality of the actor and using a backward induction process are not enough to understand coopetition and its outcomes. Even if it is not explicit, the game theory begins to highlight some clues about how an organization can favor cooperation in an uncertain context. However, the game theory is not inherently aiming to dig deeper into the organization and its management. The game theory is not completely satisfying our understanding of coopetition.

Sum up. on the game theory insight

The game theory highlights the opportunities of reconceptualizing as simultaneously cooperative and competitive any relationship between two economic actors. It predicts that the best rational choice between two economic actors, including between competitors, is to cooperate when there is an opportunity to expand the value-creation potential and the market size. Uncertain outcomes weaken the game theory predictions. In this context, the game theory begins indirectly to highlight the key role of the organization and its management (e.g., creation of repeated game, ability to identify defection, credible penalties). However, the assumptions on which rely the game theory do not allow us to dig deeper into the organizational level and the management. We need more research in order to dig deeper directly into the management of coopetition. This management could be the missing link to allow the collaboration between competitors in an uncertain context.



2. Rethinking through resource and competence based view

If the game theory justifies the need to rethink the business relationship between competitors as cooperative and competitive, it is not completely satisfactory. For instance, the game theory is not enough to understand how this optimal outcome of collaborating can be reached in uncertain contexts or to explain how cooperation generates this positive sum game at the organizational level. In response to these limits, the coopetitive literature mainly uses the resource based view (RBV). In these articles, the RBV is used in complement of the game theory predictions and sometimes even replaces the game theory (e.g. Clarke-hill et al., 2003; Fernandez & Le Roy, 2010; Gnyawali & Park, 2009). The RBV is a relevant lens because through a reflection on the *raison d'être* of the firm; it justifies the need to rethink the business relationship between competitors as “competitive and cooperative” and gives concrete materialization of this shift. Thus, there is a real need to focus our attention on this theory.

Our theoretical reflection on RBV is based on three steps. First, we present the traditional arguments that RBV tends to defend a competitive relationship between competitors (cf. subsection 2.1). Then, we question the relevance of conceptualizing the relationship between competitors as only competitive. To do so, we use three contributions of the multiple RBV extensions: (1) the collaboration as a loci of firm's resources, (2) the benefit of choosing a competitor as partner and (3) the shift from a static to a Schumpeterian dynamic perspective (shifting from a rival to a non-rival approach of the resources (cf. subsection 2.2). The last step consists in synthesizing RBV insights and highlight that it also suffers from limitation. To illustrate and increase our understanding of these limits, we choose to focus on one of the limits and highlight the research opportunities that constitute this limit (cf. subsection 2.3).

2.1. Thinking of the business relationship as an internal resource race

The RBV traditionally offers a competitive view of the business relationship between firms (Fernandez, 2011, p. 62). Firms are engaged in a resource accumulation race, also called “skill-building marathon” (Hamel, 1991, p. 83). The firms are engaged in this race because the resource differentials are the *raison d'être* of the multinational firms (Hamel, 1991; Teece, 1986). The resources enable a firm to conceive and implement value creating-strategy (Michael , Hitt & Ireland, 1986). The resource very broadly includes “all assets, capabilities,

organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enables the firm to conceive of and implement strategies that improve its efficiency and effectiveness”(Barney, 1991, p. 101)⁴. They can also take different forms from “tangible resources” (e.g., machinery, equipment, patents, trademarks and intellectual property) to “intangible resources (e.g., knowledge of employees, managerial skills, firm’s reputation”). Thus, from the RBV, a firm is a portfolio of value creating resources and skills instead of a portfolio of products or markets (Hamel, 1991; Prahalad & Hamel, 1990). Prahalad and Hamel (1990) used the metaphor of a tree. The business units are like the branches of the tree, the end products are the leaves, and the whole tree relies on its roots which represent the value creating resources. A firm’s survival is based on the accumulation of strong “roots” (i.e., idiosyncratic value creating resources). For example, Honda’s competitive advantage is based on its expertise in powertrains but also on its encompassing disciplines as total quality control, just-in-time manufacturing system. The former allows the reuse of different products in its automobiles and motorcycles. The latter delivers a product at the best price/performance (Hamel, 1991).

Resource-based perspective focuses on the individual firm’s bundle of resources. For a long time, it has been considered that the RBV had nothing to say about inter-firm relations. It is the main limit of this traditional perspective of the resource-based view. It envisions firms as an independent entity (Lavie, 2006). However, firms are not independent and most of the time even negatively interdependent. The competitive advantage of firms is related to the firm’s internal resources relative to the other firm’s internal resources. The existence of competitive advantage relies on two assumptions: (a) that firms are heterogeneous concerning their resource profiles and (b) those resources are not perfectly mobile across firms (Barney, 1991). The heterogeneity implies that resources and skills are not distributed equally among firms. Performing skills is not enough to generate a competitive advantage. The survival of the firm will depend on the relative performance of its skills compared to the ones owned by the competitors. The exploitation by a competitor of a specific skill emphasizes the focal firm’s skill deficiencies (Hamel, 1991, p. 83). Thus, the whole competitive advantage relies on skill discrepancies. The second assumption of the imperfect mobility of resources is at the origin of complementarities between firms. The fact that they are not perfectly mobile makes

⁴ Barney’s definition is based on Daft (1983).

the buying, imitation, or internal development consume too much time, money and opportunities (Lavie, 2006).

However, within all the resources owned by the firm only certain resources, namely “strategic resources,” put firms in a position that enables them to achieve an above normal profit (i.e., rents). These strategic resources are like other resources; it can take all the forms as assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. Their specificities are their valuable, rare, inimitable, and non-substitutable characteristics. It is these four characteristics that assimilate the resource as a “rival good” which generates sustainable competitive advantage and above average performance (Barney, 1991). The competitors who do not possess such resources cannot implement similar value-creating strategies (Barney, 1991; Peteraf, 1993). By being valuable, they increase the efficiency and effectiveness of the firm; by being rare, they generate an advantage relative to the other firms; by being not substitutable, any other resources do not have a comparable performance; by being inimitable, they are firm-specific requirements (Peteraf, 1993). As these strategic resources are considered as rival good, the challenge is to own and control them

Thus, a firm’s *raison d’être* and performance rely on its capacity to control valuable, rare, inimitable, and non-substitutable resources. The resources are rival, and firms are engaged in an intense competition to develop and control these rival resources.

2.2. Rethinking the business relationship as an opportunity for flows of resource

Although the resource based view initially offers a competitive view of the business relationship between firm inter-firm relations, in this section we justify why business relationships need to be reconceptualized through cooperation and competition and not just competition. We present the three critical elements that serve as the conceptual scaffolding for our reflection : (a) the importance of the collaboration as a loci of resource flows, (b) the insight that a competitor can be a relevant partner, (c) the distinctive contribution of shifting from a static to a Schumpeterian dynamic perspective and from shifting from a rival to a non-rival approach of the resources. Then, we articulate them and conclude about the real need to rethink the relationships between competitors.

❖ Cooperative relationship as a loci for resource flows

The specificity of a cooperative relationship is that they allow the flow of strategic resources. These flows are crucial because few firms can create alone all resources needed to prosper and grow (Leonard, 1998). Most of the firms need to import some existing resources from beyond their boundaries. Resources and capabilities, especially when they are tacit and complex, cannot be easily traded through market channels; therefore, inter-firm collaborative mechanisms are relevant to gain access or internalize complex and tacit resources (Hamel, 1991; Kogut, 1988; Mowery, Oxley, & Silverman, 1998). These strategic resources can take different forms of flow. It can be asset, information, or status flows (Gnyawali & Madhavan, 2001). The *asset flows* refer to money, equipment, technology, and organizational skills; the *information flows* include information and knowledge gathered from connected firms about their competitive intent, strategies, and resources. The information flow happens even in the absence of any asset flows. The last one, the *status flow*, refers to gaining legitimacy from being associated with a high-status firm (Gnyawali & Madhavan, 2001).

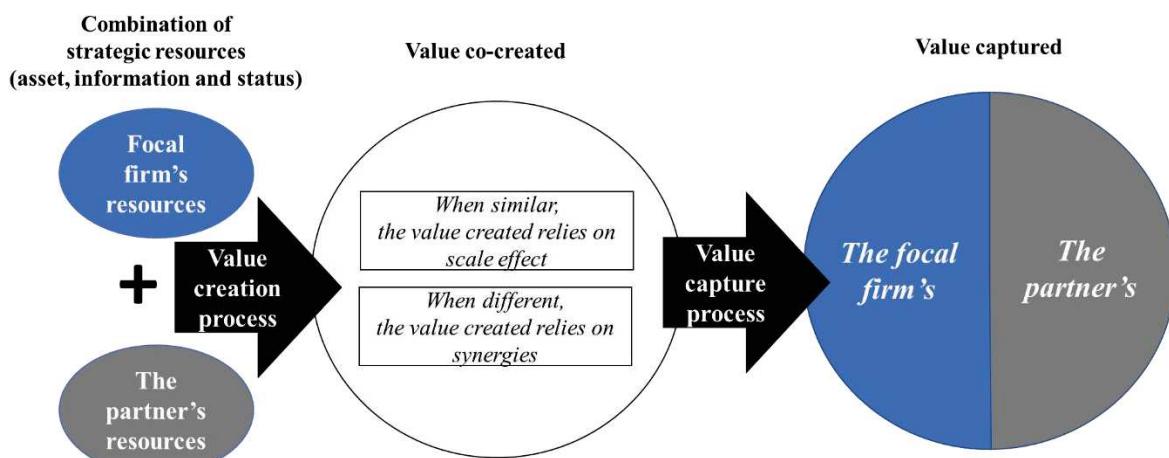
The flows of resources allowed by cooperation do not only fulfill the focal firm's resources based by the missing resources; it also co-creates new value (Ritala & Tidström, 2014). This co-creation is called “relational rents” (Lavie, 2006). The relational rents are common benefits from the collaboration that none of the firms can generate independently. There are two types of relational rents: economies of scale and synergies (Lavie, 2006). The collaboration can benefit from the *economies of scale* when the partners have similar resources. Combining these similar resources allows reaching the critical mass to be profitable (Ritala, 2012). It allows engaging in projects to be considered as not profitable. It happens when the partner has similar resources. For example, the well known car called “monospace” might not have existed if Peugeot and Fiat had not decided to collaborate. Alone, neither Peugeot or Fiat would have considered this car profitable enough due to its low volume of production. Thus, for activities in which firm's benefit from scale effect, the collaboration makes sense. The economy of scale can also concern status and money flows. They can change the bargaining power on the market by combining their money and status. For instance, the groceries, Casino and Cora, decided to combine their money and status to create a common purchasing center when the two leaders Carrefour and Promodes merged (Dussauge & Garrette, 2009).

On the contrary, the synergies happen when the two partners have highly complementarity resources. These synergies have multiple beneficial effects. It can allow the development of new activities or new markets, saving time-to-market and reducing the risk perception by

having ready to use resources. The firm saves time because it does not have to develop them internally and it reduces the risk because the resources already exist and have demonstrated its usefulness in another context (Srivastava & Gnyawali, 2011). For example, Volkswagen became the leader of the Chinese market by combining its manufacturing knowledge to the commercial channel of its Chinese competitor Shanghai Automotive Industries Corporation (SAIC) (Dussauge & Garrette, 2009). Accessing complementary resources is also key because it increases the *diversity in the resource*. The collaboration exposes the focal firm to a breadth of portfolio resources. This breadth of portfolio resources helps a focal firm be engaged in more exploration. For example, the exposure to partners’ diverse technologies broadens the firm’s perspective and increases its ability to see fruitful opportunities that may arise at the confluence of several technologies (Srivastava & Gnyawali, 2011).

From a resource based view, the firm is not an altruist, if they cooperate to create relational rent it is because they perceive their own advantages (Lavie, 2006). They perceive the ability to capture value from the one co-created (cf. *Figure 7*). The ability to appropriate rent from the relational rent depends on multiple factors as the initial contract agreement, the relative scope and scale of the resources, the opportunistic behavior, the bargaining power and the absorptive capacity (Lavie, 2006). These factors can have simultaneously positive and negative effects. For example, a high opportunistic behavior will decrease the scope of the collaboration and thus the relational rent created (Dyer & Singh, 1998). Simultaneously, this opportunistic behavior will lead to the capture of a higher proportion of relational rents. Moreover, these factors evolve through time. The bargaining power might shift when during the collaboration of one of the partner internalizes the competencies of the other (Hamel, 1991; Inkpen & Beamish, 1997).

Figure 7 – The value creation and capture process



Source: Sea Matilda Bez's doctoral research, 2017's visualization of the appropriated relational rent

The rent extracted from the collaboration is not only the proportion of the relational rent appropriated. It can also be private rents which do not concern the partner (Khanna, Gulati, & Nohria, 1998). These private rents also called “internal rents” have been already highlighted twenty or thirty years ago. They can stimulate the development of internal technology, the absorption of a technology, the learning, withstand environmental shocks, improve survival prospects and financial performance, improve the reputation by benefiting from the partner’s status (e.g. Ahuja, 2000; Carlin et al., 1994; Cohen & Levinthal, 1990; Hamel, Doz, & Prahalad, 1989; Powell, Koput, & Smith-Doerr, 1996).

Thus, the resource flows shapes the firm’s capacity to extract rent from collaboration. The resource flows allow the creation of new rents (relational rent) or the leveraging of existing resource based (internal rent). Collaboration results from the calculation and private interest. A focal firm perceives the reinforcement of its power and rents through collaboration (Dameron & Joffre, 2007).

❖ Cooperative relationship with competitors as a loci for relevant resource flows

Cooperating does not automatically generate rents and competitive advantages. If the rents depend on the resource flows, they also differ based on the types of partners. A strong competitor is an attractive partner regarding resources (Ahuja, 2000). Its resources are likely to be very useful to each other compared to another external partner (Kang & Kang, 2010; Le Roy, Robert, & Lasch, 2016). Indeed, when partners are also competitors, they share a common language and similar processes which facilitate the successful combination of their resources (Gnyawali & Park, 2011; Inkpen, 2005). For example, when a firm chooses a competitor, this partner-competitor has the same common market vision thus it is easier to align the joint goal on this same common market. Moreover, when the partner is a competitor, it favors the potential of creating new synergy between complementary resources. Dussauge, Garrette, and Mitchell (2000) refer to the “advantage of having similar dominant logic”(p.102). Moreover, it is because they are competitors that they have useful, ready to use, and superior resources (Gnyawali & Park, 2011; Ritala & Hurmelinna-Laukkanen, 2009). Indeed, as competitors, they are characterized by market commonality and resource similarity (Chen, 1995). Thus, by nature, the content of the other resource is highly relevant and compatible (Lane & Lubatkin, 1998; Luo, 2007; Peng & Bourne, 2009).

From a broad resource and based theory, firms will not only collaborate, they might be proactively willing to collaborate with their competitor. The competitor is an attractive partner regarding resources.

- ❖ Amplification of the need to collaborate with a Schumpeterian dynamic perspective and a non-rival perspective

A context characterized by Schumpeterian competition weakens the traditional rents of the RBV. Indeed, the traditional RBV perspective is mainly static and based on Ricardian rents. The rents are the surplus value after all costs and normal returns. This surplus is driven by different accumulations and mobilizations of resources. However, these rents based on internal resources are continuously in danger in a Schumpeterian competition. Any firm can be endangered by an external actor with a new resource. Not being able to develop internally a substitutable competing resource can threaten the focal firm's survival. No one is safe; even a leader can be threatened by the resource of a new entrant. This situation accelerates the need for a new logic based on the integration of external resources (Dyer et al., 2008).

The main difference between the traditional view of RBV and its extension into a dynamic theory is that it is not enough to accumulate resources anymore. Firms need to renew their resources continuously. The competitive advantage does not rely only on the exploitation of existing internal or external resources. The core of the competitive advantage comes from the creation of new resources. The innovation becomes the source of competitive advantage and thus a firm's priority. The role of inter-firm collaboration changes from accessing existing external resources to their renewal. This renewal aims to innovate and achieve congruence with the changing business environment (Teece, Pisano, & Shuen, 1997). This innovation dynamic changes the perception of the strategic resources. It set aside the need to control non-imitable resources. Having non-imitable resources is only a potential short-lived competitive advantage. This rent extracted from these resources can quickly erode. The real competitive advantage is to access first the resources which have the capacity to change the competitive structure (Baumard, 2009b). The firm's goal is to access the resources that allow it to identify the environment shift or generate this shift.

The specificity of this approach is that the resources are not considered as a rival. The use of one resource by one company does not exclude the use of another. Sometimes the use by someone else can even reinforce its value. Gnyawali and Park (2011)'s case study of the collaboration between the two competing companies Sony and Samsung can be reinterpreted

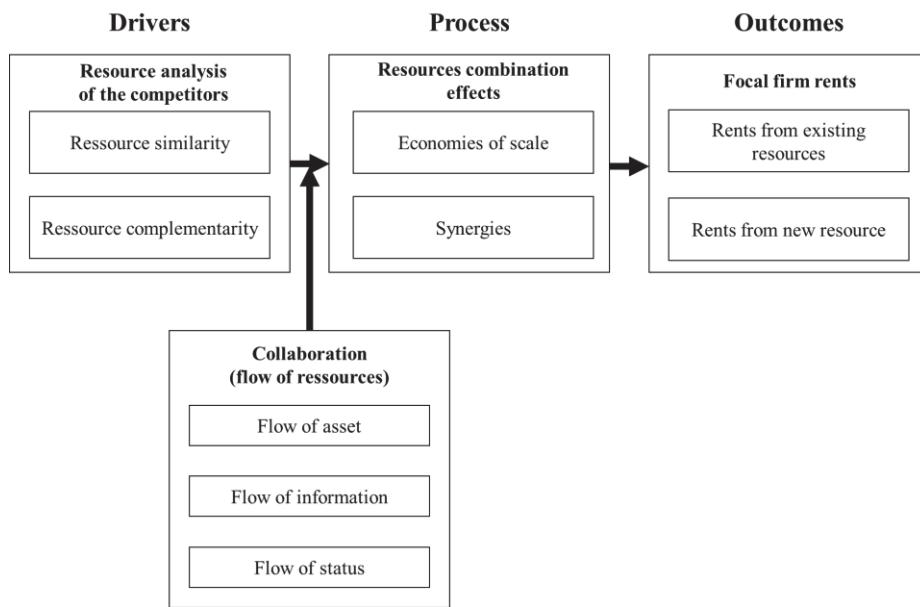
through this lens. Samsung had a substitutable technology to the one used by the leaders of the flat screen industry as Phillips. By pooling this technology with Sony's expertise in television manufacturing, Samsung improved its technology but more importantly improved the value of its technology. Sony, the leader of the traditional television, began to sell flat screens with the initial Samsung technology inside. These sales increased Samsung's technology status and even allowed Samsung to win the technological standard. A battle that Samsung would not have won alone. Thus, the resource as this LCD technology is not a rival good. Perceiving the resources as non-rival amplifies the opportunities to extract value of its resources

❖ Articulation on the three elements above

The three RBV extentions described above serve as the conceptual scaffolding for our reflection. By articulating them, we can argue that there is a real need to rethink the relationship between competitors. Indeed, a focal firm's *raison d'être* is its ability to exploit existing internal and external resources and to create new resources. This resources creation intent underlines the idea that resource accumulation is not enough. A firm's goal is to continuously renew its resource base and innovate (cf. *the above discussion "c" about the shift from a static to a Schumpeterian dynamic perspective*). Based on this resource creation intent, the collaboration between competitors reveals to be a relevant means. Indeed, by nature, competitors have similar and complementary resources (cf. *the above discussion "b" about a competitor being a relevant partner*). Thus, collaborating with a competitor gives access to these flows of similar and complementary resources (cf. *the above discussion "a" about collaboration as a loci of firm resources*). These flows between competitors create new resources that the firm would not be able to create alone (i.e. new assets, new information and new status). The focal firm is motivated into this new resource creation because through a rent appropriation process; it will be able to benefit from it.

As competitors are motivated to let resources flow to its competitors, it proves that perceiving the relationship between competitors as only competitive is too narrow. There are real rent creation opportunities to collaborate with a competitor and let the resources flow between them. Figure 8 offers a schematic representation of the linkage between our conceptual scaffolding from the RBV extensions.

Figure 8 ~ An integrated framework from the three picked RBV extensions



Source: See Matilda Bez's doctoral research, 2017

2.3. Synthesis and research gaps of the resource and competence based view insights

We used the resource and competence based view because the initial game theory which popularized the concept of coopetition was not relevant enough to dig deeper into coopetition at the organizational and managerial level. The resource and competence based view revealed to be a relevant lens that confirmed and extended the game theory insights. Indeed, through the resource and competence based view, we reach the same conclusion: thinking that the relationships between competitors as only competitive is not enough, there is a real need to rethink them simultaneously, cooperatively, and competitively.

The specificity of the RBV extensions is that they give concrete answers about why cooperating with competitors generates additional value (i.e. “positive sum game” for the game theory). Indeed, it is the simultaneous high complementarity and similarity which makes sense of collaborating with competitors. Allowing flows of resources between competitors unlocks economies of scale and synergies. This unlocking is crucial because it allows pursuing their own rent quest. More precisely, it increases the rents from existing resources and the rents from a new resource.

Shift conceptualization of the business relationships between competitors is crucial because a firm with only a competitive representation of the business relationship might not survive an environmental shift. Focusing only on the accumulation of internal resources might

put the firm in a situation of the continuous follower which in this case they will try to survive by developing internally similar resources. One way to not be this perpetual follower is to accept that the resource is non rival goods and that the firm can extract rent from this non rival situation. To do that, there is a need to move beyond the overly simple ideas of competition and reach a vision of the rent extracted from cooperation. Thus, even if firms compete, they can cooperate for their own competitive rent goal.

However, the current RBV does not completely satisfy our understanding of coopetition. On the one hand, the RBV and its extensions make sense of having competitors being simultaneously in cooperation and competition. But on the other hand, the RBV and its extensions understudy the complexity of the intermeshing of cooperation and competition and the managerial solution regarding this complexity. For instance, the RBV and its extension do not take into account enough : (1) the cost of being simultaneously in cooperation and competition, (2) the impacts of the partner's goal and expectations, (3) the negative effect of the resource flows with competitors. These three identified elements call for more research on the management of these business relationships characterized by cooperation and competition. For the record, in this Doctoral research, we do not aim to answer all these limits, but by highlighting them, we increase our understanding of the bigger picture behind coopetition and the need for more research on the management of the intermeshing between cooperation and competition.

First the RBV under-studies the cost of being simultaneously in cooperation and competition. The resource based view and its extension look at the value created and the rent extracted from collaboration, but they do not take into account the multiple costs of this complex situation. It can be an organizational cost for maintaining a greater and more diverse repertoire of cognitive maps, behavioral routines, and organizational resources. But it can also be the implicit price to pay to attract the partner. Hamel et al (1991) refer to the price to be pay to “enticing the partner into the relationship”(p.93). It was confirmed by Ahuja (2000) who highlighted that the desire to collaborate was not enough, the firm must be attractive. There are also the opportunity costs due to no efficient pursuit of the strategy. For example, as the partner is also a competitor, the fear of the knowledge internalization process by a competitor may lead to be less transparent and thus jeopardize the knowledge development and quasi-rents. Lado et al. (1997) refer to the risk of a partner as becoming increasingly “closed” (p.124) (i.e., discloses less and less information”). These costs, if they're not

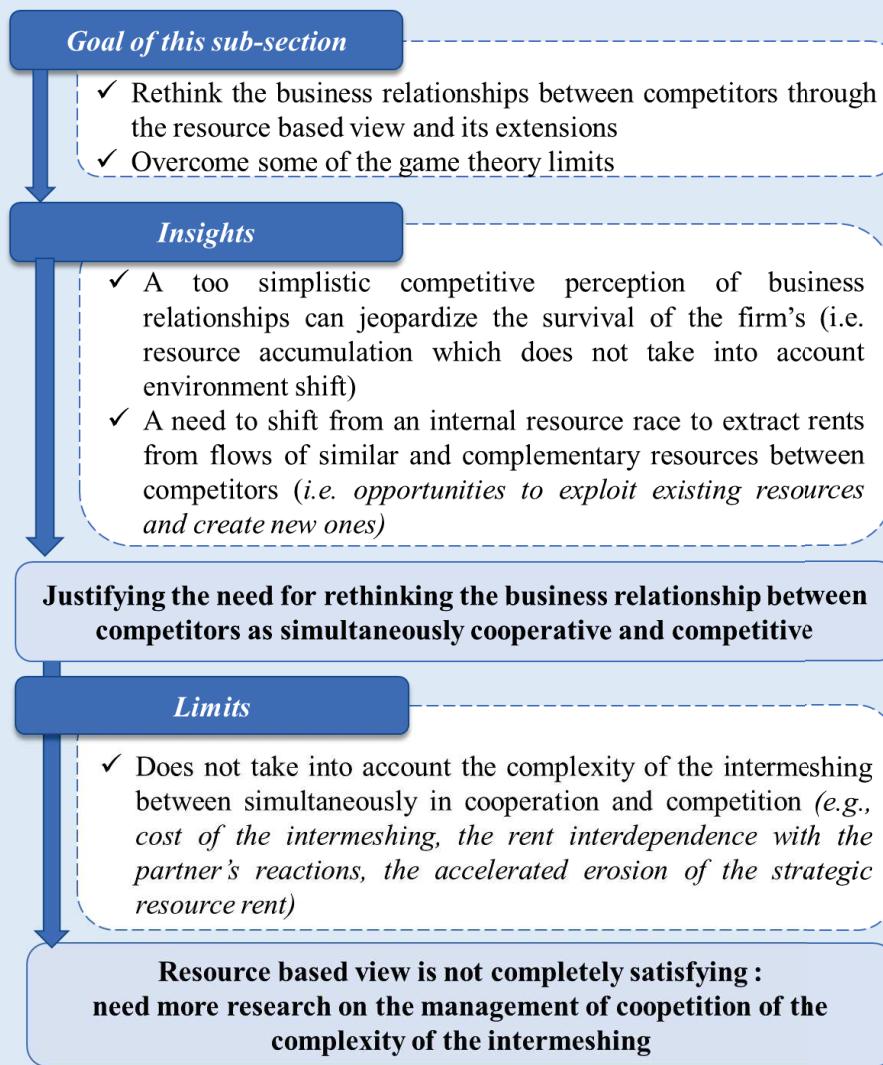
managed, can outweigh the benefit of cooperating (Park & Russo, 1996). Thus, the management of coopetition is a real under-studied issue.

Secondly, the RBV level of analysis, which is the focal firm's resources, limits its potential to explain coopetition and its management. Indeed, it leads to focus only on the management of the focal firm's rents without considering the partner's goals and reaction to the focal firm's rent maximization actions. As highlighted by the game theory, the rational choice depends not only on the focal firm's own preferences but also the partner's actions. It is not possible to maximize the focal firm's rent without thinking about how these actions are impacting the partner's resource contributions. Thus, there is a need for more research which integrates the competitor's goals and reaction.

The third limit is that it is not possible to shift the business relationship conceptualization from only “competitive” to “competitive and cooperative” without shifting the mechanism of capturing value. Indeed, collaboration with competitors increases the likelihood of resources imitability or substitutability. Thus, by collaborating, the focal firm is likely to speed up the erosion of its own strategic resources. The usual protection against external imitation relies on isolating mechanisms, such as property rights protection and causal ambiguity (Dyer & Singh, 1998). These protections can be relevant for partners external to the collaboration, it is weak for the partner inside the co-creation process. It is even weaker when the partner is a competitor. It is almost the same as sending a fox to keep geese. From the perspective of an individual firm participating in an alliance, causal ambiguity and social complexity become insufficient for preventing imitation by the competitor when the competitor is the partner (Park & Russo, 1996). Indeed by collaborating with a competitor, the competitor will have access and even internalize the resource (Hamel, 1991). Thus, the substitutable and inimitability will depend less on the nature of resources and more on the proactive actions of the firms. Factors such as contractual safeguards, absorptive capacity, and opportunistic behavior will determine the degree of imitation and possibility for substitutable resources (Lavie, 2006). Being involved in business relationships simultaneously in cooperation and competition might lead to the rethinking of the appropriation of relational rent when accessing complementary resources of a partner. Lavie (2006, p.647) gives one example: a firm may not need to develop complementary resources internally but should develop mechanisms that ensure appropriation of relational rent when accessing complementary resources of a partner. Thus, the management appears to be strategic and we need to deeper into how to manage it.

Sum up on the resource and competence based view insight

The resource-based view and its extensions justify the need to reconceptualize the business relationship between competitors as simultaneously cooperative and competitive. Indeed, cooperation with competitors can generate rents for the focal firm. The cooperation allows the access to the competitor's similar and complementary resources. A focal firm would never be able to generate these rents alone or it would be too time and money consuming. However, our literature review highlights also a real need to dig deeper into the management of these simultaneous cooperative and competitive relationships. For instance, the RBV highlights a paradox that it does not resolve: by fostering cooperation firms actively promote imitation and substitution (Lavie, 2006). Two characteristics which speed up the erosion of the value of their strategic resources.



3. Extending the coopetition roots with the theory of cooperation and competition

The coopetition literature traditionally relies on game theory and resource and competence based view. We have highlighted how these theoretical approaches could be used to give impetus to coopetition (i.e., justifying a bigger shift behind coopetition). It is possible to go further into the foundation of coopetition by looking outside the current coopetition literature. Indeed, we found that Deutsch's theory of cooperation and competition went back on the mechanisms behind each dimension of coopetition (i.e., cooperation and competition). Understanding the drivers and effects of each dimension of coopetition allows new insights into coopetition.

Deutsch initially developed the theory of cooperation and competition in 1949⁵, then for 60 years, it was continuously improved. Thus in this Doctoral research, we used the upgraded version of the theory of cooperation and competition (Deutsch, 2011). This version is improved because it considers 60 years of opponent critics. For example, if initially, his reflection relied on single goal relationships, now it is based on multi-goals relationships; or if initially, Deutsch considered that all participants had equal power, he changed it to take into account the existence of more powerful actors (Johnson & Johnson, 2005). This theory had a huge impact because it is considered as the basic theory of social interdependence (Johnson & Johnson, 2011)⁶. Moreover, this strategy has proved to have implications for, and applications to a wide range of problems and situations going from education (Johnson & Johnson, 2011) to international conflict and peace-building (Coleman & Deutsch, 2015) or to understand the competitive advantage of the organization as the organization effectiveness (Tjosvold, 1991).

It is surprising that this theory was not used more in the coopetition literature because it discusses the essence of cooperation and competition. Some research quotes it in the coopetition literature and even argues that this theory is “the traditional Western research on cooperation and competition” (Chen, Xie, & Chang, 2011, p. 354) and that this theory “explores the conditions that drive choices between cooperative and competitive” (Smith &

⁵ The theory was developed based on the work of Koffka (1935) and Lewin (1935).

⁶ A theory of cooperation and competition and then the theory of social interdependence are *powerful theories* when we consider the internal and external validity. The theory has been validated in over than 1,500 research and generalizes across a wide range of individual differences, situational variables, cultures and historical periods (Johnson & Johnson, 2011). It has also been used in business research (Johnson & Johnson, 2005).

Lewis, 2011, p. 381). One partial explanation could be that it is coming from the psychosociologist perspective and not the managerial and strategy perspective. However, this explanation is only partial because the theory has been used as a theoretical framework in management's high ranked journal (e.g., Johnson et al. (2006) in *Academy of Management Journal*). Moreover, even if Deutsch does not directly refer to the firm's relationships, his theory makes predictions about intergroup processes. Thus, Deutsch creates interesting insight into coopetition because two competitors collaborating can be considered as two distinct groups having positive and negative interdependences.

Through this theory, we discuss the essence of cooperation and competition (*cf. section 3.1*). Then, we highlight the counter-intuitive implications of engaging in cooperation with a competitor (*cf. section 3.2*). By extending the coopetition foundation to the theory of cooperation and competition, we understand why even the worst competitors can be in collaboration and what the counterintuitive implications are of being both simultaneously.

3.1. Thinking the business relationship as a positive or a negative interdependence

The essence of cooperation and competition takes its roots in Kurt Lewin's works who suggested that mutual goals created an interdependence among group members. Deutsch (1949a, 1973, 2011) extended Lewin's notion. The individuals' goals are linked when the accomplishment of each's goals is affected positively or negatively by the achievement of the other's goal. His contribution is the nature of the interdependency which can be positive or negative, and that this interdependence is the cause of conflict. It is positive when the goals are linked in such a way that the amount or probability of a person's goal attainment is positively correlated with the amount or probability of another obtaining his goal. Conversely, the "negative interdependence" happens when the amount or probability of goal attainment is negatively correlated with the amount or probability of the other's goal attainment. For the record, the individuals can also have independent goals. But in that case, the goals are not linked, and thus the individuals do not cooperate or compete.

It is the degree of positive and negative interdependence which explains the cooperation and the competition between two individuals. The collaboration situation refers to a situation in which the goals of the participants are so positively linked that any individual can not reach its goal without the other reaching its. Deutsch (1973, 2011) uses the example of two swimmers if one sinks both sink. Thus, to swim the other needs to swim too. This positive

interdependence can arise for multiple reasons as a rational reward system (i.e., reward is based on the joint achievement), as a common obstacle (i.e., overcome the obstacle together which can be a common enemy, an authority, a huge R&D cost), as a missing skill or resource (i.e., unable to achieve the task alone needed to divide the work or access the other skill) or even for emotional reasons (i.e., people liking one another). The competition situation refers to a negative interdependence of goals in which the goals are so linked that they are in contradiction with each other. The purest competitive situation is a situation in which the success relies on the other's failure. If we reuse the example of the swimmer, to swim I need the other to sink; and the other needs me to sink in order to swim. This situation happens for an emotional reason (i.e., dislike someone), or a negative reward system (i.e., the more the other has, the less focal firm receives).

This positive interdependence and negative interdependence are a simplified reality. The reality is most of the time much more ambiguous. The ambiguity of the reality is that individuals and organizations have multiple goals. These multiple goals co-existed and can be different in nature (i.e., positive or negative inter-dependent). This simultaneity of both inter-dependencies creates a mixed-motive of both cooperation and competition.

The powerfulness of this theory is that it can be used for intrapersonal, interpersonal, intragroup, and intergroup processes (Deutsch, 2011). If we look at the business relationship between competitors, it is obvious that there are negative inter-dependencies but also positive interdependencies between competitors. Competitors are negatively inter-dependent by nature. The competitor has a negative interdependent goal. They fight for the product, the superior skills, the innovation, the access to resources or suppliers, or the industry leadership (Chen, 1996). However, when the environment is characterized by shorter product life cycles, the convergence of multiple technologies, and increasing R&D and capital expenditures (Gnyawali & Park, 2009), firms become positively interdependent. Their effective pursuit of technological innovations leads to resource dependencies of the competitors⁷. We already developed the argument in section 2. Past literature highlighted that this positive interdependence happens between small firms (Gnyawali & Park, 2009; Robert, Mira, &

⁷ The relevance of using the theory of cooperation and competition into our framework was confirmed by the use of the resource dependence theory to justify multifaceted relationship and thus coopetition (Dowling et al., 1996). Indeed, the resource dependence theory developed by Pfeffer and Salancik (1978) can be perceived as one type of positive interdependence that explain why competitors collaborate. They both lead to similar predictions.

Cadeau, 2014) but also between big firms (Fernandez & Le Roy, 2010; Srivastava & Gnyawali, 2011).

Thus, the theory of cooperation and competition allows us to predict that the more the firm aims to innovate, the more it will be positively interdependent to the competitor and thus engage in mixed-motive relationships characterized by both cooperation and competition.

3.2. Rethinking the business relationship though substitutability, attitudes and inducibility

One other major contribution of the theory of cooperation and competition⁸ is that in a cooperation situation, self-interest expanded to joint interest (D. Johnson & Johnson, 2005). This happens because in cooperation, the individuals accept substitutability (the degree to which the actions of one-person substitute for the actions of another person), positive attitude (believing that they are going to benefit from each other), inducibility (being willing to help the other fulfill its goals) (Deutsch, 1949). Thus, it is not neutral to be in a cooperative or competitive situation. It involves three keys psychological processes: the substitutability, the positive attitudes, and inducibility (cf. Table 4).

Table 4 ~ The characteristics of cooperation and competition

Situation	Effect on the substitutability	Effect on the Attitudes	Effect on the Inducibility
Cooperative	Accept substitutability	Benefit from each other	Willing to help the other fulfill its goals
Competitive	Refute substitutability	The other wants to hurt the focal firm	Obstructing the other to fulfill its goals

Source: See Matilda Bez visualization of Deutsch (2011)

If we transpose it to two competitors in collaboration, that means that behind a cooperative relationship between competition, both competitors accept some substitution of the tasks, a positive attitude of benefit from each other, and also to be willing to help the other fulfill its goals. It is interesting because it is counterintuitive for our research on collaboration between competitors. This means that competitors in cooperation engage in promotive interaction.

⁸ Saying it just the contribution of the theory of cooperation and competition is a little bite narrow. It is also the contribution of the social interdependence theory.

They facilitate each other's efforts in order to complete their tasks and even accept to strengthen each other's capability. Strengthening a competitor's capability is counter-intuitive. It is even more counter-intuitive when the power in a relationship is due to the differential in expertise (Deutsch, 2011). Thus, cooperating means strengthening the competitor with its own capability which gives him more power inside the relationship (i.e., creating or increasing asymmetric power relationships).

The theory of cooperation and competition goes further than understanding the three psychological processes resulting from interdependence; it also highlights the interaction patterns. Positive interdependence results in promotive interactions (i.e., individuals encouraging and facilitating each other's efforts to complete tasks in order to reach the group's goals) while negative interdependency results in oppositional or conflicting interaction (i.e., individuals discouraging and obstructing each other's efforts to complete tasks in order to reach their goals) (D. Johnson & Johnson, 2011). Thus, competitive relationships lead to obstruction and thus at the end value destruction. On the contrary, cooperative relationships lead to promotive action and thus value creation. As by nature individuals react positively to what is beneficial for them and negatively to what can be hurtful, thus it makes sense for competitors to collaborate in a positive interdependence context. This insight is interesting because even if it does not explicitly refer to management, it highlights that there are promotive and obstructive processes behind cooperation and competition. Being conscious of the positive interdependencies and thus of the promotive processes behind them favors cooperation even between competitors. Thus, this gives some clues about how to manage the simultaneous cooperative and competitive relationships. These processes directly impact the outcomes.

3.3. Synthesis and research gap from the theory of cooperation and competition insight

The theory of cooperation and competition (Deutsch, 1949a, 2011) confirmed the game theory and resource and competence based view. It makes sense that even the worst enemies cooperate when the goals are positively interdependent. Deutsch adds two ideas; this independence varies in intensity and evolves through time.

It varies in intensity because firms are a multi-goal organization. Thus, some goals are positively interdependent, and some are negatively interdependent. It is the degree of total positive interdependent goal which predicts cooperation and the degree of total negative

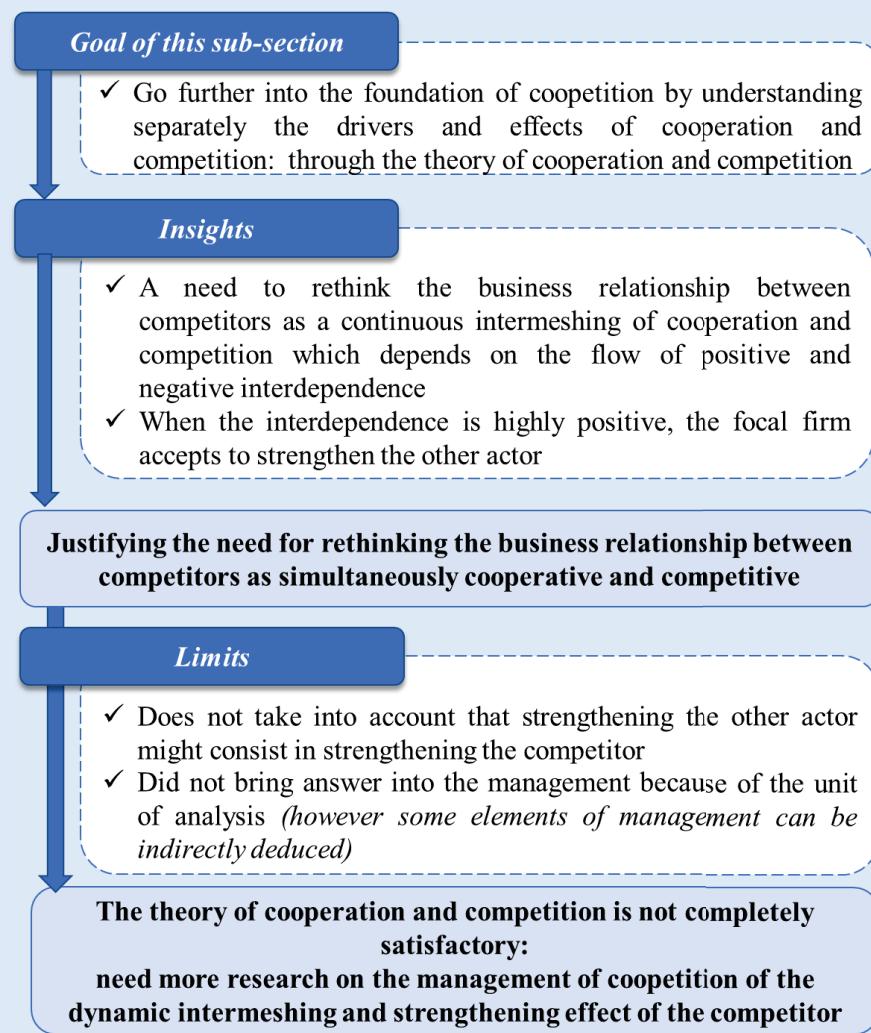
interdependence which predicts competition. A firm can be mainly cooperative, mainly competitive or be an intermeshing of both. Thus, it is too narrow to consider the relationship between competitors as only competitive. Moreover, the conceptualization of the relationship evolves through time. Any internal or external shift can change some goal interdependence (i.e. reinforce or weakens a positive or negative interdependence) and thus change the conceptualization of the relationship. For example, when a new entrant into a market threatens the current competitors, the current competitors' capacity to successfully innovate together determines their survival. Thus, the competitors collaborated because the external threat increased their positive interdependence. This highlights that not only does cooperation make sense, it can also be strategic.

To conclude, based on the theory of cooperation and competition, we need to rethink the business relationship between competitors as a continuous intermeshing of cooperation and competition which depends on the flow of positive and negative interdependence. This representation of the relationship between competitors is not without consequences. When the degree of positive interdependence is high, it implies accepting substitutability and inducibility and having a positive attitude toward the competitor. In its most counter-intuitive form, it consists of promoting the cooperation by bringing each other mutual assistance. In another word, it leads to strengthening the competitor. Strengthening the competitor is counter-intuitive and maybe even dangerous. Thus, there is a need for more research to understand how to manage positive interdependence relationships which imply the strengthening of a competitor.

For the record, even if Deutsch did not study the organization and the management, he began to give nonexplicit managerial advice about processes as the promotive processes.

Sum up on the theory of cooperation and competition insight

Based on Deutsch theory of cooperation and competition we highlighted the need to rethink the business relationship between competitors as a mixed motive situation (i.e., with simultaneously multiple cooperative and competitive goals). One perfect example of this mixed motive is an innovation project with a competitor. Indeed, for innovation, competitors have a positive interdependent goal which should lead to cooperation. However, this cooperation is counter-intuitive because there are three implications of being in cooperation which is counter-intuitive when the partner is a competitor: substitution, the attitude of benefiting from each other and even a willingness to help the other fulfill its goals. Thus, there is a research gap: In a mixed-motive situation with a competitor, does a firm accept to “strengthen the other’s capabilities “?



Conclusion Section 1

To swim, I need you to sink. This metaphor illustrates the basic destructive competitive relationship (Deutsch, 2011). It represents a zero-sum logic in which to win, the other needs to lose. It has been the main perception of the relationship between competitors for a very long time (D'Aveni & Gunther, 1994). Some past research complexified it by highlighting that competitors can collaborate (Carlin et al., 1994; Hamel et al., 1989). However, when we dig deeper, most of these collaborations are still rooted in the same win/lose relationship. One illustration is what they called the “learning race” (Hamel, 1991). Competitors use the collaboration to internalize each others knowledge with the goal of being to do it quicker than the other. Being quicker allows for ending the relationship before the other manages to internalize the wanted knowledge. It is a win/lose relationship even if they are involved in a formal collaboration.

This first section questions the relevance of this competitive relationship between competitors. We used three very different theoretical approaches: the game theory, the resources based view, and the theory of cooperation and competition. Although they are very different regarding the level of analysis, assumptions, research objects and even limits, the three of them lead to the similar prediction about the benefit of cooperative relationships whatever the partner is:

- The game theory focuses on the decision process in an interdependent situation between two economic actors. It predicts the superior outcomes of cooperative relationships relatively to a competitive one. Indeed, when there is an opportunity to expand the value-creation potential and the market size, two economic actors including competitors should cooperate. Not cooperating leads to sub-optimal outcomes and thus locks away some value creation.
- The resource base view focuses on the resource *raison d'être* of the firm and the rent extracted from these resources. It predicts additional rents from a cooperative relationship with competitors. By cooperating with competitors, the focal firm accesses the competitor's similar and complementary resources which allow rents that the focal firm could not have generated alone or with a non-competitor. Again, not cooperating with a competitor locks away some value creation.

- The theory of cooperation and competition studied separately the nature and processes of cooperation and competition. This study highlights the fundamental superiority of cooperation in an interdependent goal situation. Cooperation leads to mutual assistance when competition can potentially lead to obstruction and value destruction.

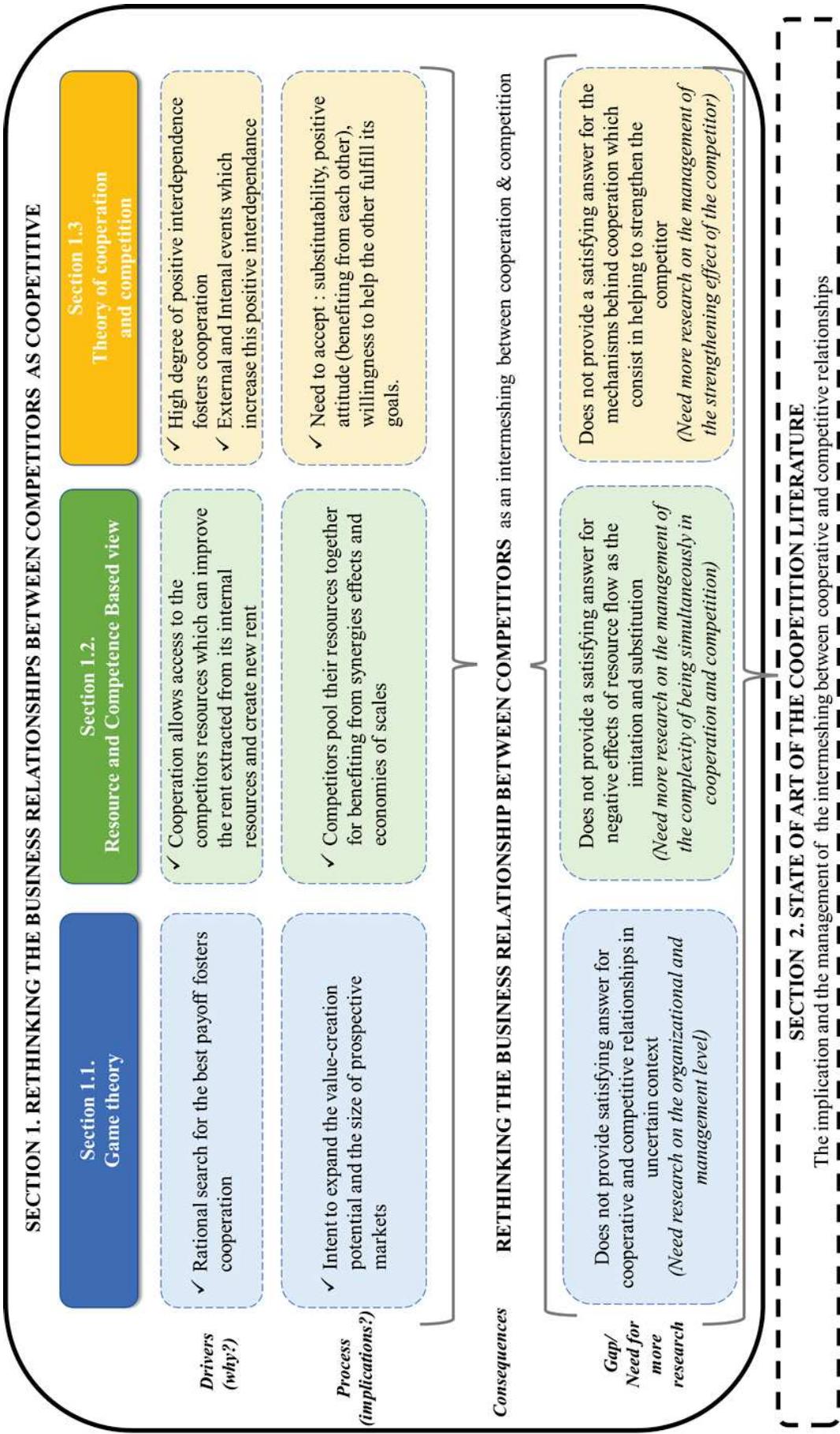
These three theoretical approaches strengthen the need to reconceptualize the relationship between competitors as simultaneously cooperative and competitive. Having only a competitive conceptualization is too simplistic and can lock away value creation opportunities.

Moreover, the three theoretical approaches did not only reinforce the need to reconceptualize the relationships between competitors as simultaneously cooperative and competitive, but it also highlighted the complexity and paradoxical implication of its pursuit:

- The game theory predicts that collaboration is the strong rational choice for competitors when there is a possibility to create a positive sum game. But this prediction is weak when the outcomes are uncertain. The uncertainty of the outcome favors opportunism and thus under-optimal competitive reaction. Even if the game theory did not aim to dig deeper, it implicitly highlights the key role of organization and its management to maintain cooperation in an uncertain context.
- The extension of resource based view justifies through the flow of resource the benefit of cooperating with a competitor. However, the flow of resources actively promotes imitation and substitution and thus the erosion of the value of their strategic resources. There is a real refection needed on the management of this erosion.
- The theory of cooperation and competition highlights that behind cooperation there are implications such as mutual assistance. In other words, the focal firms need to let the competitor “swim” or even help him to “swim.” Accepting to strengthen the competitor (i.e. help him swim), is paradoxical and counter-intuitive. There is a real need to understand how a focal firm can strengthen a competitor without this action being hurtful.

Thus, unlocking the value creation by collaborating with a competitor is a complex strategy. Its pursuit implies a specific management that the three theoretical approaches does not fulfill satisfactorily. Thus, we need to look elsewhere to answer our questions about the management of the simultaneously cooperative and competitive business relationship.

Figure 9~ Synthesis Section 1

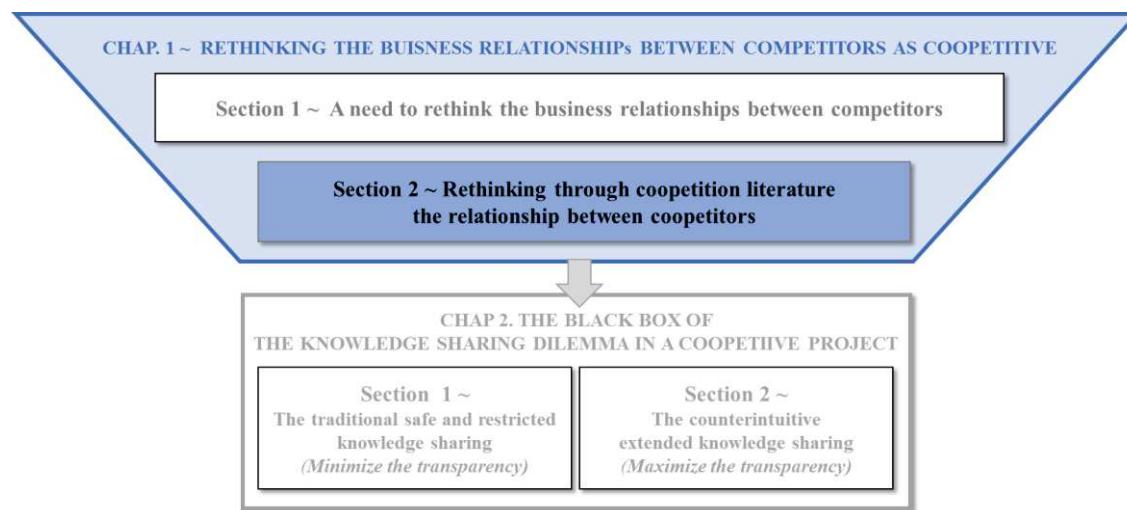


Section 2 ~ Rethinking the relationship between coopetitors: state of the art of coopetition literature

In *section 1*, we justify the need to represent the business relationship between competitors as an intermeshing of cooperation and competition. If the three theoretical lenses were used for a conceptual justification, they remain relatively silent on how managers should unlock and pursue the opportunities of this intermeshing of cooperation and competition. Indeed, we highlighted the need to deepen our understanding of the management of these relationships.

As we also explained there is a specific stream of research which already studied the managerial phenomenon of having companies engage in simultaneously cooperative and competitive strategy. Most of them call this phenomenon “coopetition.” Thus, in this section 2, we do a state of art of the current progress in understanding this unique phenomenon of simultaneous competition and cooperation called coopetition (Ansari et al., 2016; Bengtsson & Kock, 2000b; Gnyawali et al., 2016; Le Roy & Czakon, 2016).

Figure 10 ~ Visual representation of our programmatic literature review

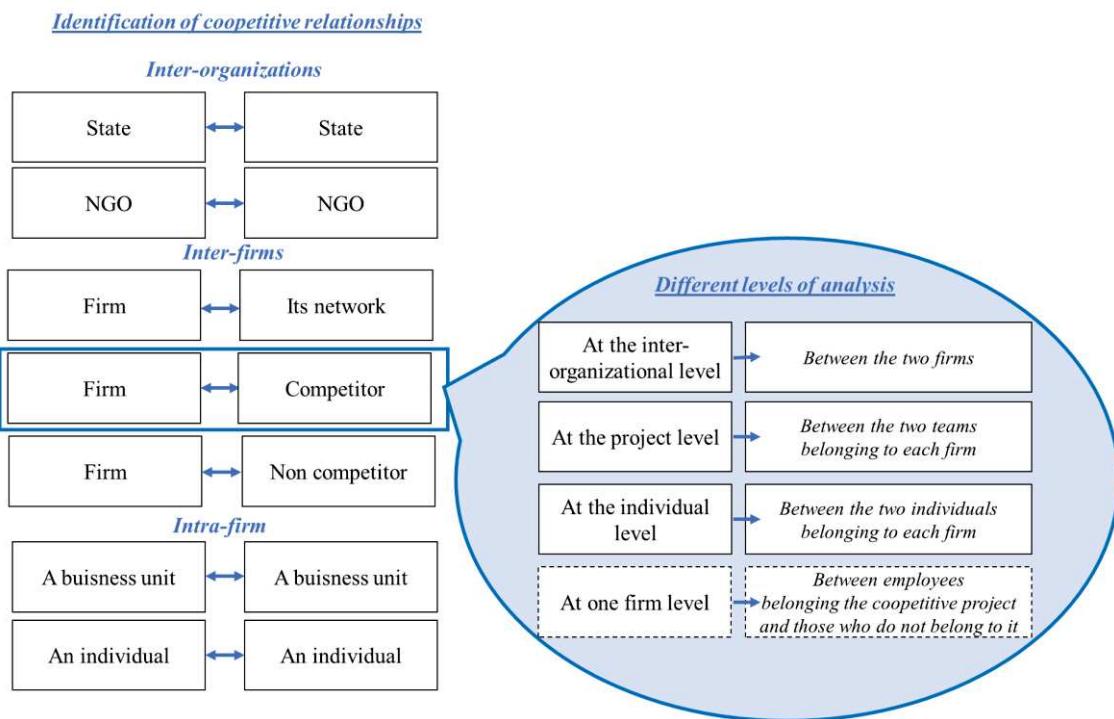


The term *coopetition* is a neologism of the words “**coo**(peration)” and “(com)**petition**” (Brandenburger & Nalebuff, 1996). It conceptualizes the coexistence of cooperation and competition. Research on coopetition has been growing rapidly since one of its first use in the managerial book of Brandenburger & Nalebuff (1996). Indeed, a “Business Source Premier” search on the term “coopetition” or “co-opetition” before the book was published yields only four articles with a peer review (Amburgey & Rao, 1996; Bart, 1996; Denison, Hooijberg, &

Quinn, 1995; Dowling, Roering, Carlin, & Wisnieski, 1996). Today⁹, the same research generates 1091 articles. A more narrow research highlights that of those articles 216 have “coopetition” or “co-opetition” in the title. All these articles made progress in understanding this unique and managerially important phenomenon of coopetition (Ansari et al., 2016; Bengtsson & Kock, 2000b; Gnyawali et al., 2016; Le Roy & Czakon, 2016).

However, defining coopetition is a complex task. There are a wide variety of definitions on coopetition (Bengtsson & Raza-Ullah, 2016; Gnyawali & Song, 2016). Nowadays any phenomena that exhibits simultaneously competition and cooperation is called coopetition. They use the term “coopetition” without specifying what is the exact phenomenon observed and the level of analysis. Depending on the research, the term “coopetition” refers to different relationships: inter-organization coopetiton, inter-firm coopetition or intra-firm coopetition (cf. *Figure 11*).

Figure 11 ~ The multiple phenomena of coopetition and its multiple levels of analysis



For the record : this figure does not aim to be exhaustive but to highlight the ambiguity of the concept of coopetition (i.e. depending on the articles, coopetition refers to a different phenomenon in which there are simultaneously some cooperative and some competitive dimensions).

Source: See Matilda Bez's doctoral research, 2017.

⁹ Research done the June 28th, 2017.

It can be a cooperation and competition relationship between states (Esty & Geradin, 2000), between the firms of its network (Peng & Bourne, 2009), between two organizations (Le Roy & Fernandez, 2015), between business units (Tsai, 2002), among groups of people or individuals (Näsholm & Bengtsson, 2014). Moreover, the phenomenon observed depends not only on the relationship but also on the level of analysis. For example, the phenomenon of coopetition between two firms can be studied at different levels (cf. *Figure 11*): at the inter-organization level, at the working group or at the individual level (Le Roy & Fernandez, 2015). Some even look at the internal tension generated by an inter-firm coopetition (Pellegrin-Boucher & Le Roy, forthcoming).

Thus, the term coopetition might be used each time there is a relationship which is simultaneously cooperative and competitive. One of the most extreme consequence could consist in calling a collusion situation by the term coopetition. In collusion, two competitors are simultaneously collaborating and competing. They are collaborating by fixing a common price that increases the value captured from the client. Thus, paradoxically the success of the concept of coopetition is also its weakness. Coopetition cannot only be defined as simultaneously cooperation and competition. Each researcher should always carefully specify which phenomenon is studied and at which level (Bengtsson & Raza-Ullah, 2016; Gnyawali & Song, 2016). In this doctoral research, as we explained in section 1, we aim at observing the business relationship between competitors. Thus, we are focusing only on the inter-firm relationship between direct competitors. We deliberately set aside the other forms of coopetition.

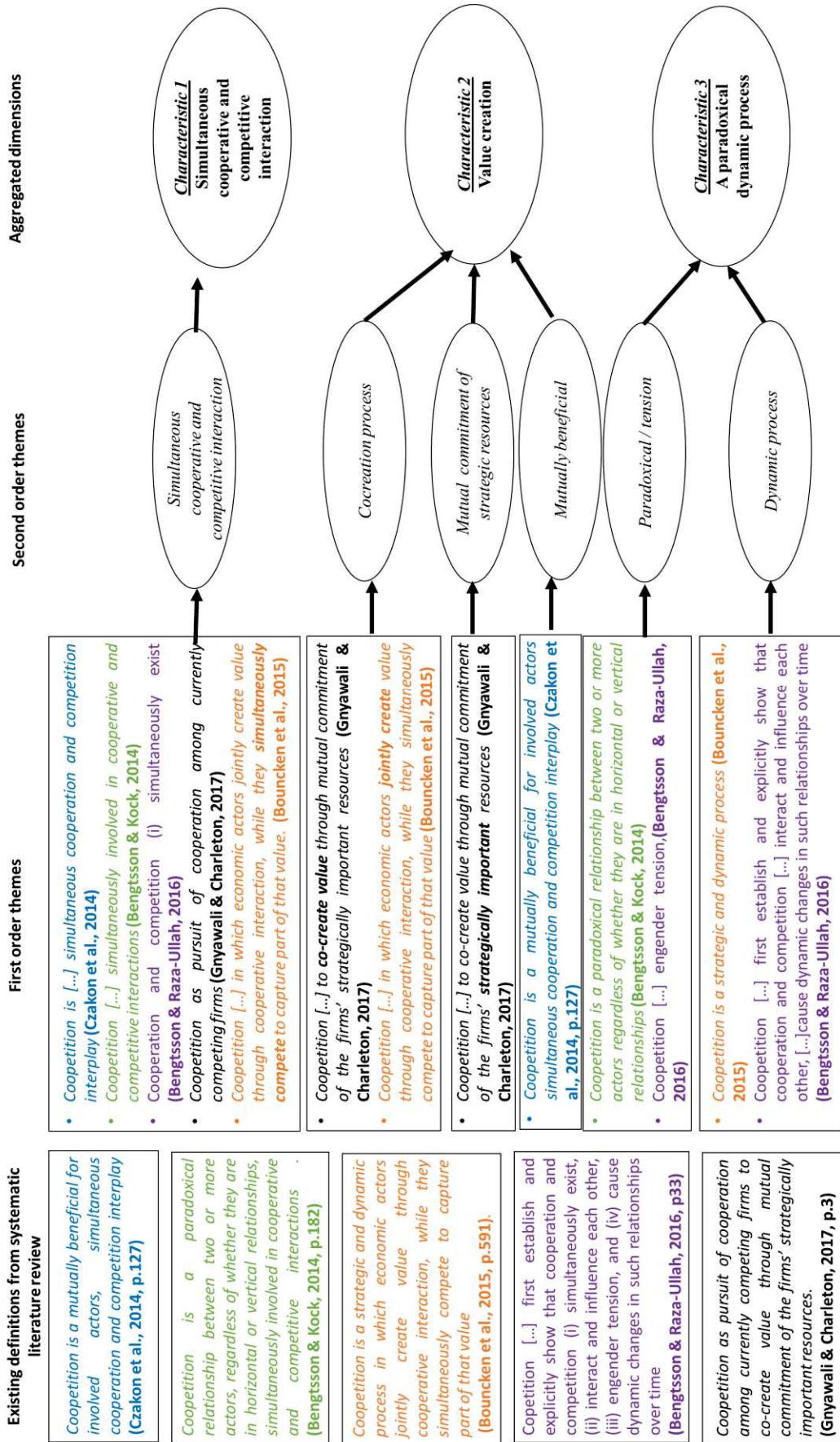
Thus, in this section, we answer the question: “What does coopetition between inter-firm competitors concretely mean? How can we identify a coopetition strategy?” To answer these questions, we used several literature reviews on coopetition (Bengtsson & Kock, 2014; Bengtsson & Raza-Ullah, 2016; Bouncken, Gast, Kraus, & Bogers, 2015; Czakon, Mucha-Kus, & Rogalski, 2014; Dorn, Schweiger, & Albers, 2016; Gnyawali & Charleton, 2017). Indeed, the number of articles on coopetition reached a point that doing a review of the coopetition literature was relevant (Bouncken et al., 2015; Czakon, Mucha-Kus, et al., 2014; Gnyawali & Charleton, 2017; Zineldin, 2004). We picked five of these recent articles that used their systematic literature review to develop their own definitions of coopetition¹⁰ (cf. first column of *Figure 12*). Based on these five definitions that we considered as raw data, we

¹⁰ We did not use directly Dorn et al (2016) because they do not construct their own definition of coopetition.

analyzed them to identify the key characteristics of coopetition. Our analysis process is inspired from the Gioia et al.'s method for rigors in inductive research (Corley & Gioia, 2011)¹¹. Our conclusion is that although all the definitions are unanimous on the characteristic of the simultaneity of cooperation and competition between competitors, it is not enough to depict a coopetition strategy. It is necessary to add other characteristics as positive sum intent or that coopetition is a paradoxical dynamic process (cf. last column of *Figure 12*). We are going to look at these characteristics one by one: first, the simultaneity of competition and cooperation; second the value creation intent; third the paradoxical and dynamic process of coopetition. Each characteristic is also extended with complementary contributions of the coopetition literature. This reinforcement leads us to go further in the three main characteristics of coopetition and through them to do a state of art of the coopetition literature.

¹¹ We are aware that this method is not usually used for the analysis existing definition but we considered it was an interesting and relevant method to analyses with some objectivity these definitions.

Figure 12 ~ Characteristics of coopetition
 (Source :Sea Matilda Bez doctoral research 2017)



1. Characteristic 1: from the simultaneity of cooperation and competition to the simultaneity of strong cooperation and strong competition

The simultaneity of competition and cooperation is the most fundamental characteristic of coopetition (Gnyawali & Charleton, 2017). The 96 papers analyzed by Czakon et al. (2014) refer unanimously to this simultaneity. Thus, the sequential cooperation and competition cannot qualify as coopetition. It is not coopetition when a firm is cooperating for one period of time and competing for another (Luo, 2007). Both dimensions need to occur simultaneously. We are aware that some of the initial research on coopetition had a broader approach of coopetition and include in the coopetition definition the time compartmentalization of cooperation and competition (Baumard, 2009a; Dumez & Jeunemaître, 2005; Pellegrin-Boucher & Fenneteau, 2007). However, the later research took the stand for a narrower definition which excluded the temporal sequential presence of both dimensions. It is the simultaneity that makes the phenomena unique and interesting (Gnyawali et al., 2008; Le Roy, Yami, & Dagnino, 2010). In a first sub-section, we characterized coopetition as a simultaneously cooperative and competitive relationship.

1.1. Coopetition as a simultaneous cooperative and competitive relationship

However, even if some research argues that this simultaneity is the less contentious characteristics (Gnyawali & Charleton, 2017), Bengtsson and Raza-Ullah (2016) highlight two different ways to materialize the simultaneity of cooperation and competition (Cf. *Table 5*). For ***the Actor School of Thought***, coopetition is a context. Cooperation and competition can be divide among actors inside a network (Brandenburger, & Nalebuff, 1996). These actors of the value net network can cooperate with some actors and compete with others in a “value-net” network. In other words, different actors including customers, suppliers, and competitors can complement each others value, i.e., “*bake a bigger cake.*” Then they can all compete for the appropriation, i.e., to take a maximum share of that cake (Bonel & Rocco, 2007; Brandenburger & Nalebuff, 1996). They do not have to be a direct competitor to be engaged in a coopetitive relationship. For example, in Dyer and Singh (1998), a firm can increase its competitiveness by cooperating with other firms. In that case, the firm is simultaneously engaged in a cooperative and competitive relationship but with different firms. The competition occurs between networks of allied firms. Conversely, for ***the Activity School of Thought***, the simultaneity of competition and cooperation is a mandatory happening

between the two same firms. The same firms simultaneously cooperate in some activities and compete in others. In brief, it refers to the coexistence of cooperation and competition relationships between the same global rivals (Luo, 2007). The focal firm is engaged in one-to-one, direct, and simultaneously cooperative and competitive interactions with the other firms (Gnyawali & Park, 2011). These rivals can be direct competitors or suppliers that compete in some activities. For example, Microsoft, who was initially a supplier for Surface Book producers, decided to produce its own surface book. Thus, as Microsoft became a competitor to its Surface Book client, they are engaged in a coopetition relationship (Bengtsson & Raza-Ullah, 2016). In this activity school of thought, some studies do not distinguish between horizontal and vertical coopetition. They often treat the two dimensions as similar (Bouncken & Fredrich, 2012).

Table 5 ~ The main differences between the two coopetition School of Thought

Coopetition School of Thought	Actor School of Thought	Activity School of Thought
Main focus	The network	The coopetitive relationship
Are they competitors?	Not necessary: they can be any actor that can be a complementor to the firm product (that add value)	For the most extreme school of Thought: they are a direct competitor For the less extreme: it can be a supplier which is in some activity a real or potential competitor

Source: Sea Matilda Bez's doctoral research, 2017 (based on Bengtsson and Raza-Ullah (2016) identification of the two School of thought

This doctoral research is part of the most extreme group of the activity school of thought. This choice implies that the focal firm needs to engage in a cooperative relationship with a direct competitor. We deliberately make this choice because we believe that the most extreme cases are the cases that offer the unique opportunities for counterfactuals (i.e., non-occurrences) and thus facilitate the creation of novel insights. Moreover, it is consistent with our aim to look deeper into the paradoxical relationship of coopetition. Thus, it is logical to pick the most paradoxical relationship; i.e., *when the contradictory logics of cooperative and competitive interactions between the same pair of firms happens at the same time and between direct competitors* (Le Roy et al., 2010).

It is key to materialize what is cooperation and what is competition to be able to identify a coopetition relationship. Competition means taking independent actions in domains to improve their own performance and indirectly hinders the other's actions (Dorn et al., 2016). For example, when a firm sells one product to a client, it hinders the other firm's sales. Chen (1995) conceptualizes the competitor analysis and concludes that what characterizes high competitive relationships is the simultaneity of market commonality and resource similarity. Market commonality refers to the degree of overlap in the markets of the focal firm and its partners. Resource similarity refers to the degree of comparability of the strategic resources of the focal firm and its partners. The competitive tensions are the highest when both dimensions are high. Moreover, the competition depends also on the firms' competitive actions to challenges the status quo of the market process. The intention impacts the dynamic of value capture. The actions aim to capture more value at the expense of the other competitors (Ferrier, Smith, & Grimm, 2016). In Table 6, we highlight the multiple ways of competing.

Table 6 ~ The multiple ways of competing between competitors

Competition Characteristics	Examples
Market commonality	<ul style="list-style-type: none"> ➤ orders, ➤ contracts, ➤ market share.
Resource similarity	<ul style="list-style-type: none"> ➤ technology, ➤ information, ➤ human resources, ➤ natural resources, ➤ indigenous supplies, ➤ favorable government treatment
Competitive actions	<ul style="list-style-type: none"> ➤ Price action ➤ Marketing action ➤ Product and innovation action ➤ Capacity action ➤ Legal action ➤ Signaling action

Source: created by combining Chen (1996), Luo (2007), Ferrier (2000)

Inversely, the collaborative relationship means that the actions undertaken by one actor deliberately facilitate the actions undertaken by the other (Dorn et al., 2016). Most of the time

these cooperative relationships refer to flow of resources and more precisely to the likelihood of knowledge transfer and learning potential (Srivastava & Gnyawali, 2011)¹². The flow of resources (i.e., asset, information or status) can take multiple forms. It can (1) be a cooperative alliance or any collective efforts, (2) concern very different functional areas of concern by the collaboration, and (3) vary depending on different product goals (cf. *Table 7*). The opportunities of collaboration between competitors are much larger than only alliances and are rooted in this need of external resources (Bengtsson & Kock, 1999)¹³.

Table 7 ~ The multiple ways of cooperating between competitors

Characteristics	Examples
Type of collaborative relationship	<ul style="list-style-type: none"> ➤ an international joint venture, ➤ an outsourcing agreement, ➤ a licensing agreement, ➤ a franchising agreement, ➤ a R&D consortia agreement, ➤ a co-production agreement, ➤ a co-marketing agreement, ➤ an action to improve a host country's industry infrastructure ➤ an action to press the local authorities for market access or fair competition ➤ a unit action against uncompensated leakage of proprietary knowledge to local firms, ➤ a sharing common supplies or global distribution channels, ➤ a cluster for production, development, or resource supply at home or abroad ➤ a lobbying action ➤ a common industry standard
Functional area concern	<ul style="list-style-type: none"> ➤ primary value chain activities (both upstream and downstream), ➤ especially long-term out-sourcing or supply agreements,

¹² cf. section on the resource and competence based view in the chapter 1 of this doctoral research for further arguments.

¹³ In Bengtsson and Kock (1999), two drivers appear to be key: the need for external resource and the relative position in the sector. From their analysis and visual representation, we understand that it is the strong need for external resources that leads to cooperation. It is the combination of this need with the relative position in the sector that shifts the cooperation into a pure cooperation relationship (i.e., when combined with a low relative position in the sector) or a coopetitive relationship (i.e., when combined with a high relative position in the sector).

by the collaboration	<ul style="list-style-type: none">➤ co-production,➤ co- marketing,➤ supporting value chain activities, especially R&D,➤ information systems,➤ organizing experience,➤ managerial expertise.
Product concern by the collaboration	<ul style="list-style-type: none">➤ An untested product by the market,➤ A product involving complementary strengths but divergent competing markets or competitive goals,➤ A product offering a learning opportunity to firms that have limited access to proprietary skills.➤ Product for geographical areas that are promising but volatile, difficult to access due to tangible and intangible barriers.

Source: Table constructed based on the article of Luo (2007, p.130-131)

1.2. Coopetition as a pursuit of strong cooperative and strong competition relationships

The cooperation and competition relationship can be more complex and interrelated than just the two dimensions occurring simultaneously. Past research went deeper and highlighted that inside a coopetition relationship, there can be different levels of cooperation and competition from weak to strong (Bengtsson & Kock, 2000; Park, Srivastava, & Gnyawali, 2014). More precisely, if Bengtsson and Kock (2000) identified three cases: coopetition with a cooperation dominance, coopetition with a competition dominance and equal relationship when cooperation and competition are equally distributed. Park et al. (2014) highlighted that the equally distributed relationship could be divided in two: balanced strong coopetition and weak coopetition. The research goes further and argues that it is the “balanced-strong coopetition” (i.e., strong cooperation and strong competition) which enhances firms' innovative coopetition performance (Le Roy et al., 2010; Park, Srivastava, & Gnyawali, 2014a; Park et al., 2014b). Strong competition urges firms to innovate while strong cooperation stimulates resource sharing which is necessary to innovate. Or in a broader conceptualization, the balanced strong coopetition is the most performant because it combines the benefit of cooperation (i.e., access to the resources) and competition (i.e., stimulation and innovation). Thus, the phenomenon of coopetition is an intriguing phenomenon not because of the simultaneity of cooperation and competition. It is the high rents of the pursuit of

simultaneously strong cooperation and strong competition which make coopetition intriguing (Le Roy et al., 2010; Park, Srivastava, & Gnyawali, 2014a; Park et al., 2014b).

Sum up on the first characteristic of coopetition:

The goal of this first sub-section is to discuss the main and unanimous characteristic of coopetition which is the simultaneity of cooperation and competition. Our reflection based on our literature review confirms that the simultaneity is key (i.e., in this doctoral research sequential cooperation and competition is not coopetition). Moreover, the degree of cooperation and competition appears to be crucial in the characterization of a coopetitive relationship. For us, a coopetition business relationship is a cooperation which occurs between direct competitors. Thus, the relationship is characterized with simultaneous strong cooperation and strong competition. This situation happens when the firms in interaction are characterized on the one hand by market commonality, resource similarity and competitive actions, and on the other hand by a high flow of resources which can lead to resource transfer and learning potential.

2. Characteristic 2: from value creation from cooperation with competitors to value creation from the intermeshing of cooperation and competition

The second characteristic of a coopetition relationship is the value creation process from being simultaneously in cooperation and in coopetition. Indeed in the definition of coopetition based on systematic review of literature of coopetition, two of the five felt the need to put this characteristic explicitly in the definition (Bouncken et al., 2015; Gnyawali & Charleton, 2017).

2.1. Value creation from cooperation with competitors

Gnyawali and Charleton (2017) argue that mutual commitment of strategically important resources is an enabling condition for value creation to happen. For them and as well as for us, strategically important resources are the one's which generate rents through their valuable, rare, non-imitable, and non-substitutable characteristics (Barney, 1991). They justify this need of strategic commitment with the example of Sony and Samsung's collaboration. This collaboration ended by a value creation process which enabled the partners to outcompete others and made LCD as the dominant standard for flat-screen TV. To reach this level of value creation, the two firms involved top management's commitment, investment of \$2 billion from each partner, critical engineering and development expertise, and relevant organizational competencies for the LCD panel technology. This strategic resource commitment facilitated the achievement of value creation goals (Gnyawali & Park, 2011). For them, this criterion is so important that when the resources committed are not rent generating resources (e.g., industry wide alliance) it is representing a case of weak coopetition.

However, if the commitment of strategic resources is key to value creation, this same commitment can also lead to negative rents (Lavie, 2006). Negative rents are generated by opportunistic acts (Park & Russo, 1996), unintended spillovers (Dyer & Singh, 1998), and outlearning by the competitor-partner (Hamel, 1991). These negative rents question the generalization of the coopetition as a mutually beneficial strategy. Indeed, coopetition could be a win-win strategy or a win-lose strategy (Ritala & Hurmelinna-Laukkonen, 2009). The perfect example is the “competitive collaboration” described by Hamel (1991).

The main difference between the two outcomes is in the research focus. The former who argues the need to commit strategic resource focuses its attention on the value creation. The

latter who stresses the negative rent from the commitment of strategic resources focuses on the value capture. This distinction has already been highlighted by Gnyawali and Charleton (2017) who identified two different streams of research interested in the simultaneity of cooperation and competition (cf. *Table 8*). The first stream called “the interplay” perceives the collaboration with a competitor as capture value opportunities and most of them do not use the concept of “coopetition.” They are mainly interested in the value capture allowed by the cooperation between competitors. They consider that the competition jeopardizes this value capture and thus needs to be reduced. The second stream called “the integrative” claims and uses the concept of “coopetition” in the content of the research and even in the title of their articles. They believe that being in cooperation and competition simultaneously creates value that could not have been created in an only cooperative or competitive situation.

Table 8 ~ The main differences between the Integrative and Interplay approaches

Perception of cooperation and competition	Interplay	Integrative
Consequence of been in cooperation and competition	Incentive to be opportunistic	Opportunity for a win-win relationship
Main research attention Emphasis of understanding	Value capture of either competition or cooperation, (introduce the other element as a contextual or explanatory variable)	Value creation that stem from interactions between cooperation and competition
Link between cooperation and competition	Either-or entities – distinct but inter-related parts	Two interdependent parts of a unified whole
Examples of authors	Dussauge, Garrette, & Mitchell,2000; Park & Russo, 1996	Ansari et al., 2015; Gnyawali & Park, 2011

Source: *Sea Matilda Bez's doctoral research, 2017 (based on Gnyawali and Charleton (2017))*

As explained earlier, in this, doctoral research, we are interested in the value creation of the coopetitive business relationship, thus we belong to the second stream called “integrative.” We consider that being simultaneously in cooperation and competition generates specific beneficial conditions. The coopetitive literature enumerates a list of drivers and positive

outcomes of a collaborating relationship with a competitor: improve quality standards, production efficiency, and product innovation; to influence a third party; to achieve economies of scope and setting industry standards (Dorn et al., 2016; Gnyawali & Park, 2011; Zineldin, 2004). Although most research confirmed these positive outcomes of collaborating with competition, we consider that it does not justify why the intermeshing of cooperation and competition creates value.

2.2. Value creation from the intermeshing of cooperation and competition

For us, it is the intermeshing which creates value (more than the positive impact of collaborating). We argue that the strength of coopetition is that the intermeshing of cooperation and competition is likely to positively impact the firms' ability and motivation to create value (cf. *Table 9*). The intermeshing of cooperation and competition impacts the ability to create value because it combines the strategic resources of the current competitors. It is the fact that the partner is a current competitor that explains the synergies between their mutual resources. Being competitors implies resource relevance to the collaboration: the resources are directly useful (e.g., simultaneously similar, complementary and superior) and the resources are compatible (e.g., same threat and opportunities in the environment)¹⁴. Firms can create value that they could not have done alone or by collaborating with a non-competitor.

The strength of the intermeshing of cooperation and competition is that it does not only impact the ability to create value, it also increases the motivation to create value. We find two reasons explaining why the intermeshing of cooperation and competition increase the motivation of creating value. First, it is the *expectation concerning the potential value to capture* (i.e., competition) which increases its willingness to create value. Moreover, it is also because they are competitors that their relationship is characterized by a *strong willingness to learn* for the resources of the other (Hamel, 1991). Being simultaneously in cooperation and competition is a protection against a risk of any collaboration which is the lack of motivation to learn. By collaborating with a competitor, there are fewer risks of disinterest, neglect, or decision traps. Each competitor asserts its receptive abilities. Larsson et al. (1998) highlight the strength of having a "good student" attitude instead of a "teacher" attitude in a value

¹⁴ We had already developed these ideas (cf. Part 1- Section1). The resource based view highlighted the additional synergic effect of combining resources from a competitor relatively to a non-competitor.

creation process. Concretely, as the partner is a competitor, if a firm shares strategic resources, its competitor has a high incentive to use and learn it. It will generate a virtuous circle: the more critical resources are shared for the cooperative purpose, the more the competitor-partner will be willing to learn, and the more mutual resource creation will occur. Thus, it is the syncretism between competition and cooperation that fosters greater resource seeking and resource development and technological progress, than either competition or cooperation pursued separately (Lado, Boyd, & Hanlon, 1997).

Table 9 ~ Competition leverage the cooperation

Competition effects	Details on the beneficial effect of competition in cooperation
Ability to create value	<p>Useful resources – if the partner is a competitor that means it has “superior” resources</p> <p>Compatible resources – if the partner is a competitor that means they have evolved in the same environment and share common threat or opportunities</p> <p>Capacity to give advice - if the partner is a competitor that means it has to challenge the current decision of the firm</p>
Motivation to create value	<p>Incentive to create value - The expectation concerning the potential value to capture (i.e., competition) increases its willingness to create value</p> <p>Willingness to learn - Their competitive position increases its willingness to learn which increases the capacity for knowledge development</p>

Source: Sea Matilda Bez's doctoral research, 2017.

These leveraging effects happen in a relationship characterized by strong cooperation and strong competition. These leveraging effects are the roots of the advantages of being both in cooperation and competition (Dagnino & Padula, 2002). It is these effects that lead to superior performance and not just the cooperation (Lado et al., 1997). It is because collaboration and competition coexist that they benefit from their joint dynamic (Ritala, Kraus, & Bouncken, 2016). Thus, a coopetition strategy invites us to rethink the relationship between cooperation and competition through this leveraging effect. It rejects the view that the competitive

dimensions are only harmful and need to be reduced (Das & Teng, 1996; Dyer & Singh, 1998). On the contrary, it argues that firms can benefit from the positive dynamic of the intermeshing of cooperation and competition. Reducing the competition can lock away value creation opportunities.

Sum up on the second characteristic of coopetition

The goal of this second sub-section is to discuss coopetition as a co-creation process. Our reflection based on our literature review confirmed the specificity of coopetition. The value creation is due to the leveraging effect of competition on the cooperation. It is the intermeshing of cooperation and competition which creates value. Thus, the core outcome of coopetition is not the collaboration (e.g. split of the R&D cost, split of the risk) but the outcomes from the intermeshing of cooperation and competition (e.g., ability and motivation to create value).

For the record, this specificity leads to a paradoxical situation: the strength of coopetition is that the competitor is motivated to learn.

3. Characteristic 3: from a paradoxical and dynamic relationship to the management of the dynamic and paradox of being simultaneously cooperative and competitive

Most of the time, the articles on coopetition adopt a normative approach concerning coopetition (Le Roy & Czakon, 2016). They consider that the intermeshing of cooperation and competition leads to superior performance relative to only cooperation or only competition (Bengtsson & Kock, 2014; Czakon, 2009). However, the pursuit of this strategy is complex and does not always end as expected (Park & Russo, 1996). Being simultaneously in cooperation and competition has specific implications. It is in opposition to Aristotle's principle in which it is not possible to be something and its contrary simultaneously (Dumez & Jeunemaître, 2006). Thus coopetition raises a question: is it possible to implement simultaneously the contradictory actions of cooperation and competition? (Dumez & Jeunemaître, 2006). A whole sub-stream of the coopetition literature answers this question by arguing that it is possible, but it implies a specific management (Fernandez & Chiambaretto, 2016; Le Roy & Czakon, 2016; Le Roy & Fernandez, 2015). Indeed, coopetition is inherently paradoxical. This paradoxical situation creates tensions, strain, and conflicts which inhibit the effectiveness of the firm's responses and at the end lock away some interfirm outcomes (Gnyawali et al., 2016). We construct our reflection on the three critical ideas of this stream : (1) that coopetition is a paradoxical and dynamic process, (2) that this paradoxical and dynamic process can be a threat for the firm, (3) that this paradoxical and dynamic process needs to be managed (and not reduce the paradoxical situation).

3.1. Coopetition is a paradoxical and dynamic relationship

The paradoxical nature of coopetition is a key characteristic of coopetition. The three articles considered as the cornerstone of the coopetition literature, Brandenburger et Nalebuff (1996), Lado et al. (1997) and Bengtsson et Kock (1999)¹⁵, all refer to coopetition as paradoxical (cf. *Table 10*).

The paradoxical nature was considered as crucial because, by revealing the coopetitive relationship, the researcher revealed complex relationships which consist of two opposite

¹⁵ These three article are the cornerstone of the coopetition literature according to Le Roy et al. (2010)

logics of interaction. Competitors are simultaneously hostile to each other due to conflicting interest (i.e., competition) and simultaneously friendly due to common interests (i.e., cooperation) (Khanna et al., 1998). If we reuse Gomes-Casseres (1996) comparison of cooperation and competition as the oil and water, it means that we found cases where oil and water are mixed which are on a physical dimension impossible. Oil and water, as cooperation and competition are not known to mix, and they are even known to operate side by side, one after the other, or layered one on top of the other. In the past sections, we went further by highlighting that coopetition does not just consist of being in cooperation and competition simultaneously. Coopetition is characterized by both dimensions as being highly interrelated. The competition increases the motivation to cooperate, and the cooperation creates additional incentive to compete. This simultaneity and persistence over time of the contradictory and yet interrelated elements are what characterized a paradox (Smith & Lewis, 2011). Thus, coopetition is inherently paradoxical.

Table 10 ~ The paradox at the origin of coopetition

The three cornerstone articles of coopetition	How did they use the paradox characteristic of coopetition?	Quotes
Brandenburger et Nalebuff (1996)	As an explanation for the fact that being simultaneously in cooperation and competition is counter-intuitive	“This duality [of cooperation for creating the pie and competition to divide it up] can easily make business relationships feel paradoxical ” (p.264)
Lado et al. (1997)	As a consequence of having cooperation and competition simultaneously	“We view the simultaneous pursuit of both competitive and cooperative strategies as a paradox ” (p.112),
Bengtsson et Kock (1999)	As one crucial characteristic of coopetition that needs to be highlighted in the definition of the coopetition	“The dyadic and paradoxical relationship that emerges when two firms cooperate in some activities, such as in a strategic alliance, and at the same time compete with each other in other activities is here called “coopetition” (p.412)

Source: Sea Matilda Bez's doctoral research, 2017

This specific organizational phenomenon is considered as one of the most paradoxical (Chen, 2008). Previous studies have made substantial progress in understanding the organizational phenomena of being simultaneously in cooperation and competition

(Fernandez, Le Roy, & Gnyawali, 2014; Gnyawali et al., 2016; Tidström, 2014). They confirmed that cooperation and competition are paradoxical by identifying concrete materialization of the antagonism. Indeed, existing simultaneously creates strains or conflicts (Gnyawali et al., 2016)¹⁶. These specific strains and conflicts are also known under the constructs of “tension,” “felt tensions” or “coopetitive tensions”(Fernandez et al., 2014; Tidström, 2014)¹⁷. These researches already highlighted the different coopetitive strains and conflicts. They are multi-dimensional, multi-level and dynamic. Considering the levels, the coopetitive strain and conflict can arise at different levels of the organization: inter-organizational level, intra-organizational level and inter-individual level (Fernandez et al., 2014). At each level, they can have different sources. It can be related to the antagonist role, knowledge sharing, the power & dependence, or opportunism (Tidström, 2014). For instance, being simultaneously in cooperation and competition can create a schizophrenic attitude of simultaneously looking for the organization’s goal and the cooperation’s goal (Tidström, 2014). This happens when in order to reach the collaboration goal a firm has to share strategic resources, and this sharing reduces the firm’s ability to capture value from it in the future. Thus if the sharing is relevant for the cooperation goal, it jeopardizes the organization’s future.

This antagonism does not necessarily remain constant over time; it can become stronger or weaker through time. Firms constantly configure and reconfigure its cooperative and competitive interactions in response to changing parameters in goals, market conditions, and roles (Bouncken et al., 2015). The cooperation and competition between a given pair or group of firms are likely to change to respond to new threats or opportunities (Hung & Chang, 2012). Similarly, an intermeshing of cooperation and competition evolves through the interactions. Indeed, when one firm behaves opportunistically or adopts a competitive learning behavior, the other firm reacts in accordance which can change the intermeshing between cooperation and competition (Hamel, 1991). For example, Hamel (1991) highlighted that firms which initially did not intend to learn the knowledge of the partner began to engage in a knowledge internalization process as a defense reaction to the partner’s behavior. Thus,

¹⁶ Gnyawali et al. (2016) distinguish strain and conflict. The strain are due to the duality of being in cooperation and competition, and the conflict are due to the contradictions.

¹⁷ When past research chooses to use the construct of “tension”, “felt tensions” or “coopetitive tensions”, their choices fit to their research object and level of analysis. Here in this section, we nurtured our reflection with all their work. We choose to use strain and conflict because it refers to directly observable construct compare to tension.

even if the firm might be initially “cooperation dominant,” the competitive behavior of the partner can change the intermeshing between cooperation and competition. These dynamic changes between the intermeshing of cooperation and competition are more and more intense and rapid due to today's convergence of industries and rapid change, as well as increased customer demands for complex, integrated, and unstandardized products and services (Bengtsson & Raza-Ullah, 2016).

Thus, a coopetitive relationship is a paradoxical and dynamic relationship. The strains and conflicts are the manifestations of the paradox of the simultaneity of cooperation and competition. Moreover, their evolutions materialize the dynamic relationship. The results are a continuous flow of cooperative and competitive actions that are intermeshing.

3.2. A potentially hurtful dynamic and paradoxical process

The pursuit of the coopetition strategy can be difficult and a real challenge because of these strains and conflicts (Fernandez et al., 2014; Gnyawali et al., 2016). These strains and conflicts can jeopardize the execution of coopetition strategy (Bonel & Rocco, 2007). Fernandez et al. (2014) provide illustrations of how these strains and conflicts that they call tensions can threaten coopetitive relationships. They can turn a common project into failure or make it miss some opportunities. In their case study of the collaboration between the two competitors Astrium and TAS, Fernandez et al. (2014) identify nine different tensions which occur almost simultaneously and at three levels. At the inter-organizational level, there can be tension concerning the commercialization. The fear that the new co-developed product can cannibalize some current market share can hinder its development. Astrium and TAS had co-developed a satellite called Alphabus. This new satellite was heavier, more powerful and more expensive than the existing satellite. Thus, it suffered from a lack of competitiveness. To be competitive this new satellite needed to be used for bid in higher categories. However, there was strain and conflict which slowed down and even stopped this change of category. Both companies feared that the new co-developed satellite was going to cannibalize their market share on this higher category of the bid. For this higher category, they initially preferred to do it alone which locked away some opportunities to the creation and increased performance. Thus, the strain and conflict due to competitive commercialization can lock away some opportunities. But these strains and conflicts due to the commercialization are not the only one; there are strains and conflicts due to the ordering party, the division of the activity, the governance, or the activities division (Fernandez et al., 2014). To be more

precise, the conflict concerning the governance is that both want to be the prime contractor. The prime contractor is the manufacturer that directly interacts with the client. This frequent interaction creates a privileged relationship and optimizes its chances to win future bids with the same client. Thus, the two firms are in direct competition for this position. This competition might slow down and jeopardize the execution of the coopetitive strategy; especially if they do not manage to solve this solution. If these inter-organizational strains and conflicts are difficult and can jeopardize the success of the relationships, there are also strains and conflicts inside the mixed project team in charge of the development of the new satellite. These tensions can be due to differences between industrial processes or dilemmas between protecting or sharing strategic information. Fernandez et al. (2014) also found strain and conflict at the interindividual level. When an individual wants to defend his/her parent firm, it can lead to reinforcing competing behaviors among team members. It is why some engineers refused to share the agreed and needed information. For them, the information was too crucial and could jeopardize the firm. However, by not sharing it, it jeopardizes the common project.

In this specific case of Astrium and TAS, the two companies managed to overcome these strains and conflicts. They managed to reach their goals which were to win the bid and manufacture this very innovative satellite called Alphabus. However, there are cases where the competition eclipses the cooperation (Park & Russo, 1996). Through quantitative tests on the joint ventures in the electronics industry, Park and Russo (1996) find that the presence of competition between joint venture partners outside of the agreement scientifically impairs the chances for the operation's chance of survival. Their explanation is that when the firms are competitors, they will act opportunistically. Indeed, as competitors, they can recognize and appropriate key technologies and know-how which increases their incentive to act opportunistically. The opportunistic behavior or even just the fear of the opportunistic behavior jeopardizes the collaboration. More concretely, in alliances with competitors, the collaboration and knowledge sharing is compromised by the information leakage and the risk of hold up (Santamaria & Surroca, 2011). Other research confirmed that the collaborating with competitors is the least fruitful way of producing innovations. Given the increased risk of opportunistic behavior, the fear of helping a rival and lack of trust is too strong to allow cooperation. (Nieto & Santamaría, 2007). Thus, the competition dimension leads to strain and conflict that could (1) slow down, (2) miss some opportunities, (3) jeopardize the whole collaboration. The competition can eclipse the cooperation. Thus, an intuitive reaction could be to reduce the competitive dimension.

However, reducing the competition is in contradiction with our two first characteristics in which we highlighted that it is the intermeshing between cooperation and competition which creates the coopetition advantage (Padula & Dagnino, 2007). It is the simultaneity of both competition and cooperation which make coopetition a highly profitable strategy (Le Roy & Czakon, 2016). The difficulty is to find a balance between cooperation and competition intermeshing in order to benefit from its advantages but not fall in the destructive process highlighted above (i.e., negative ending, conflict, or strain).

3.3. The management as the missing link between coopetition and its benefit

Although the strains and conflicts can evolve into a destructive or low-value cooperation, there are empirical results proving that these negative shifts do not always occur. Past research highlighted several examples of highly paradoxical coopetitive relationships, and yet these relationships managed to deliver the significant expected common outcomes (Bez, Le Roy, Pellegrin-Boucher, & Goursaud, 2014; Fernandez & Le Roy, 2010; Gnyawali & Park, 2011). One famous example is the collaboration between the two television manufacturers Sony and Samsung. The internal and external strains and conflicts were very high. The internal one concerned the fear that Sony's confidential technology would fall into rival Samsung's hands and the external one was due to the public reaction in Japan which considered Sony as a traitor since Samsung was a South Korean company (Gnyawali & Song, 2016). Despite their fierce rivalry and these strains, they formed a joint venture (called S-LCD) in 2004, invested \$1 billion each, and managed to co-develop and produce LCD panels for flat-screen TVs (Gnyawali & Park, 2011). These cases are not exceptional cases. Quintana et al. (2004) carried out a longitudinal analysis of a sample of European dedicated biotechnology firms which usually take part in collaboration networks characterized by coopetition dynamics. They found that cooperation with direct competitors contributes positively and significantly to product lines. Faems et al., 2010 highlighted that in research and development project, the two partners managed to share sensitive technological information even if it took some time (Faems et al., 2010). In contrast, Ness (2009) reports how changes in a goal led to highly contentious interaction and less knowledge sharing. In accordance, Hamouti et al. (2014), through a quantitative and qualitative study in the video-game industry, highlight that coopetition had a positive impact on radical innovation. A result which is in contradiction with Santamaria & Surroca (2011). Thus, coopetition leads to ambiguous outcomes; the

empirical results sometimes conclude that coopetition leads to positive outcomes and sometimes negative one.

A growing specific stream of research in coopetition phenomena argues that this ambiguity is due to the management of the tension or the capabilities to deal with the coopetitive tensions. The management of coopetitive tension is the missing link between the tension issue from the paradoxical relationship and the outcomes (Gnyawali et al., 2016; Le Roy & Czakon, 2016; Le Roy & Fernandez, 2015). The management could explain the ambiguous results of the coopetition. They identify different principles to ensure the success of the strategy even when they are simultaneously in high cooperation and high competition (Fernandez & Chiambaretto, 2016; Fernandez et al., 2014; Seran, Pellegrin-Boucher, & Gurau, 2016; Tidström, 2014). The specificity of this stream is that they look for a managerial solution that does not consist in reducing one dimension, but they look for a managerial solution that consists in allowing the coexistence and even the intermeshing between both dimensions of cooperation and competition. The theoretical roots of this stream of research is the management of paradox (e.g. Poole & Van de Ven, 1989; Smith & Lewis, 2011)

One of the managerial principles identified to manage coopetition is the principle of separation¹⁸. This principle takes its origin in the idea that individuals are not able to internalize the paradox. Thus, the solution is to split the individuals inside the organization between those who are going to collaborate with the competitor and those who are going to compete with him (Bengtsson & Kock, 2000a; Dowling et al., 1996; Herzog, 2010). The management of cooperation and the management of competition should be split to manage coopetitive tensions. By splitting, the individuals oversee only one dimension (i.e., cooperation or competition). Thus, they should not experience strain or conflict due to the need to deal with the intermeshing of both. It should reduce and hinder the destructive effect of having both simultaneously. The separation can be functional (e.g., collaborate and the R&D and compete on the marketing activities) or spatial (e.g., collaborate in one country like China and compete in other countries). Recently, Le Roy and Fernandez (2015) identify a concrete organizational design which allows this separation principle. They called it the

¹⁸ We are aware of the critics of the separation principle: However, this solution can be considered as only relatively relevant for two reasons. First, it does not allow the whole benefit of the intermeshing between competition and collaboration (Oshri & Weeber, 2006; Chen, 2008). Second, the separation principle appears to be inefficient because the individual in charge of the cooperation needs to integrate the paradox. Even if they collaborate, they need to consider the interest of the firm.

“coopetitive project team.” It is a fully dedicated team composed of technological, human and financial resources from both competitors and which has a dedicated clear objective and a specific time limit. The clear objective is to mix the project teams to create and exploit positive synergies. This specific team allows splitting cooperation and competition: cooperation for the member inside the team and competition for the other. This splitting process allows theoretically co-existence of both dimensions without the need for an individual to deal with the intermeshing.

However, creating a coopetitive project team is not enough to prevent strain and conflict. Inside the coopetitive project team, the tension needs to be managed through the integration principle. The integration principle consists of the acceptance of paradoxes. The individuals understand their roles in a paradoxical context and behave accordingly, following both logics simultaneously. Instead of reducing cooperation or collaboration, firms maintain the balance between both (Fernandez & Le Roy, 2015). The main insight is that in a coopetitive project team, the individual has to overcome the destructive strain and conflict. They need to integrate the coopetition duality into their daily activities. Even if the two teams are working together on a daily basis, they still belong to their parent firm and defend the firm’s interest. The individual is aware that next to the collaboration their firms are competing in current other projects or future projects, and that their behavior can impact positively or negatively this competition. Thus, they have to defend their firm’s interests and yet collaborate. It is in contradiction with the roots of the principle of separation which is based on the idea that an individual cannot integrate the paradox. Some research brought proof that some individuals as the project manager or an engineer can integrate the paradox. In the case of the engineer in the Astrium and Thales who did not want to share the strategic knowledge, through effective management the two firms managed to share this strategic knowledge. Thus these engineers managed to integrate the paradox. This example gives the interesting insight that the management can change the individuals’ way of behaving to integrate the paradox and accept the intermeshing between cooperation and competition. One concrete way to do it is to use the co-management principle. It consists of a duplication of the managerial functions (i.e., bicephalous governance structure and dual management committee). Thus, team members of the coopetitive project team receive directives from a project manager belonging to its parent firm. This process reduces the strain and conflict of knowledge sharing at the engineering levels. Indeed, engineers consider it easier to accept to share the knowledge if the directive comes from one manager of the parent firm and not from one of the competing firms. The fact

that the other managers want the knowledge is obvious, but it might not be so relevant, if one manager from its parent team asks to share the strategic knowledge, it means that it is relevant for the firm.

Thus, the intermeshing between cooperation and competition needs to be managed. The management through separation, integration, and co-management principles allows the two firms to engage in the highly paradoxical and dynamic relationship without having the simultaneous cooperation and competition leading to strain and conflict that could destroy the collaboration or lead to missing some opportunities.

Sum up on the third characteristic of coopetition

The goal of this third sub-section is to discuss the paradoxical and dynamic nature of coopetition which is the simultaneity of cooperation and competition. Our reflection based on our literature review confirmed that being simultaneously in cooperation and competition leads to paradoxical and dynamic intermeshing between cooperation and competition. This paradoxical and dynamic intermeshing have two opposite effects. On the one hand, it is wanted because it is generating the competitive advantage of a “coopetitive relationship,” on the other hand, it generates strain and conflict which can lead to missing some opportunities or even threatening the survival of the firm. Based on this insight, the management has a crucial role in maintaining high cooperation and high competition without generating the destructive strain and conflict.

Thus, for us, coopetition is characterized by the need of a specific management that deals with the dynamic and paradox of the high cooperation and high competition intermeshing.

Remark: through the coopetitive project team lens, it appears the management of the intermeshing between high cooperation and high competition happens at the working group level (i.e., between the two teams belonging to two competing parents). Thus, to look deeper into the intermeshing between high cooperation and high competition, we should focus on the working group level.

Conclusion Section 2

Our section 2 aimed to do a state of the art of the knowledge on coopetition. To do this state of the art, we first relied on a two-step process. The first step relied on the five articles which had developed their own definition of coopetition based on their recent and systematic literature reviews of coopetition (Bengtsson & Kock, 2014; Bengtsson & Raza-Ullah, 2016; Bouncken et al., 2015; Czakon, Fernandez, & Minà, 2014; Gnyawali & Charleton, 2017). From these definitions, we identified three main characteristics coopetitive business relationships: (1) the relationship is characterized by the simultaneity of cooperation and competition, (2) the intent is to create value with competitors, (3) this relationship is paradoxical and dynamic. Our second step consisted in extending our reflection on these three characteristics based on some additional contributions to the literature of coopetition. This work leads us to extend the characteristics of coopetition : (1) coopetition is a business relationship characterized by strong cooperation and strong competition, (2) the intent is to create value through the leveraging effect of cooperation and competition intermeshing, (3) the condition to benefit from this value creation is to implement a specific management.

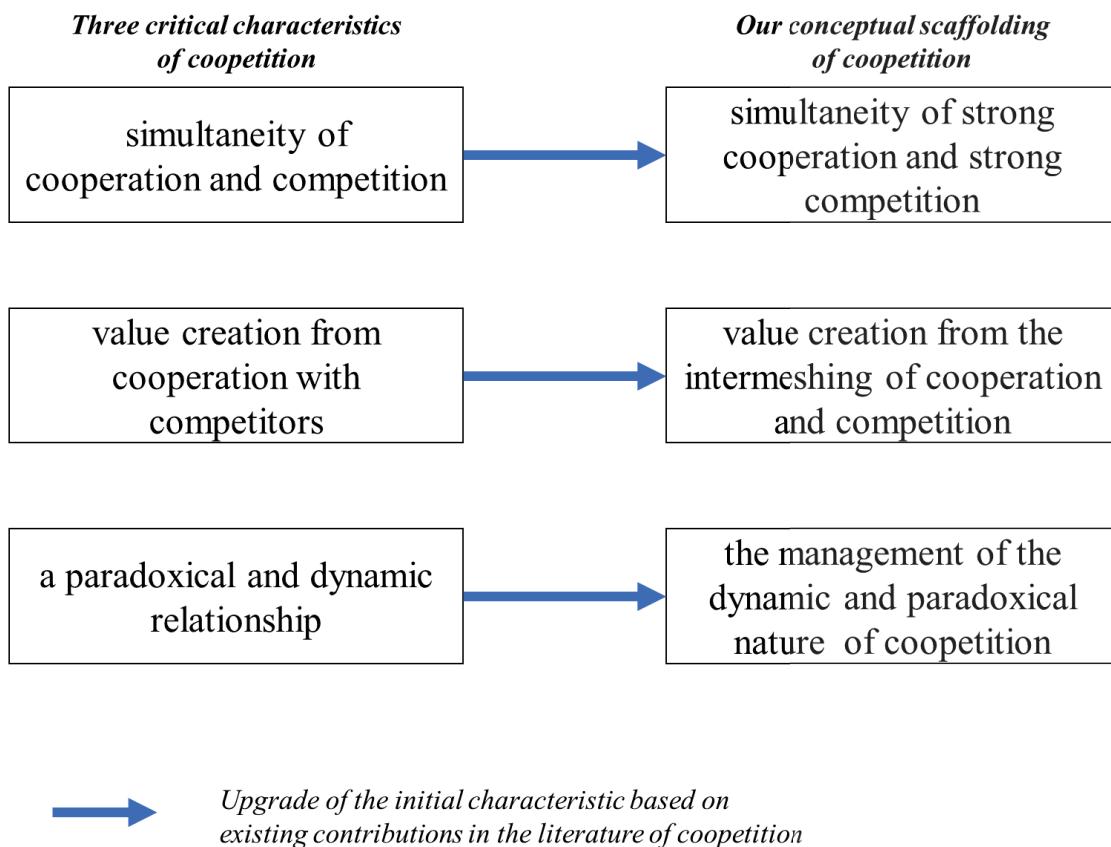
If this work aims to increase the current knowledge of coopetition, it also allowed us to develop our own definition of coopetition : ***Coopetition is a value creation process which relies on the leveraging effect of simultaneously engaging in strong competition and strong cooperation and which needs a specific management to unlock the opportunities of the intermeshing (opportunities are likely to be locked away due to the strain and conflict of being simultaneously in cooperation and competition).***

Moreover, this work leads us to an additional insight. When the firms execute a coopetitive value creating strategy through a coopetitive project team, the strain and conflict of the intermeshing of cooperation and competition can hinder the coopetitive opportunities. The individual of the team in the project team needs to integrate the paradox. But there are still unknowns about what it means to integrate this paradox.

In this doctoral research we focus on the strain and conflict arising at the project level. The project level is one of the most relevant levels of analysis (Fernandez & Chiambaretto, 2016; Le Roy & Fernandez, 2015). This level is relevant to study the coopetitive strains and conflicts because it is at the project level that competing parent firms work together on specific projects on a daily basis (Fernandez et al., 2014; Gnyawali & Park, 2011).

Previous studies have mainly focused on coopetitive strains and conflicts as a whole and identify lists of them (Chiambaretto & Dumez, 2016; Fernandez et al., 2014; Tidström, 2014). Now that these first understandings of the coopetitive strains and conflicts are done, there is a need to explore more deeply each of them. Fernandez and Chiambaretto (2016) began this deeper exploration into one. They focused on the project level and looked at one critical coopetitive strain and conflict which is the need to simultaneously share and protect information (Fernandez et al., 2014). There is a real need to increase our understanding of each coopetitive strain and conflict. Each of them is crucial because they are mediating the link between coopetition and its outcomes and can endanger the relationship's success and influence negatively the rent extracted (Chen, 2008; Czakon, 2009; Ding, Huang, & Liu, 2012).

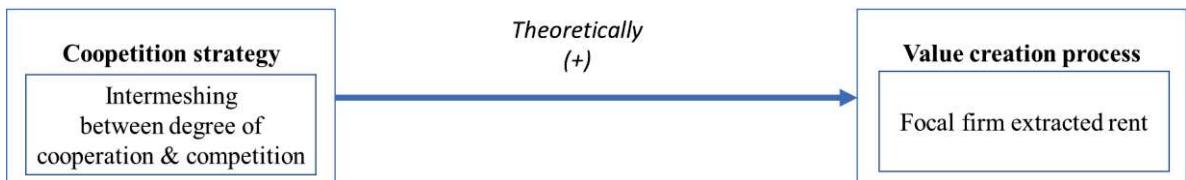
Figure 13 ~ Synthesis Section 2



Conclusion of the chapter 1 & theoretical framework

Through this first chapter, we discover that the real stake of coopetition is not to collaborate with a competitor but more to unlock the positive leveraging effects of the intermeshing of cooperation and competition (i.e. to strategizing coopetition). Furthermore, our section 2, which is a state of art of the coopetition literature highlights that it is the intermeshing between high cooperation and high competition which leverages the value creation process and makes coopetitive business relationships so interesting (cf. *Figure 14*).

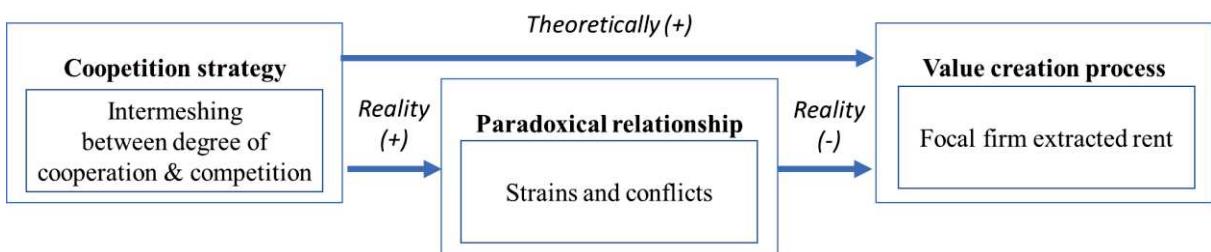
Figure 14 ~ First step of our theoretical framework



Source: Sea Matilda Bez's doctoral research, 2017

However, if this value creation in a coopetitive relationship is attractive, its execution can be an issue. The high intermeshing between cooperation and competition also generates strains and conflicts. These strains and conflicts can directly jeopardize the positive link between coopetition strategy and value creation process (cf. *Figure 15*). More precisely the strains and conflicts jeopardize the relationship when it leads to rejection of the intermeshing between cooperation and competition and reduction of one of the two dimensions. This behavior can lock away positive opportunities due to the intermeshing of cooperation and competition (i.e., opportunity cost).

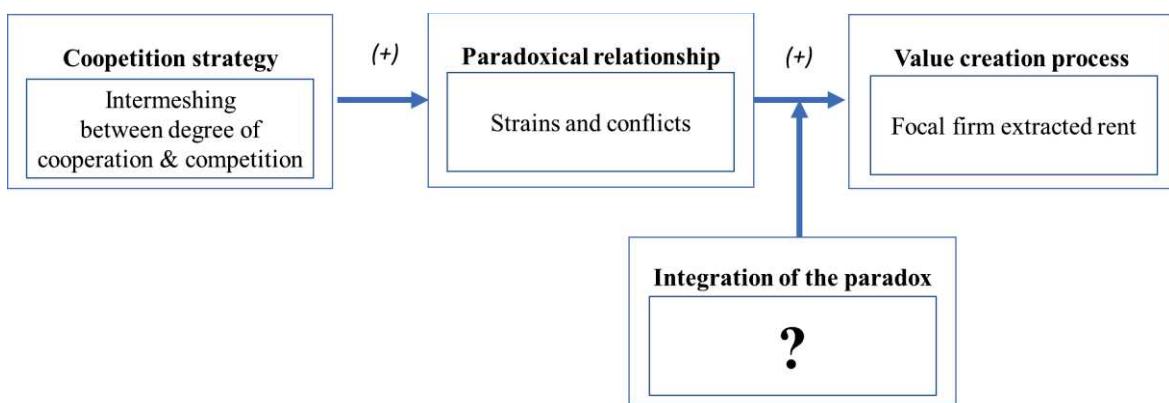
Figure 15 ~ Second step of our theoretical framework



Source: Sea Matilda Bez's doctoral research, 2017

A sub-stream of research in the phenomenon of coopetition is interested in the management of coopetition. This stream gives some answers into how to unlock and pursue the opportunities of the intermeshing between cooperation and competition. One of their answers consists of arguing that firms should create a coopetitive project team (a dedicated team separated from the other competitive projects) and this team should integrate the paradox. That means, they need to accept the tensions (i.e., overcome the strains and conflict) related to the intermeshing of cooperation and competition (cf. Figure 16).

Figure 16 ~ Third step of our theoretical framework



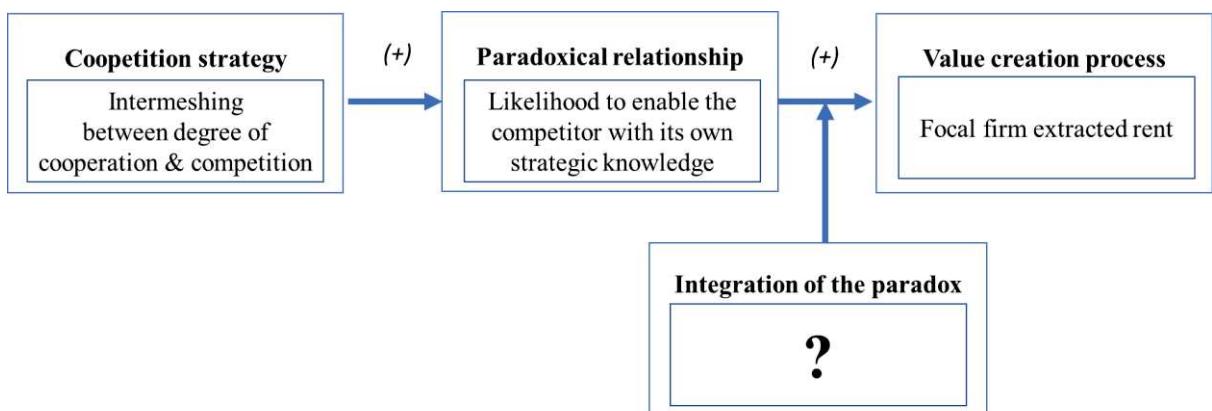
Source: Sea Matilda Bez's doctoral research, 2017

However, is there still a gap on how to strategize and manage coopetition? And more precisely: "how does a focal firm share their knowledge to create and pursue the coopetition advantages?" This question is our problematic. Most of the research looked at the global picture (Fernandez et al., 2014; Gnyawali et al., 2016; Tidström, 2014). They considered all the strains, conflicts and tensions as a whole (Fernandez & Chiambaretto, 2016). As a list of strains, conflicts and tensions are done, we have the opportunity to add complexity to our understanding of the cooperative's integration principle. To do so, we decided to focus on one paradox triggered by the intermeshing of high cooperation and high competition: the paradox that collaboration consists of knowledge sharing which is likely to enable the competitor to internalize the core strategic knowledge of the focal firm.

We decided to focus on the paradox due to the likelihood of knowledge internalization by the competitor for three reasons. Firstly, in this doctoral research, we perceive knowledge as power and as the source of the rent extracted. Thus, any action that enables the internalization of strategic knowledge by a competitor is counter-intuitive. Enabling the internalization leads to reduce its power and rents. This counter-intuitive situation makes it easier to generate novel

insights. The second reason is that we have indirectly already put the stress on the need for more research on the downside of coopetition due to knowledge internalization by the competitor (cf. *section 1*). Indeed, in section 1, we highlighted the need for more research on the management of the paradox that collaboration promotes imitation and substitution (Lavie, 2006) and on the management of the condition behind coopetition of “enabling the competitor” (Deutsch, 2011). Digging deeper into the management of the competitor’s likelihood of knowledge internalization in a coopetitive relationship generates insights into the management. It is because the competitor can internalize the knowledge that the focal firms fear imitation, substitution or more broadly the enabling of the competitor. Indeed, allowing or easing the competitor’s internalization process can be assimilated as a firm “shooting itself in the foot” or a firm equipping its competitor with its own “weapons” (Pellegrin-Boucher & Le Roy, forthcoming). It is paradoxical. The third reason that lead us to pick this paradox in priority is that some research has already begun to dig into this tension and highlight some insight about how to integrate it (Baumard, 2010b; Fernandez & Chiambaretto, 2016; Hamel, 1991; Ritala, Huizingh, Almanopoulou, & Wijbenga, 2017). Thus, we have existing insights on which will be able to build on theoretically but also empirically. To conclude, there is a real need to deepen our knowledge about the paradoxical knowledge sharing with a competitor. a sharing which can enable the competitor with its own knowledge (cf. *Figure 17*).

Figure 17 ~ Specified theoretical framework to one paradoxical implication
(the paradox: knowledge sharing is likely to enable the competitor which its own knowledge)



Source: Sea Matilda Bez's doctoral research, 2017

Chapter 2 ~ Opening the black box of knowledge sharing dilemma

This Chapter 2 is focusing on one of the main paradox of coopetitive business relationship: the knowledge sharing dilemma. Indeed, cooperating relies on a knowledge sharing which can enable the competitor with its own strategic knowledge. The intuitive reaction could be not to share knowledge. However, the sharing is mandatory to benefit from the leveraging effect of the intermeshing between high cooperation and high competition. Thus, the focal firm needs to integrate the paradox to be able to unlock and pursue the opportunities of a coopetitive business relationship.

This chapter beginning by presenting the traditional way to integrate the knowledge sharing paradox developed by the coopetition literature, but also by the literature on the sharing and the protecting in inter-organizational collaborations. This traditional way is rooted in Hamel's approach of collaboration. It consists of the simultaneity of the knowledge-sharing which maximizes the learning of the partner's knowledge and minimizes its own transparency. Minimizing the transparency allows the firm to reach the common goal without the high risk of enabling the competitor with its own knowledge.

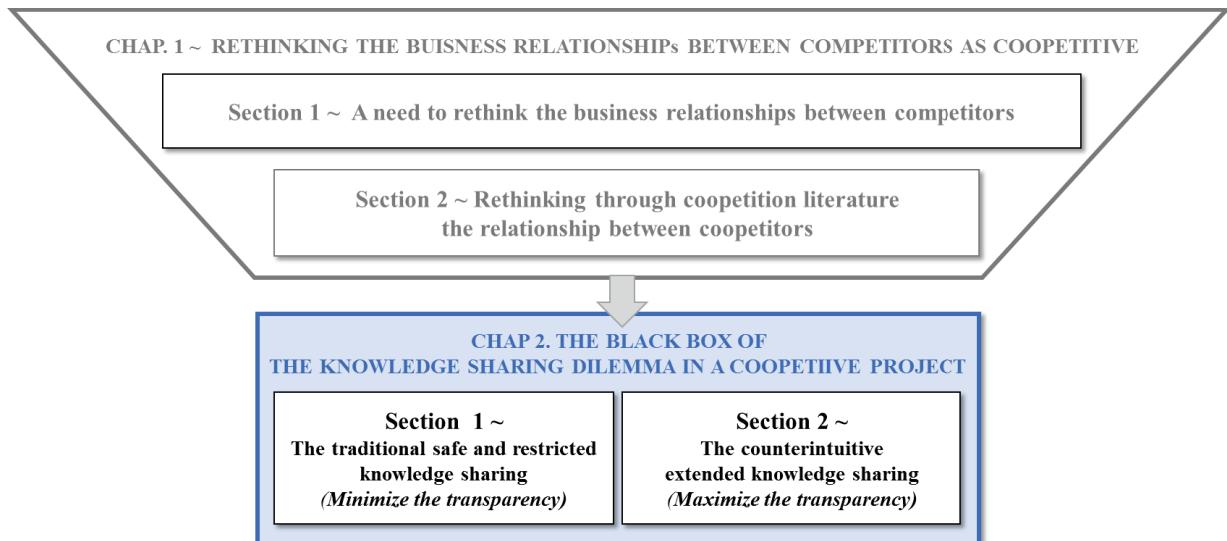
However, Hamel's approach of collaboration has been criticized. Integrating the knowledge sharing by low transparency has downsides. For example, it can hinder a collective learning (Larsson et al., 1998; Yang, Fang, Fang, & Chou, 2013). Thus, these critics open our way of thinking and make us explore what could be the other ways to integrate the knowledge sharing dilemma. We develop a new theoretical proposal to integrate the paradox based on one of the extensions of the theory of cooperation and competition into a theory of conflict resolution (Deutsch, 2011) and the theory of organizational learning (Nonaka, 1994). This integration is the opposite of the traditional approach; it consists in integrating the intermeshing of cooperation and competition by maximizing the transparency on any relevant knowledge to the project. The goal is to create a “creative chaos” (Nonaka, 1994) that constrains to innovate.

We decide to use the knowledge sharing dilemma as a trojan horse to develop theoretical answers to our problematic which is : “How to unlock and pursue the value creation of the

intermeshing of cooperation and competition?”. We made this choice because in chapter 1 we highlighted that this dilemma was one of the major and specific strains and conflicts due to the intermeshing between cooperation and competition. Indeed, any knowledge internalized by the competition does not only enable it, but it can also be directly harmful to the focal firm. Moreover, by materializing the intermeshing of cooperation and competition by a concrete dilemma of the knowledge sharing, we can easily see the repertoire of sharing the focal firm chooses (e.g., open sharing, no sharing, and gradual sharing of knowledge bites) (Das & Teng, 1996). Based on the repertoire sharing, we will increase our knowledge about the integration of the knowledge sharing paradox between direct competitors. These insights will also help us increase our knowledge about the intermeshing between cooperation and competition.

To study how a focal firm integrates the paradox, we focus on the project level. The project level is one of the most relevant levels of analysis because it is at this level that competing parent firms work together on a daily basis (Fernandez et al., 2014; Gnyawali & Park, 2011). During this daily work, they experience the strain and conflict due to shared strategic knowledge (Fernandez & Chiambaretto, 2016; Hamel, 1991; Ritala et al., 2017).

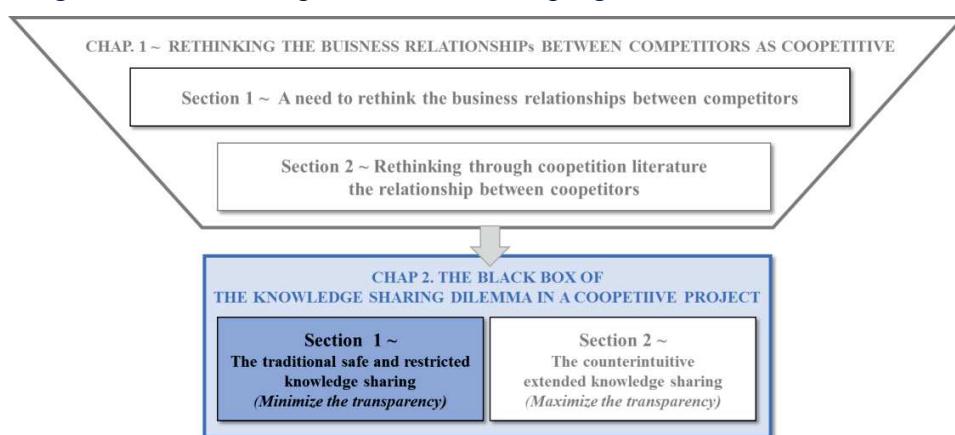
Figure 18 ~ Visual representation of our programmatic literature review



Section 1 ~ Sharing between competitors: safe and restricted knowledge sharing

According to the literature of coopetition, the competitor's knowledge internalization is perceived as the negative "other side of the coin" of knowledge sharing between competitors (e.g. Baumard, 2010b; Fernandez & Chiambaretto, 2016; Ritala et al., 2017; Ritala, Olander, Michailova, & Husted, 2015). This "other side of the coin" generates strains and conflicts which can jeopardize the needed knowledge sharing (Nieto & Santamaría, 2007). However, for unlocking the leveraging effects of coopetition firms need to share any knowledge which is critical for the project (Fernandez & Chiambaretto, 2016). Thus, the focal firm needs to integrate¹⁹ that the knowledge sharing is crucial even if there is a high competition between the coopetitors. Some past research in the coopetition literature highlighted one way to behave accordingly (Baumard, 2010b; Fernandez & Chiambaretto, 2016). We called this integration the "*safe and restricted knowledge sharing*." According to us, this integration takes its roots in Hamel's (1989,1991) perception of the inter-organization relationships. Thus, in the first sub-section, we are going to use Hamel's (1989,1991) to generate insight on (1) why the internalization of the knowledge by the coopetitor is an issue and (2) how to manage this issue. Then, in a second sub-section, we will present how the existing research on coopetition extended Hamel's insights into the integration of the paradox of sharing knowledge with a competitor.

Figure 19 ~ Visual representation of our programmatic literature review



¹⁹ As we already explained in this doctoral research, when we refer to integration we refer to the integration principle of the coopetition literature. Thus "integrate the paradox" refers to individuals who understand their roles in a paradoxical context and behave accordingly, following both logics simultaneously. When the paradox is integrated, neither of the dimension is reduced (Le Roy & Fernandez, 2015).

1. Thinking about the integration of the paradox through Hamel's theory of inter-firm learning

Our goal is to open the black box of the integration of the knowledge sharing paradox in coopetitive relationships because knowledge sharing enables the competitor to internalize some of the focal firm's strategic knowledge. To reach this goal we decided to use Hamel's theory of inter-partner learning. It is an influential and widely referenced theory that shed light on learning problems in the alliance, such as the risk of uncontrolled information disclosure and asymmetric diffusion of core competencies to partner firms (Hamel, 1991; Hamel et al., 1989). For the record, Hamel's 1991 article was quoted 6096 times on google scholar²⁰. We are aware that Hamel's work was a continuation of some existing work and that this theory generated multiple research and extensions. For instance, before Hamel's theory, Bresser (1988) highlights that collective strategy may lead to uncontrolled disclose of strategically sensitive information. After Hamel's theory, Inkpen and Beamish (1997) highlight that internalization of sufficient knowledge and skills eliminates a partner's dependency. Hamel's theory is relevant for our research because the primary unit of analysis fits to our research goal. He uses as a primary unit of analysis the individual organization which is involved in a learning competition inside the collaboration. Thus, his theory can generate insight into how a focal firm can integrate a paradox due to the inter-organizational relationship.

In this doctoral research, we review only some central and narrow elements of the theory and identify how we can use them to generate insights into the integration of the paradox of knowledge sharing and the competitor knowledge integration. More precisely, we focus on two elements of the theory: (1) the internalization of the knowledge by the partner can be hurtful, (2) the managerial tool to deal with this issue.

Let us be clear, although Hamel's (1991) theoretical predictions were initially developed only for core skills and capabilities, they are commonly used to broader categories of strategic knowledge (e.g. Lane & Lubatkin, 1998; Ritala & Hurmelinna-Laukkonen, 2009; Schreiner, Kale, & Corsten, 2009). We will do the same because our pattern of thinking includes a series of components in the concept of knowledge: information, skill, capability, know-how,

²⁰ Test done August 5th, 2017 on the article Competition for competence and inter-firm learning within international strategic alliances, Hamel, 1991, Strategic management journal

practice etc. This way of thinking relies on Nonaka's (1994) reflection on knowledge. If, we are going to go back to this definition later in section 2, we needed to recall here one part of this reflection which is the distinction of information and knowledge. Indeed, this distinction justifies why knowledge is a broader and more generic concept than the others. Information is a flow of messages or meanings which might add to, restructure, or change knowledge. Thus, information is a medium to initiate and formalize knowledge. This knowledge refers to what drives human action and thus all its practices, competences, and skills. Thus, Hamel's reflection about core competencies and skills can be included in a more global discussion about knowledge.

1.1. The internalization of the knowledge by a competitor in a collaboration can be hurtful

For Hamel, knowledge and, more precisely, core competencies are the *raison d'être* of a firm. However, these knowledges are not distributed equally among firms. The international strategic alliances, including those between competitors, play the main role in effecting a partial redistribution of knowledge among partners. Indeed, the strategic alliance might be opportunistic for the internalization of missing knowledge (Hamel et al., 1989). The challenge is that this internalization can be asymmetric. He calls it "asymmetric learning." Managers voice two concerns about this asymmetric learning. The first concern is its impacts within the relationship. The focal firm is going to be dependent on the partner, and its knowledge will become redundant. The second concern is about the firm's competitive vulnerability outside the relationship (Hamel, 1991; Hamel et al., 1989). Before explaining the two concerns which are at the origin of the need for the integration principle, we are going to explain how when doing this asymmetric learning happens.

❖ The occurrence of asymmetric learning

Asymmetric learning can happen for three reasons: the intent, the receptivity and the transparency (Hamel, 1991). Concerning the *intent*, there are relationships in which the focal firm does not want to learn the other knowledge. It happens when the focal firm engages in collaboration between competitors for investment avoidance. They avoid investment by substituting their partner's competitiveness in a skill area for their own lack of competitiveness. These collaborations give them access to complex and tacit skills that they

could not access by doing it alone²¹ or via a hierarchic relationship²². Some firms describe these collaborations with their competitors in terms of “role specialization”, “complementarity” or “center of excellence”(Hamel, 1991, p. 92). For them, these collaborations are first-choice and stable strategies. One of the managers interviewed by Hamel (1989) even argues that: *“We complement each other well [...] I see no reason to invest upstream if we can find a secure source of product. This is a comfortable relationship for us”* (p.134). Concretely, in this type of collaboration the focal firm relies on the partner’s employee for some critical activities. However, collaborating and engaging in an investment avoidance without any concern into inter-firm learning is dangerous (Hamel, 1991; Hamel et al., 1989). It is not because a competitor decides to collaborate that it no longer has a competitive goal. Some firms make the mistake of automatically projecting their unique investment avoidance into their partner’s intentions. This is a mistake because some firms perceive the collaboration as a transitional stage. If collaboration allows investment avoidance, it can also allow filling of the skill gap. Companies underestimate the learning intent of the other actor (Inkpen & Beamish, 1997)²³. The partner uses the collaboration as an opportunity for close observation of the complex and tacit knowledge of the partner, internalization of the knowledge, and even benefiting from the emulation of the ideas by “the best in class”. Thus, the competitor is going to reinforce itself. This differential in the desire to learn leads to asymmetric learning.

Concerning the *receptivity*, there are relationships in which the focal firm is willing and not able to learn from the other knowledge. The attitude of the firm as a teacher or a student is key in driving the ability to learn. Indeed, the firms which adopt a student attitude, also called humility, are more able to learn than the others. Moreover, it is not just about the attitude but also about the capacity to unlearn, the existence of slack to allow the organization to search for new approaches, and the degree of the gap between the actual knowledge and the partner’s knowledge. It is too difficult to learn when a firm has too strong of routines and cannot experiment new ways of doing things or does not have the intermediary knowledge needed

²¹ Doing it alone would put them in a perpetual follower situation because they would not be able to follow the continuous and rapid rhythm of innovations of its global competitors.

²² Accessing it though hierarchic relationship would mean internalizing the whole company and thus (1) paying for non-distinctive assets and (2) dealing with integration problem.

²³ In the most extreme and illegal case, the partner can even adopt illegal behavior as photographing and copying confidential R&D material late at night (Oliver, 2004).

for the internalization of the actual knowledge observed. Thus, there are all generating differentials in their ability to learn and thus leads to asymmetric learning.

Concerning the *transparency*, there are relationships in which the focal firm is willing and able to learn but does not have opportunities to learn. Collaborating with a competitor creates more or less a permeable membrane between the two competing firms. The degree of permeability of the membrane depends on the degree of flow of documents, people, skills, and capabilities (Hamel, 1991). The permeability and direction of the membrane are sometimes asymmetric. Some firms are more permeable than others. The most permeable ones are the firms that combine some characteristics as:

- No clannishness attitudes: employees are not sensitive of revealing useful competitive information. The reason is that they do not feel that they belong to the focal firm,
- Encodable skills: their core skills are explicit and thus easy to transmit,
- Low pace of skill building: the knowledge is not evolving,
- Penetrable social context: the knowledge is not context dependent.

For those firms, their knowledge and skills are more easily internalized by the partner. For instance, engineering drawing or market intelligence flowed more easily than the leading-edge manufacturing know-how. Some firms have more passive or “natural” barriers to transparency which protects them from an easy and quick internalization of the core knowledge by the partner. This unequal possession of natural barriers to transparency leads to asymmetric learning.

The existence of differential in the intent, the receptivity, or the transparency increases asymmetric learning. This asymmetric learning is a materialization of the competition in the cooperation between competitors. Managers voice two concerns due to asymmetric learning (Hamel, 1991; Hamel et al., 1989). The first concern is about its impacts within the relationship. The focal firm is going to be dependent of the partner and its knowledge will become redundant. The second concern is about the firm’s competitive vulnerability outside the relationship.

- ❖ The risk of asymmetric learning within the relationship: lowering the bargaining power and even ending the collaboration

Understanding the bargaining power in a relationship is key because it is directly correlated to the benefit reaped from the collaboration. In other words, if the value created was a pie, the bargaining power impacts the size of the slice received. The bargaining power depends on different variables such as the strategic priorities of the firms, the environment, the relative superiority of the own skill or technology, and its capacity to learn (Hamel, 1991). If one of these variables changes, the bargaining power might change too. For example, a rapid change in technology can erode the value of its own technology, decrease the value-added of the firm and thus it might reduce the benefits received in the collaboration. This erosion also happens with the learning. If a firm manages to out-learn one's partner, it improves its bargaining power. The reduction of the bargaining power will either lead to the reduction of the value capture or a rise in the price to pay regarding knowledge. By rising the price to pay regarding knowledge, the partner will ask to go deeper or more extensively into the understanding of the current knowledge.

Being a good partner improves the successful execution of joint tasks. However, it can also be hurtful when there is an asymmetric partner learning. In the most extreme scenario, the collaboration will even end. Paradoxically, the end of the collaboration would be a positive signal for the learning partner. It means the end of the knowledge dependence as it managed to internalize the knowledge they wanted.

Thus, the main issue for a focal firm which experiences asymmetric learning is to understand how to stay attractive over time (Hamel, 1991; Hamel et al., 1989). To understand the execution of a coopetition strategy, we need to look at a focal firm's reaction with a longitudinal approach.

- ❖ The risk of asymmetric learning outside the relationship: being competitively vulnerable outside

The other risk of asymmetric learning is the erosion of the focal firm's competitive advantage outside the relationship. Indeed, if the partner internalizes the skills or tacit knowledge, it can apply it to new geographic markets, new products, and new businesses. This reuse of the knowledge is not an issue if it does not concern the competitive arena of the firm. However, when the partner is an ambitious and international competitive firm, the

asymmetric learning is more contentious. Fernandez (2011) talked about helping the enemies to fight with its own “weapon.”

Even if no firms or very few firms argue that their initial motivation to collaborate was to “deskill the partner,” several studies revealed the reality of this phenomenon (Hamel, 1991; Park & Russo, 1996). The partners were never “deskilled” because they still possess the knowledge. The deskilling refers to the knowledge obsolescence due to the loss of monopoly on it. The rent generated from this knowledge decreased. This competitive vulnerability depends on how strategic the knowledge internalized by the partner was and how strong the competitor is. If the competitor is a local firm, the impact will be restrained. It is why some past research even argued that one of the conditions under which mutual gain is possible is when the partner’s strategic goals converge while their competitive goals diverge (Hamel et al., 1989). The firms are not equal to this asymmetric learning issue.

1.2. The management of a potential asymmetric learning

Hamel’s (1989, 1991) contributions are mostly used to highlight the existence of a learning race in collaborative relationships and to identify the drivers to win a learning race. However, Hamel’s (1989, 1991) can also be used to generate insights on how to maintain a bargaining power and competitiveness when the focal firm cannot win the race to learn. This insight is particularly interesting to our research objective as it identifies managerial tools for dealing with the strain due to knowledge sharing which can lead to the internalization by the competitor.

These strains happen when the focal firm has core knowledge which does not have natural transparency barrier, and the partner is a strong competitor which is receptive and willing to internalize the focal firm’s strategic knowledge (cf. *the occurrence of asymmetric learning*). The key question is to find a way to stay attractive even if the partner is intended and capable of learning. We are going to develop three possibilities developed by Hamel (1991) (cf *Table 11*). These possibilities are not mutually exclusive and most of the time combined, we present them separately for understanding purposes.

Table 11 ~ Different ways to integrate the paradox of enabling the competitor

Reaction to enabling the competitor	Advantage	Limits
Engage in a learning race	Out-learning the partner (by designing an efficient learning process)	All the firms are equally armed to learn. Sometimes the goal of the cooperation is cost avoidance and not learning
Continuously innovate	Out-running the speed of absorption (by a high speed of innovation)	Wrong estimation in its innovation capabilities Wrong estimation of the partner speed of absorption can be a disaster
Limit the knowledge transparency	Encompassing the knowledge internalization by the partner to the strictly necessary skill (by hindering the opportunities for extensive and intensive learning)	Active action to reduce the transparency can be regarded as provocative

Source: Sea Matilda Bez's doctoral research, 2017. based on our interpretation of Hamel (1991)

❖ Engaging in a learning race

Engaging in a learning race is the first possibility when facing the risk that the knowledge sharing leads to the internalization by the competitors of some of its strategic knowledge. Learning races are a knowledge internalization competition. The final goal is to learn quicker than the other. Learning quicker allows exiting the alliance before the other reaches its learning goal and thus maintains its outside competitiveness. It frequently occurs in technologically intensive arenas with high technological innovation and obsolescence providing temporally dependent benefits to firms. Behind this learning race, the competitiveness of a firm does not solely rely on end-product terms but mainly in corporate-wide skills. The collaboration is a means to internalize skills that could be applied across a range of businesses. To win this race, a firm needs to proactively design the learning. Learning is not automatic.

There are two main limits of reacting to the competitor's internalization of knowledge by a learning race. The first reason that we already developed is that each firm is not equal in the learning race. Their capacity of winning depends on its intention, receptivity, and partner's

transparency (cf. *section on the occurrence of asymmetric learning*). Thus, based on these three characteristics, the firm might inherently lose. The first limit of reacting by a learning race is that firms are not equal in this race and some natural characteristics can limit their learning. The second reason is that some firms consider collaboration as a first choice and not transitional stage. These firms do not want to learn the partner knowledge and then end the collaboration. They want the collaboration to continue. For them, the collaboration is cost avoiding and beneficial. For instance, it happens when the firm wants to rely on the partner's reputation. Even if it learns the skill, the partner wants to benefit from the reputation effects. They use the collaboration for cost avoiding and not for learning. Reacting by a learning race is in opposition with the initial goal of the collaboration.

❖ Always be ahead with innovation

Some firms are aware that they could never win the learning race. In this context, one way to stay attractive is to continuously innovate; i.e., create the next-generation knowledge. In that case, power comes from the capacity of creating new internal and attractive knowledge. The goal is to have a speed of innovation that out-runs the pace of absorption. It maintains attractiveness through innovation. Even if the firm discloses its current knowledge, the core knowledge remains opaque due to their rapid pace of development.

Although it can be perceived as the ultimate protection, it is also a risky protection. The focal firm can underestimate the partner's ability to absorb. This was the case with Siemens who underestimated the Chinese train company to absorb its high-speed train manufacturing skill. Siemens collaborated with a Chinese company called CRCC. The deal consisted of Siemens bringing the technical knowledge and the CRCC the access and knowledge of the Chinese market. If this collaboration can be considered as a financial success as it generated more than \$700 million revenues for Siemens, it is also a perfect example of the downside of the internalization of knowledge by a partner. CRCC internalized Siemens' knowledge very quickly, and now CRCC is competing with Siemens on its home market with a cheaper and better train²⁴. Siemens agrees that they underestimated the speed of CRCC's ability to internalize the knowledge and created their own competitor. Similarly, the other limit of using innovation as a protection to the competitor's internalization is that the speed of innovation is uncertain and can be much slower than expected.

²⁴ This example is based on an oral presentation of the doctoral research case study of Donghui Meng on the high-speed train in China at the Garwood center (March 2017).

❖ Reducing its knowledge transparency

There is another reaction possible which consists in actively impacting the “transparency” of the focal firm and its skills. Transparency determines the potential for the partner’s learning. The knowledge and skill are naturally more or less transparent, but firms can reinforce or weaken it by active measures. Hamel (1991) identified a wide variety of active measures to limit the transparency (cf. *Table 12*). First, the focal firm can process the knowledge sharing through a small “collaborative department.” This department controls the “aperture” through which the partner gained access to people and facilities. Second, the firm can act on the level of regularity and intensity of the interactions between the staff of the two competing partners. The transparency is low when the interaction is based on a “plug-in” system. The transparency is high when the collaboration requires intensive cross-membrane interactions. It happens when the two firms are jointly developing and designing a product. Third, it can also consist in narrowing the range of product and markets concerned by the collaboration. Fourth, a focal firm can reduce the transparency by choosing a third location for the joint activity. The focal firm is transparent on what knowledge is inside this third location and opaque about all the other knowledge. Fifth, a well-defined limit on what an engineer could or not share is another way to act on the transparency. Any information outside this limit needs to have the approval of a manager. Thus, there are multiple ways to reduce the transparency of a focal firm and constrain the sharing only to the knowledge which is strictly needed to the common project.

The intent for a focal firm is not to be fully opaque. Indeed, some degree of transparency is always needed. Transparency is the price to pay to successfully execute the joint task. Even the inherently “protective firm” have some degree of transparency. In Hamel (1991) there is an example of a very protective Japanese firm. Even if it was very protective, the firm was “*totally open in [what they view as needed to be known to complete the project]*” (p.95). Conversely, this same firm was totally closed on other issues. They had well-defined limits regarding what they would tell. A junior guy never interacts or shares information without the presence of a senior person. Moreover, transparency can also be a price to enticing the partner into the relationship. A partner collaborates with a specific firm because of the opportunities for knowledge internalization. Thus, there can be a specific agreement of flow of technology or knowledge. This was the case in the Siemens and CRCC collaboration, CRCC even paid Siemens for technological transfer (e.g., IP technology fees). Indeed, it is not the transparency itself which is an issue. Some transparency is planned initially. The issue is with the

unintended and unanticipated transparency. The issue concerns the transparency that goes beyond what is deemed essential for the successful performance. In other words, it is the knowledge internalization that encompasses the strictly necessary. However, there is a downside of lowering the transparency. Active measures can be regarded by partners as provocative actions. It happened to some US firms which were accused of acting in bad faith or undermining trust when they wanted to put some contractual clauses to limit transparency (Hamel, 1991).

Table 12 ~ Act on the focal firm transparency

Managerial actions	Low transparency	High transparency
Gatekeepers	“collaborative department” which control the “aperture”	No gatekeepers
Task structure	Plug-in tasks	Joint task requiring regular and intensive intermingling
Scope of the cooperation	Very narrow task and market	Extended task and market
Location of the joint work	A third localization	Inside the focal firm

Source: See Matilda Bez visualization of Hamel's (1991) variety of active measures to limit transparency

Thus, a focal firm's goal is that the knowledge internalization of the competitor is restricted to the minimum needed for the successful performance of the joint tasks. To reach this goal, the firms can rely on its natural transparency barrier and active reduction of transparency.

1.3. Synthesis of Hamel's (1991) insights and identification of a gap

Based on Hamel's (1989, 1991), knowledge internalization in an inter-firm relationship can be a source of opportunity or a source of value destruction. Indeed, these positive or negative outcomes depend on the focal firm's knowledge internalization relative to that of the partner's. When the difference is positive, the focal firm learns more than the partner. This situation is a source of opportunities because it increases its bargaining power inside the relationship and competitive advantage outside the relationship. Reciprocally the partner's internalization destructs value for the focal firm when the partner manages to learn more or more strategic knowledge than the focal firm. In that second case, the asymmetric learning is a disadvantage.

Firms are not equally facing the asymmetric learning. Indeed, the capacity of a firm to internalize knowledge depends on the intent, receptivity, and transparency (i.e., Hamel's internalization model). Thus, the inter-firm knowledge internalization generates strains and conflicts for focal firms which have low natural transparency barrier and who collaborate with a strong competitor which has the intent and ability to learn.

These firms could react to the partner's knowledge internalization by engaging in a learning race, but they are probably going to fail. Thus, they must find another way to stay attractive and maintain their bargaining power. There are two solutions: continuously innovate or actively create a transparency barrier on what is not strictly necessary for the joint project. Thus, Hamel argues that firms should restrict the knowledge sharing to the strict minimum and use natural or active transparency barriers to hinder any extensive or intensive knowledge internalization of the partner.

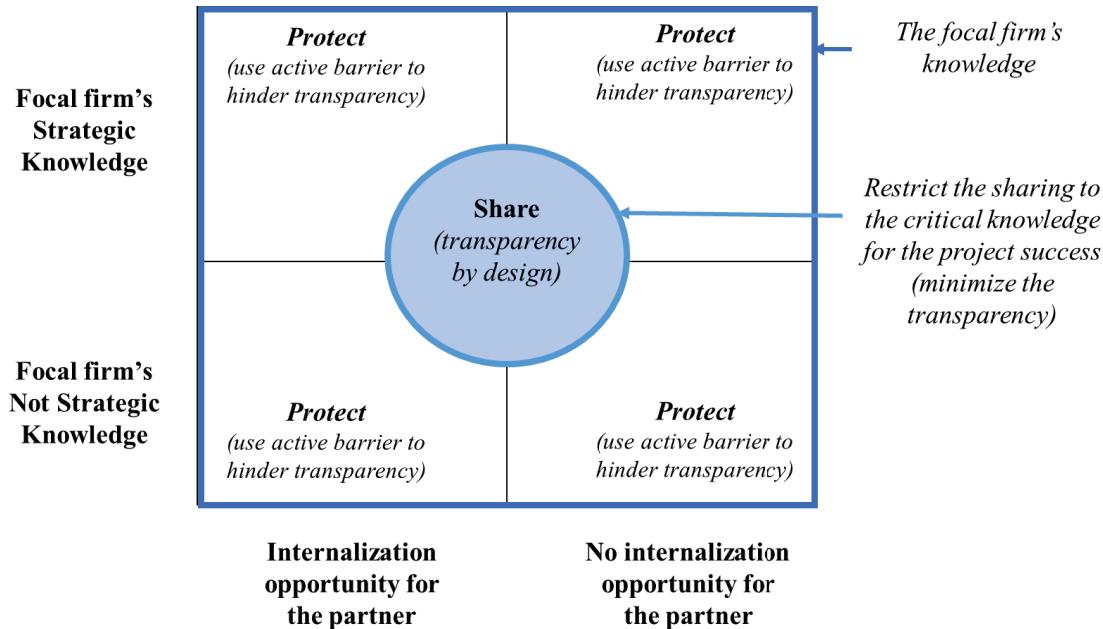
We used Hamel (1991) to create an insight for our research objective on the integration of the paradox that knowledge sharing can enable the partner to internalize strategic knowledge. We argue: "**a focal firm which integrates the paradox of cooperation and competition will openly share the knowledge (i.e.,cooperative dimension) but will simultaneously restrict the knowledge sharing to the strict minimum (i.e.,competition dimension 1), try to innovate on the knowledge share (i.e.,competition dimension 2) and try to learn from the partner (i.e.,competition dimension 3)**". Thus, Hamel's approach of the integration of the coopetition paradox consists of the reintroduction of competition in the knowledge sharing relationship.

1.4. Identification of gaps

Hamel provided an answer to our research question: "*how to unlock and pursue the opportunities of the intermeshing between cooperation and competition?*" The answer is to reintroduce a competition approach in the knowledge sharing. The competition approach does not consist of not sharing knowledge, but to share only what is strictly necessary (i.e., the minimum). Through our reflection about Hamel's contribution, we discovered that the degree of transparency is a strategic tool. The focal firm can deliberately impact it. Indeed, the focal firm designs the collaboration in order to share knowledge but restrict the likelihood of the partner's knowledge internalization to the strict minimum. The goal is to minimize the portion with high transparency (cf. the grey portion of *Figure 20*). Indeed, Hamel is aware that a

certain degree of transparency is a price to pay regarding knowledge to attract the partner or have a successful cooperation. The real challenge is to design it properly.

Figure 20 ~ The restricted knowledge sharing
 (a portion of the total knowledge of the focal firm)

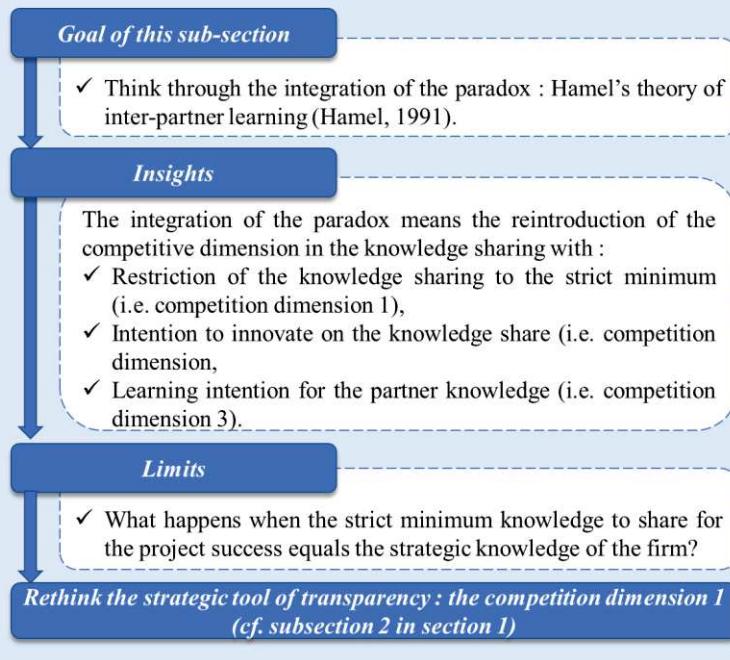


Source: Sea Matilda Bez's doctoral research, 2017

However, if this restricted minimum sharing reduces the strain and conflict due to sharing, the strain and conflict can still be very high. Indeed, the strict minimum of the critical knowledge for a successful project might include some strategic and easy to appropriate knowledge (cf. *the left high corner of grey portion of Figure 20*). These strains and conflicts are inherent because the decision to collaborate with competitors is driven by each other's strategic knowledge. Thus, the opportunities of the intermeshing between cooperation and competition can be locked away when the critical knowledge of the project fits to the critical and appropriable knowledge of the company.

Sum up of Hamel's insight into integration of the knowledge sharing paradox

Hamel's (1991) theory of inter-partner learning justifies why there are strains and conflicts in the inter-firm relationship between competitors. Indeed, the inter-partner learning can lead to becoming negatively asymmetric which can weaken the focal firm's bargaining power inside the relationship and competitiveness outside the relationship. This negatively asymmetry is likely to be stronger when the partner is a strong competitor (i.e., high intent and receptivity for learning). In reaction, Hamel's theory reintroduces competitive dimensions in the knowledge sharing. The competition dimensions can take three different forms: restriction of the knowledge sharing to the strict minimum (i.e., competition dimension 1), intention to innovate on the knowledge share (i.e., competition dimension 2) and learning intention for the partner knowledge (i.e., competition dimension 3). Thus, we predict that a focal firm which integrates the cooptition paradoxes will simultaneously share the knowledge and rely intensively on these three competition dimensions. This affirmation based on Hamel's (1991) theory of inter-partner learning gives a first answer to the question "*how to unlock and pursue the opportunities of the intermeshing between cooperation and competition?*" But it is not enough. Hamel's (1991) insights are not enough to understand how to deal with the situation in which the critical knowledge for the project is the critical knowledge of the firm. Thus, there is need to dig deeper into our understanding of the competition dimension 1 (the restriction of the knowledge sharing to the strict minimum seems to not be enough).



2. Extending Hamel's insight on the sharing of sensitive knowledge

In this section, we confirm and extend the insights created by using Hamel (1991) through an existing literature which focuses on the dilemma of knowledge sharing in coopetition or, more broader, in inter-organizational collaborations (e.g. Baumard, 2010a; Fernandez & Chiambaretto, 2016; Jarvenpaa & Majchrzak, 2016; Jordan & Lowe, 2004; Yang et al., 2013). The literature confirmed that Hamel's insight which is that there is a need to restrict the knowledge sharing to the strict minimum (cf. *subsection 2.1*), but they went further and highlighted how this restricted shared knowledge can be safe (cf. *subsection 2.2*). Thus, in this *section 2*, we are digging deeper in the existing understanding of how a firm can simultaneously share the deemed necessary knowledge for the common project's success and protect this knowledge from any internalization by the partner. Finally, knowledge exchange and knowledge protection can overcome the conflicting relationship to become complementary.

2.1. Confirmation: restriction of the knowledge sharing to what is critical from the project

Successful completion of the collaboration objectives often requires a firm to put valuable knowledge at risk of internalization by alliance partners (Oxley & Sampson, 2004). There is a real challenge to find the right balance between maintaining open knowledge exchange to further the technological development goals and controlling knowledge flows to avoid unintended leakage of valuable technology (Oxley & Sampson, 2004). One of Hamel (1991)'s insight is that a focal firm which integrates the intermeshing of cooperation and competition should attempt to minimize its own knowledge contributions while trying to internalize the knowledge contributed by their partners actively.

A whole stream of research on the knowledge sharing dilemma in inter-organizational relationship digs deeper into the restriction of the knowledge sharing to avoid unintended leakage of valuable technology. This research can also be associated with a stream of research on the inter-firm control mechanisms (Das & Teng, 1998; Fernandez & Chiambaretto, 2016). The control mechanism refers to organizational arrangements designed to determine and influence the focal firm beliefs that proper behavior of the other party is ensured (Das &

Teng, 1998). Merchant (1984, p.10)²⁵ argues that "good control means that an informed person can be reasonably confident that no major, unpleasant surprises will occur." Thus, applied to our research objective, a good control means no unpleasant surprises concerning the knowledge internalization by the partner.

A high number of research studies confirms that existence of a real risk of unpleasant surprises concerning the knowledge internalization by the partner (Ritala et al., 2015). The knowledge internalization by the partner can be much more intensive and extensive than expected and planned in the contract (Hamel, 1991). It can concern trade secrets, core technologies, IP-related knowledge and other types of strategically important knowledge (Baughn, Denekamp, Stevens, & Richard, 1997; Jarvenpaa & Majchrzak, 2016). This knowledge internalization can be hurtful when this knowledge leakage can lead to losses that outweigh the benefits of getting access to external knowledge (Hamel, 1991; Heiman & Nickerson, 2004).

As listed in the section above, Hamel (1991) had already identified a list of controlling mechanisms²⁶ as gatekeepers, the narrow scope of cooperation, a specific third location, and task structure. This list was validated and completed by numerous researchers (cf. *Table 13*). For instance, Oxley and Sampson (2004) argue that the development project can be effectively 'modularized.' This modularization fits Hamel's empirical result of "plug-in" structure. Each partner conducts a task or module in relative isolation, and they bring together only finished tasks or modules. This technique allows accessing the common goal without sharing execution knowledge. It is possible because the execution knowledge does not need to be shared to achieve the project's objective. Similarly, Oxley and Sampson (2004) extended Hamel's idea of narrowing the scope of cooperation by arguing that the joint activity to pre-competitive R&D should be restricted to pre-competitive R&D.

Some research highlighted the crucial role of the employee at the project level involved in daily interaction with the counterpart. On a strategic level, the managers might know what to share or not to simultaneously reach the common goal and not hurt the firm competitive advantage. However, the line might be more ambiguous at the project level for employees like

²⁵ Merchant, K. A. 1984. Control in business organizations. Marshfield. MA: Pitman Publishing, Mjoen Even if we did not manage to access to the book, we still use the quote found in Das and Teng (1998) because we think it is powerful illustration of what is control.

²⁶ Even if Hamel does not use the term "control" they can be assimilated to "control mechanisms" because this practice aims to reduce the unexpected surprise of the partner's internalization of knowledge which are not deemed necessary for the success of the project.

the R&D engineers who are part of the collaborative interface and make decisions about what to share (Ritala et al., 2015). These employees are key because they are engaged on a daily basis in micro-knowledge bargaining with their counterparts (Hamel, 1991). Sometimes some employees might share too little which negatively affects the success of the project; and sometimes too much which affects the long-term competitiveness of the firm (Fernandez & Chiambaretto, 2016). Thus, it is crucial for a focal firm to not only tighten and specify the collaboration with contractual frameworks, it is also key to increasing employee awareness regarding the knowledge to be protected (Ritala et al., 2015). For example, a focal firm can give explicit instructions on what engineers are not allowed to share due to the fear of unintended knowledge spillovers and losing command over the project” (Faems et al., 2010). The focal firm can use training programs and staffing inter-organizational collaboration projects in a way that reduces the potential for knowledge leakage (Ritala et al., 2015). It can also rely on gatekeepers as the project manager (Fernandez & Chiambaretto, 2016; Le Roy & Fernandez, 2015).

Table 13 – A sample of control mechanisms to restrict the knowledge shared

Control mechanism	Details and authors
Gatekeepers	Collaborative department (Hamel, 1991), project managers (Le Roy & Fernandez, 2015), alliance manager (Dussauge et al., 2000)
Structure	Plug in task structure (Hamel, 1991), modularization (Oxley & Sampson, 2004)
Scope of the cooperation	Narrow scope of the cooperation (Hamel, 1991), restrict joint activity to pre-competitive R&D (Oxley & Sampson, 2004)
Location of the joint work	A third location (Hamel, 1991), co-location is a separate space from both companies (Le Roy & Fernandez, 2015)
Management of the employee	Explicit list of confidential knowledge (Faems et al., 2010), training programs (Ritala et al., 2015).

Source: Sea Matilda Bez's doctoral research, 2017.

All these control mechanisms aim to prevent an uncontrollable, unwanted and even harmful knowledge flow between the two firms.

It is outside of the purposes of the current doctoral research to engage in a thorough discussion of accidental leakage and the management of this accidental leakage. Indeed, some employees leak strategic knowledge which is forbidden. Most of the time this type of leakage is included in the working contract and the focal firm fires the employee. Based on this leakage, the project manager can use social interactions to fix the situation (Fernandez &

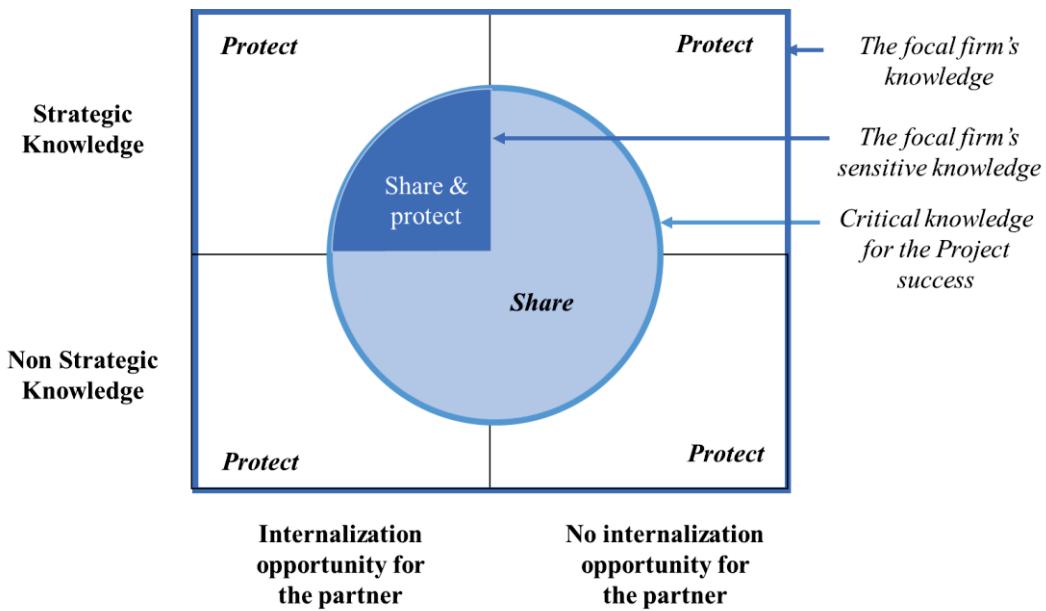
Chiambaretto, 2016; Ritala et al., 2015). Fernandez and Chiambaretto (2016) highlight that in their case study of the collaboration between the two rivals TAS and Astrium a project manager can request the other manager not to use the information that was transferred by mistake. In this case, the other project manager agreed and never transferred to its parent firm. However, it is out of the scope of this doctoral research We are interested in the knowledge which is deliberately shared for the common project's success. In next sub-section, we will see that even the restricted knowledge shared can cause strains and conflicts.

2.2. Extension: to take into account the safety of the knowledge sharing

Some of the restricted knowledge shared is sensitive knowledge. Sensitive knowledge is knowledge which is simultaneously strategic for the firm and can be internalized by the partner. In other words, it is a “knowledge possessed by one organization that another organization can act on in ways that can cause harm to the releasing organization” (Jarvenpaa & Majchrzak, 2016, p. 10). The line between which knowledge is sensitive and not sensitive to their firm is a highly situated, temporal, and ambiguous assessment (Faems et al., 2010; Jarvenpaa & Majchrzak, 2016). Indeed a list of “sensitive knowledge” cannot take into account the dynamics of inter-organizational interactions in particular circumstances. (Jarvenpaa & Majchrzak, 2016). The degree of sensitivity can evolve (Park & Russo, 1996; Simonin, 1999). Knowledge which was not considered as initially sensitive (e.g., materials used in the manufacturing of a product) can become highly sensitive in the course of the interaction (Faems et al., 2010; Jarvenpaa & Majchrzak, 2016). For instance, through the interactions, the employees might go beyond the initial knowledge of materials used and explain the strategic context of this choice (de Rond & Bouchikhi, 2004; Enberg, 2012). The other example is that the sharing was restricted only to the list of material which alone was not a sensitive knowledge. This nonsensitive list became a sensitive one when the two counterparts made a joint discovery together.

Making this complex list of what is sensitive or not is not the only managerial solution. It is possible to release the knowledge in such a way that the other individual's home organization is unable to act on it in a harmful way (Faems et al., 2010; Jarvenpaa & Majchrzak, 2016). A focal firm needs to manage the risk of knowledge leakage very carefully (Ritala et al., 2015). The goal is to simultaneously share and protect the sensitive knowledge which is deemed necessary for the common project's success (cf. the sensitive knowledge represented by the dark blue portion of *Figure 21*).

Figure 21 ~ The restricted knowledge sharing which need to be protected
 (a sub-portion of the total knowledge of the focal firm)



Source: See Matilda Bez's doctoral research, 2017.

There is a need to overcome the view of learning and protecting as two contradictory activities focus either on knowledge sharing or knowledge protecting (Kale, Singh, & Perlmutter, 2000; Yang et al., 2013). Indeed, Hamel's view of restricting the sharing to the knowledge which is deemed necessary can be considered as an either/or approach to knowledge sharing: share what is critical for the project and protect what is not critical. One of Hamel's (1991) interviews illustrated this process: “*The Japanese partner had a view of what we needed to know to complete the project. They were totally open in this regard but totally closed on all other issues. They had well-defined limits in terms of what they would tell us*” (p.95).

Overcoming this either/or approach is crucial. Quantitative and qualitative research has highlighted the need to do both to be a successful benefit from any collaboration. Majchrzak, Jarvenpaa, & Bagherzadeh (2015) concluded from a cross-case systematic analysis of 22 longitudinal qualitative cases on Interorganizational Collaboration Dynamics that in successful collaborative projects, the partners can manage the simultaneous sharing and protecting of knowledge (Majchrzak, Jarvenpaa, & Bagherzadeh, 2015). Similarly, Heiman and Nickerson (2004) confirm with empirically unrelated datasets that firms are engaged simultaneously in knowledge management practices to increase the knowledge sharing (e.g., high-bandwidth communication channels and co-specialized communication codes) and safeguarded mechanisms

(e.g., specific governance choice in reaction to the fact that increase the knowledge sharing increases the opportunism hazards).

However, overcoming this either/or approach and integrating the duality of simultaneously sharing and protecting represents a managerial challenge (e.g. Fernandez & Chiambaretto, 2016; Heiman & Nickerson, 2004). Indeed, Heiman and Nickerson (2004) did 18 interviews which provided qualitative support for the proposition that the focal dilemma represents an important managerial challenge. Jarvenpaa and Majchrzak (2016) go further and argue that it involves “*cat's whiskers and artful skill to regulate the sharing-protecting tension*” (p.9) Thus, the capacity to share knowledge and simultaneously protect its knowledge from the internalization by rivals is one of the most critical (Hurmelinna-Laukkanen & Olander, 2014).

Our literature review allowed us to identify two categories of techniques with extending Hamel's (1991) idea of restriction of the knowledge shared to only the critical knowledge by an idea of safety. Both categories allow the sharing to impact but have different implications. The first category reduces the harmfulness of the knowledge internalization by the partner. The second impacts the ability to internalize the knowledge.

The first one consists in allowing the partner to internalize the knowledge but control the effects to be sure that the internalization is not going to be harmful. It acts on the partner willingness to reuse any knowledge that it has internalized and which could be hurtful for the sharing firm. There are multiple ways to reach this goal. We decided to present three of them²⁷: patents, governance structure, and hostage arrangement. The three allow the sharing of sensitive knowledge and simultaneously decrease of the downside of the sharing. The first one is the most traditional technique. It concerns patents, but also trademarks or copyrights. They are mostly used for the protection of established knowledge that can be codified and embodied in final products or services (James, Leiblein, & Lu, 2013). They have the advantage to limit the reuse of the knowledge by the partner or to benefit for licensing fees from it. These formal and legal protections are considered as crucial when the partner is a competitor and has similar knowledge bases and strategic goals (Estrada, Faems, & de Faria, 2016; Park et al., 2014). Indeed, Ritala and Hurmelinna-Laukkanen (2013) highlighted that firms with a strong appropriability regime, as these formal legal protections, have better innovation performance than firms with a weak appropriability regime. The focal firm can

²⁷ The three chosen technics are only a sample of the existing technic. We could have added others as the use of interpersonal trust. Our goal is not to do a deep presentation of all the technics but to have an overview of the main categories.

also act by choosing an appropriate governance structure or organizational form. The governance and organization form can promote knowledge sharing and protection in an alliance (Kale et al., 2000; Oxley & Sampson, 2004). For instance, some researchers argue that hierarchical control through equity-based governance structure allows more protection and safeguard against opportunism (Heiman & Nickerson, 2004). Next, there are other techniques such as creating a hostage arrangement. The hostage arrangement aims to decrease the incentive to behave opportunistically because the firms are engaged in multiple relationships. One firm's opportunistic behavior could jeopardize the development and maintenance of the relationships in the other contexts²⁸. Thus, there is less need to protect the knowledge.

The second categories of techniques consist in impacting the ability to internalize the knowledge. We could say it consists of “sharing without sharing” (Baumard, 2010a, p. 93)²⁹. The idea is to use the knowledge but hinder any opportunities to internalize the knowledge. To achieve the goal, the firm can use segmentation techniques or obfuscation techniques (Baumard, 2010a; Faems et al., 2010; Fernandez & Chiambaretto, 2016; Jarvenpaa & Majchrzak, 2016). The segmentation consists in breaking down sensitive knowledge into segmented “pieces.” All the pieces of knowledge are shared or shared but in different ways. This process hinders the internalization. For the record, there are different types of knowledge segmentation. Jarvenpaa and Majchrzak (2016) who did a sum up of the existing type found three types which allow sharing without giving the opportunities to internalize it³⁰. Each of them allows the sharing of the knowledge and reduces the internalization capability of the partner. The first one is the compartmentalizing of knowledge by tasks. It consists in breaking down the joint problem-solving in multiple subtasks and only share the knowledge that is related to the assigned subtask. This process makes it really difficult for the partner to recombine the knowledge of each subtask and have a global picture. The second segmentation

²⁸ We are aware that increasing the scope of the cooperation to create a hostile arrangement is in contradiction with Hamel (1991), we will develop more this contradiction to justify why Hamel's integration of the paradox needs to be questioned.

²⁹ This is the translation of a French subsection title of this Baumard (2010a) book chapter. Even if Baumard used this title to refer only to obfuscation, we decided to use it for a much broader category which includes obfuscation but also segmentation.

³⁰ In Jarvenpaa and Majchrzak's (2016) sum up, there are five segmentation techniques. The two others do not concern our research focus which is to share and hinder the appropriation simultaneously. Indeed, the first segmentation technique consists in exchanging knowledge bites. It is a means to ensure the reciprocity of the sharing. The second consists in using trust-but-verify. It belongs to our first category of actions which consists in reducing the harmfulness of the knowledge internalized by the partner

called “Segmenting knowledge source” consists in sharing the knowledge content but not the knowledge sources. The last one consists in removing details and specifics of knowledge when sharing. Jarvenpaa and Majchrzak (2016) called it “Limiting sharing to generic knowledge.”

All the segmentation techniques consist in segmented “pieces” of the knowledge; there is another technique called the “*obfuscation*” technique (Baumard, 2010a). It also reduces the capacity of the partner to internalize the knowledge and thus contributes to the “safety” of the knowledge. However, the process is different. The obfuscation consists in concealing the strategy or the core knowledge in a more complex group of information composed of placebo or neutral information. This effect allows the protection against any opportunistic behavior³¹. We could use the adage about the difficulty of drinking from a fire hose³². The information communicated is so broad and complex that the partner cannot reuse it. The principle of obfuscation has been used a lot in the telecommunications, software, and media industry (Baumard, 2010b). According to Das and Teng (2004),³³ an obfuscation technique can materialize a calculative and long-span opportunistic behavior. Baumard (2010a) develops an illustrative example of LastFM which obfuscated its competitive intent toward Apple. In these cases, the obfuscation is not used for defensive and protective purposes but an offensive purpose. The offensive purpose of the obfuscation is out of the scope of this doctoral research. Thus, to overcome the choice between knowledge sharing and knowledge protection, a focal firm engaged in a coopetitive relationship can use both segmentation and obfuscation techniques. The strength of these techniques is that they can (1) be used for tacit knowledge, (2) be used in weak legal intellectual protection, (3) overcome the choice of sharing and protecting.

³¹ The concept of obfuscation has not initially been developed to study the sharing in coopetition or inter-firm relationships. Moreover, it can be used in multiple situations as for the communication of risk in large firms annual reports, or when doctors interact in front of a patient and they do not want to worry the patient (Baumard, 2010a, 2010b).

³² Although this adage was initially used in Hamel (1991), Hamel used it a different way. It refers to the fact that a firm can remain opaque by having a rapid pace of product development. Indeed, this rapid pace can overcome the pace of knowledge absorption. In this doctoral research, we use it because it fits perfectly to the *obfuscation techniques*.

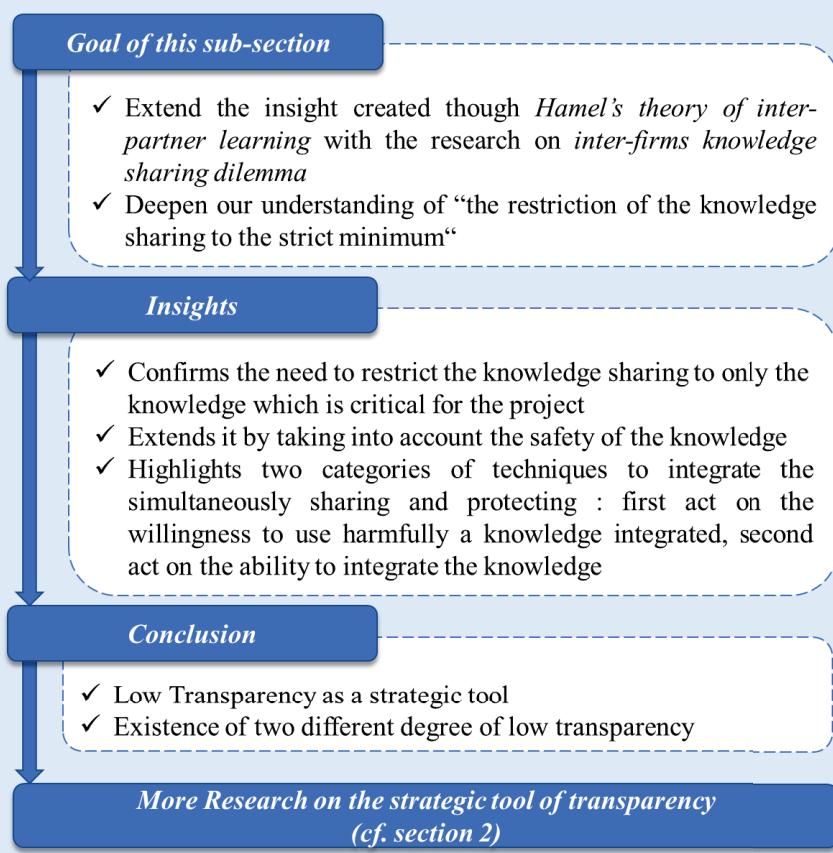
³³ “When a partner firm withholds critical information from the focal firm and attempts to confuse and obfuscate calculatively, it is engaging in long-span opportunism with low relational risk.” (Das & Teng, 2004, p. 754).

2.3. Synthesis on the extension of Hamel's insight and transparency as a strategic tool

In this sub-section, we extend our understanding of the first competition dimension of the insight created based on Hamel (1991). Indeed, the insight created is that “a focal firm which integrates the paradox of cooperation and competition will openly share the knowledge (i.e., cooperative dimension) but will simultaneously restrict the knowledge sharing to the strict minimum (i.e., competition dimension 1) [...].” By looking more deeply into the existing sharing-protecting literature in inter-organizational or coopetitive context, we first confirm the relevance of Hamel’s insight about restricting the knowledge sharing to the strict minimum. However, our literature review leads us to identify a need to go deeper into the restriction. Restricting the knowledge sharing to the knowledge which is critical for the project success is not enough. Some of the critical knowledge needed for the project’s success is sensitive knowledge (i.e., knowledge which is strategic for the firm and easy to internalize by the partner). In that case, the focal firm uses proactive measures to hinder the partner’s ability or willingness to internalize the knowledge. To reduce the willingness, the focal firm can use patents, governance structure, or hostage arrangement, etc. To reduce the ability, the firm can use segmentation techniques or obfuscation techniques. The interesting insight on this extension of Hamel is that it highlights that there are different degrees of transparency. A focal firm can decide to have a low degree of transparency and have a very restricted knowledge sharing which includes only the knowledge deemed necessary. The firm can also adopt an even more extreme low degree of transparency by using additional protective mechanisms on the sensitive knowledge which is shared. Thus, we argue that the degree of transparency, defined by Hamel (1991) as the potential for the partner’s learning, is a strategic tool.

Sum up of the extensions of Hamel's insight into integration of the knowledge sharing paradox

The degree of transparency is a strategic tool. A focal firm can act on its transparency by restricting the knowledge share to only the knowledge which is deemed necessary for the project success (i.e., minimize the knowledge sharing). However, some knowledge which is critical for the coopetitive project is also the knowledge which is strategic. In that situation, the firm needs to integrate the knowledge sharing dilemma and simultaneously share and protect. To do so, the focal firm shares the knowledge and simultaneously acts on the partner's ability to internalize the knowledge or willingness to reuse in a hurtful way the knowledge internalized. Thus, we brought further the answer about "*how to unlock and pursue the opportunities of the intermeshing between cooperation and competition?*" We highlighted that an enabling condition is a low transparency.



Conclusion Section 1

The conclusion of this section is that *knowledge sharing* is the “beating heart” of coopetitive relationships and *knowledge transparency* is the “pacemaker.” Sometimes, the beating heart can suffer from an arrhythmia. It means that the beating heart can beat too fast or too slow, which leads to damaging effects. The effects can be more or less troublesome going from dizziness and to death. Reciprocally knowledge sharing in a coopetitive relationship is crucial for the value creation and the rent extracted. However, the knowledge sharing process can suffer from not enough sharing. Not enough sharing can lock away the value creation from the intermeshing of cooperation and competition. The origin of this “arrhythmia” is the fear that the competitor internalizes the focal firm’s sensitive knowledge. This coopetitive relationship is filled with opportunism and knowledge internalization opportunities. The focal firm needs to integrate the paradox to overcome this fear of knowledge internalization and find a “normal” rhythm of knowledge sharing.

The first subsection highlights that to integrate the paradox the solution might be to reintroduce competition in the knowledge sharing. Reintroducing competition means that by being simultaneous with the knowledge sharing, the focal firm will restrict the knowledge sharing to the strict minimum (i.e., competition dimension 1), try to innovate on the knowledge shared (i.e., competition dimension 2) and try to learn from the partner (i.e., competition dimension 3).

The second subsection went deeper into the first competition dimension and we stress that restricting the knowledge sharing to the critical knowledge for the project is not enough. Most of the time, this critical knowledge includes some of the focal firm’s strategic knowledge. In that situation, the firms can use different techniques to reduce the partner’s ability to internalize the knowledge or the willingness to reuse the knowledge in a way which could be hurtful for the focal firm.

Thus, we answer our research question of “how to unlock and pursue the opportunities of the intermeshing between cooperation and competition?” by arguing that the enabling condition is to have restricted and safe knowledge sharing (cf. *Figure 22*). The focal firm achieves its low transparency condition through natural barriers of transparency and proactive measures to reinforce this natural barrier. In a coopetition relationship to enable the knowledge sharing, the focal firm is characterized by a low degree of transparency.

Although the mandatory condition to unlock and pursue the opportunities of the intermeshing between cooperation and competition may be the low transparency, this low transparency can also lead to project failure or no knowledge creation. We found three reasons that question the generalization of the use of low transparency to all coopetitive relationships between competitors.

First, this pattern of thinking behind low transparency is based on the dangers of being a "good partner" in strategic alliances. However, some studies question the generalization of the dangers of being a good partner. Indeed, Hennart et al. (1999) conducted a study and only one case of 58 cases studied aimed to expropriate the knowledge for the other firm. Thus, only in one case, the alliance was used as a pure "trojan horse." In all the other cases, the collaboration was more of a "workhorse" where companies are given long-term access to complementary and difficult to transfer resources. More concretely, this collaboration even generates resource pools in which the common resources can be used within as well as beyond the cooperation. Thus, if the low transparency is a relevant way to integrate the knowledge sharing dilemma of coopetition when the context is the learning race, this answer only fits to 1 of the 58 cases. We do not know if it is always relevant to integrate the paradox by low transparency when the partner does not use the collaboration as a Trojan Horse. We ask this question because of some authors, such as Zeng & Hennart (2002) who argue that adopting Hamel's approach to manage a collaboration leads to a "poor joint venture design." Thus, there is more research needed on the generalization of this type of integration in coopetitive relationship.

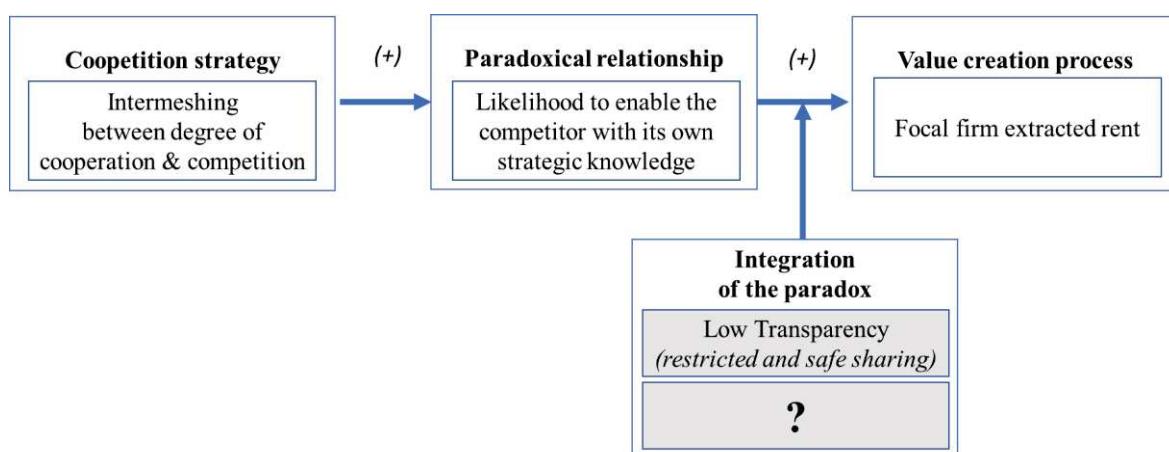
The second reason for questioning the relevance of low transparency is that authors like Larsson et al. (1998) who are conscious of the risk of being a good partner, also highlight the downsides of a low transparency. Indeed, nontransparent sharing inhibits the collective learning, and the nonreciprocal intent by one partner undermines the willingness to cooperate with the other partner. Thus, we can expect that the more a firm reduces its transparency, the more the partner will reduce it's too. Thus, low transparency decreases the joint learning and the willingness of the other party to cooperate (Larsson et al., 1998; Yang et al., 2013). Even Hamel (1991) was aware of this problem as he considered that some transparency was the price to pay even for the most protective firm. In the same line, Ho and Wang (2015) develop and bring empirical evidence that: "the firm's protective action towards the cross-border knowledge transfer process negatively affects its foreign partner's absorptive capacity to acquire and apply the transferred knowledge into the alliance context. "This high level of

knowledge protection employed by the partner may become a major hindrance to alliance learning and success.

The third reason is that some research develops contrary insight into how to manage the opportunistic behavior of a coopetitor. They argue that instead of restricting the collaboration to a very narrow area, the focal firm should implement more cross-boundary activities with the same competitive partner. The activities can be joint product design and joint quality improvement, expanding the scope of cooperation and deepening the interdependent relationship (Yang et al., 2013). The link predicted is that a larger scope of mutually involved activities will lead to less opportunism because the other relationships create a self-discipline process. It deters any willingness to act opportunistically as intentionally stealing knowledge beyond the scope of cooperation. The resource commitment can even increase this effect. By increasing the dedicated specific assets in the multiple relationships, the payoff of opportunism is reduced as it creates a high mutual dependence. (Yang et al., 2013). Thus, the relevant way to integrate the knowledge sharing dilemma is to increase the sharing to multiple activities.

Based on these three reasons, we develop the intuition that there might not be one way to unlock the opportunities of the intermeshing between cooperation and competition. The next chapter aims to look more deeply at the idea that maybe a high transparency could be another solution to integrate the paradox of knowledge sharing (*the question mark on Figure 22*).

Figure 22 ~ The fourth step of our theoretical framework

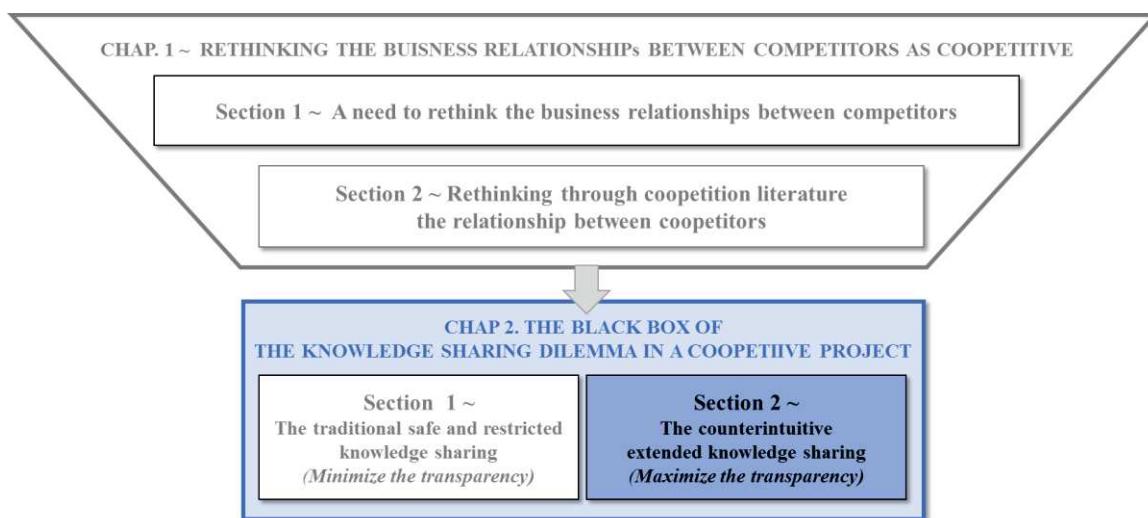


Source: Sea Matilda Bez's doctoral research, 2017

Section 2 ~ Sharing between competitors: extended knowledge sharing

The past section (cf. *section 1 in chapter 2*) was written almost like an advocacy in favor of minimum knowledge transparency. This section is written as the opponent advocacy. It aims at interpreting in new ways the knowledge sharing and the management of transparency in coopetitive projects. To open our way of thinking we used two different theories: Deutsch's constructive conflict resolution theory (2011) and Nonaka's dynamic theory of organizational knowledge creation (1994). Both are complementary. The constructive conflict resolution theory warns about the potentially destructive effect of competition unless the actors in interaction manage to create a constructive competition. Thus, integrating the intermeshing of cooperation and competition could consist in intending a constructive competition and avoiding any destructive competition. Nonaka's theory gives concrete techniques to create this constructive coopetition. He calls it the "creative chaos." The specificity of the creative chaos is that it relies on extensive controlled sharing. Thus, in this section, we argue that there is another way to integrate the paradox and benefit of the leveraging effect of coopetition. This way consists in extending in a controlled way the transparency to constrain to innovate.

Figure 23 ~ Visual representation of our programmatic literature review



1. Rethinking the transparency through the constructive conflict resolution

In this section, we aim at questioning the generalization of the principle of reducing transparency. The theory of cooperation and competition presented in chapter 1 was extended to create a constructive conflict resolution theory (Deutsch, 2011). This theory is interesting because it highlights that there is a choice when resolving a mixed motive conflict: resolve it through a cooperative constructive process or a competitive destructive process. The theory predicts the efficacy of the dynamic process of the cooperative problem-solving, whereas it predicts value destruction for a competitive problem-solving process. There is an exception to this prediction. It is when the individuals or organization managed to create fair rules. In this context of fair rules, the destructive process of competition shifts into a constructive process of competition. For the record, we can wonder if reducing transparency does not generate value destruction because “reducing transparency” is considered as a competitive action to solve the strain and conflict of knowledge sharing (cf. section 1 of this chapter 2).

1.1. The dynamic effects of cooperation and competition

Deutsch developed a general intellectual framework for understanding conflict and the conditions which foster its constructive conflict resolution. Facing a conflict due to the mix-motivation situation (i.e., situation in which there are simultaneously positive and negative inter-dependences) can lead to two different conflict solving reactions. It can trigger a cooperative problem-solving or a competitive problem-solving. The cooperative problem-solving reveals to be a constructive process when the conflict is seen as a mutual problem. And the competitive problem-solving reveals to be a destructive conflict resolving solution when the conflict is framed as a win-lose struggle. To understand why, we are first going to sum up quickly the effect of cooperation and competition problem solving and then understand that these effects are fulfilling.

❖ The effects of cooperative and competitive problem solving

A constructive process of conflict resolution is a cooperative problem-solving process (Deutsch, 2011). Indeed, in cooperative problem-solving processes, the perceived positive interdependence leads to considering the conflict as a common problem to solve. This willingness to solve this common conflict generates positive effects as effective communication, productive division of the labor, and enabling processes. The core idea is to

focus on efficiency and not hesitate to help the other to strengthen its capabilities if it can increase the success of the common goal (cf. *Table 14*).

On the contrary, a competitive problem solving framed the conflict as a win-lose struggle. This win-lose struggle lead to a destructive process. Indeed, the other firm's capabilities are a threat and might lead to loss. Any action that could strengthen the other capabilities is not undertaken. The main consequences are that the global communication is impaired, they share only misleading information or low-value information, and any idea from the partner is systematically rejected (cf. *Table 14*).

Table 14- The effects of cooperation and competition problem solving

	Cooperative problem solving	Competitive problem solving
Goals	Integrating various contributions	Evaluating and ranking people based on their capacity for a particular task
A conflict	A mutual problem to solve together	Is a win-lose situation (the solution is imposed by the winner)
Interactions	Helpfulness Enhance it	Obstructiveness Reduce it
Reaction to the other power	(you are strengthened when the other's capabilities are strengthened)	(other's capabilities are a threat)
Communication	Effective	Impaired
Impact on the division of the labor	Able and willing to divide the tasks to be more productive	Unable to divide (duplication to have a "mirror image")
Self-confidence	Increases because its ideas are recognizing and respecting by the other	Decreases because the ideas are continuous rejecting by the other
Outcomes	Both win	Win-lose

Source: adaptation into a table of Deutsch argument about the effect of cooperation and competition (2011, p. 26)

To sum up the theory of conflict resolution (Deutsch, 2011, p. 31), any organization which is engaged in an interdependent relationship should look for an effective cooperative problem-solving technique. The intent is to have two winners. Indeed, in this conflict resolution, people discuss their differences with the objective of clarifying them and attempting to find a

solution that integrates the best thoughts that emerge during the discussion, no matter who articulates them. Thus, during the controversy, each party deepened its insights and enriched its views of the matter that was initially in controversy. It is different from a competitive problem solving in which there are a winner and a loser. Thus, from the moment there is a competitive contest, the ones that have “the best” ideas, skills, and knowledge typically wins. While the other, who is judged to be less good, typically loses.

However, as we explained in chapter 1, the positive or negative interdependency are only the polar of a continuum and most of the time, the reality is a mostly mixed situation. These mixed situations can shift into cooperative problem solving or competitive problem-solving. Until now, we presented the theory as static. In a static environment, it was enough to look at the degree of positive inter-dependence relative to the degree of negative interdependence to deduce which type of problem-solving is going to be chosen: cooperative-constructive or competitive-destructive. In the next section, we will see that this perception occults the dynamic and self-fulfilling prophecy of cooperation and competition.

❖ Take into account the self-fulfilling prophecy

Deutsch wanted to understand the drivers of a constructive or destructive conflict resolution. To do so, he looked at “mixed-motive” (cooperative and competitive) situations which could move in either direction. In response to his interrogation and after identifying a general pattern in the data, he developed *The Crude Law of Social Relations*. He found that cooperation induces more cooperation, and competition induces subsequent competition (Deutsch, 2011).

These effects of cooperative or competitive actions are not static but a self-fulfilling prophecy. It is in every living creation’s instinct to react positively to what is beneficial and negatively to what is hurtful. Any individual or organization has a hostile reaction to any event that he believes is going to hurt him. This hostile action will be perceived as a bungling action for the common goal, and thus it is rational to try to obstruct this hostile action. This obstruction confirms the initial “negative perception.” This process leads to a continuous escalation of hostile actions until perceiving the other as an “evil enemy.” This escalation creates a non-ended situation where both are incapable of disarming without feeling vulnerable. On the contrary, as it is human nature to react positively to what is beneficial for them. An initial cooperative behavior tends to promote cooperative behavior in return. The positive effect is, in that case, also self-fulfilling.

These predictions are interesting because they highlight a dynamic (and not static) state of cooperation and competition. The level of cooperation or competition present in a situation depends on the previous efforts to engage in cooperative or competitive efforts (Johnson & Johnson, 2011). Each action supporting a member's efforts tends to move the equilibrium point towards an increased cooperation while refusing to help a struggling group member tends to move the equilibrium point towards a decreased cooperation. Johnson & Johnson (2011) argue that 'level of cooperation among group members is in a constant state of flux, as each member's actions promotes or hinders the movement of the group towards goal achievement' (p. 58). This dynamic prediction is one of the main contributions compared to the inter-dependency highlighted by Lewin (1935). For him, the level of cooperation occurring in a group was a quasi-stationary equilibrium.

This theory creates new insights into our research on the transparency in coopetition. If reducing the knowledge transparency is perceived as a bungling action, it will move the equilibrium point towards decreased cooperation and increased competition. As the process is following a self-fulfillment prophecy, this reduction of transparency can escalate into a total opacity. A total opacity might encourage the partner to perceive the situation as a learning race and be actively looking for unwanted leakage. This insight was confirmed by Johnson et al. 2006)'s dynamic experimentation. They highlight that when a group changes from a competitive reward structure to a cooperative reward structure, the information sharing which is expected due to the cooperative reward structure is not happening. Thus, it is key to take into account that any competitive action, such as the reduction of transparency, can have dynamic negative outcomes. Hamel (1991) shared this same insight by highlighting through its interviews that active measures to reduce transparency are perceived as provocative.

1.2. Opening the choice of conflict resolution

The choice of conflict resolution is not restricted to a positive cooperative problem-solving or a negative competitive problem-solving. There can be positive competitive problem solving. Indeed, competition is not always a destructive process. The competition can be beneficial. For instance, it can foster the selection of those who are more able to perform the activities, encourage the acquisition of the skills necessary to compete effectively, stimulate innovation, increase the task focus, generate high-quality problem solving, or build a group cohesion (e.g. Beersma et al., 2003; Wong & Tjosvold, 2010).

However, as we saw, there are serious problems associated with competition (e.g., disrupt information exchange, destabilize decision-making processes, obstruction, etc.). Thus, the whole challenge is to effectively regulate it by fair rules to transform it into a constructive process. Competition is a fun and playful context when it turns into a “game” without any high emotional dramas relating to victory and defeat, life and death, power and helplessness, dominance and submission. The key is to create an internal win/lose relationship in which both are externally winning. The loser is better off after the competition than before the competition. Deutsch (2011) gives the example of a tennis match, there is always a winner and a loser, but the loser at the end of the match could have improved his game. The match allowed him to practice its current skills and maybe even learn some new skills. Thus, even if he fundamentally lost the game, the game can still be an enjoyable and beneficial experience. In a constructive competition, the system is evaluating and ranking people based on their capacity for a particular task, but at the end, they use the best of both ideas, skills, knowledge.

Table 15- *Types of competition*

	Unfair, unregulated competition	Fair, regulated competition	Constructive competition	Constructive cooperation
End	Destructive end	In between	Positive end	Positive end
Relation	Win-Lose	Win-Lose	Win-Lose but the losers are better off after the cooperation than before the competition.	Win-win
Process	Illegal obstruction	Legal obstruction	Emulation to have the best of each ideas, skills, knowledge.	Integrates the best thoughts no matter who articulates them

Source: See Matilda Bez's doctoral research, 2017. constructed on the three types of competition (Deutsch, 2011, p. 29)

The existence of different types of competitions creates new insight into our research on the transparency in coopetition (cf. Table 15). In a mixed-motive situation between competitors, the competition is part of the everyday life even if they are highly positive interdependence. Thus, the coopetitor is going to look for the internalization of the focal firm's knowledge. If the coopetitor managed to learn it, the focal firm would lose its asymmetric skills and power in the relationship. Thus, this internalization is considered as hurtful, and the firm will obstruct it.

The exception of this behavior happens when the competition is a constructive competition. The other may win more, but the focal firm will also win. Accepting the asymmetric situation (and relative losing situation) can be a way to win too. The theory of constructive resolving conflict opens the ways to react to the internalization of the knowledge by the competitor. In the context of high positive interdependence between competitors, the managerial solution could consist in creating this constructive competition.

1.3. Synthesis of the insight of the theory of constructive problem solving

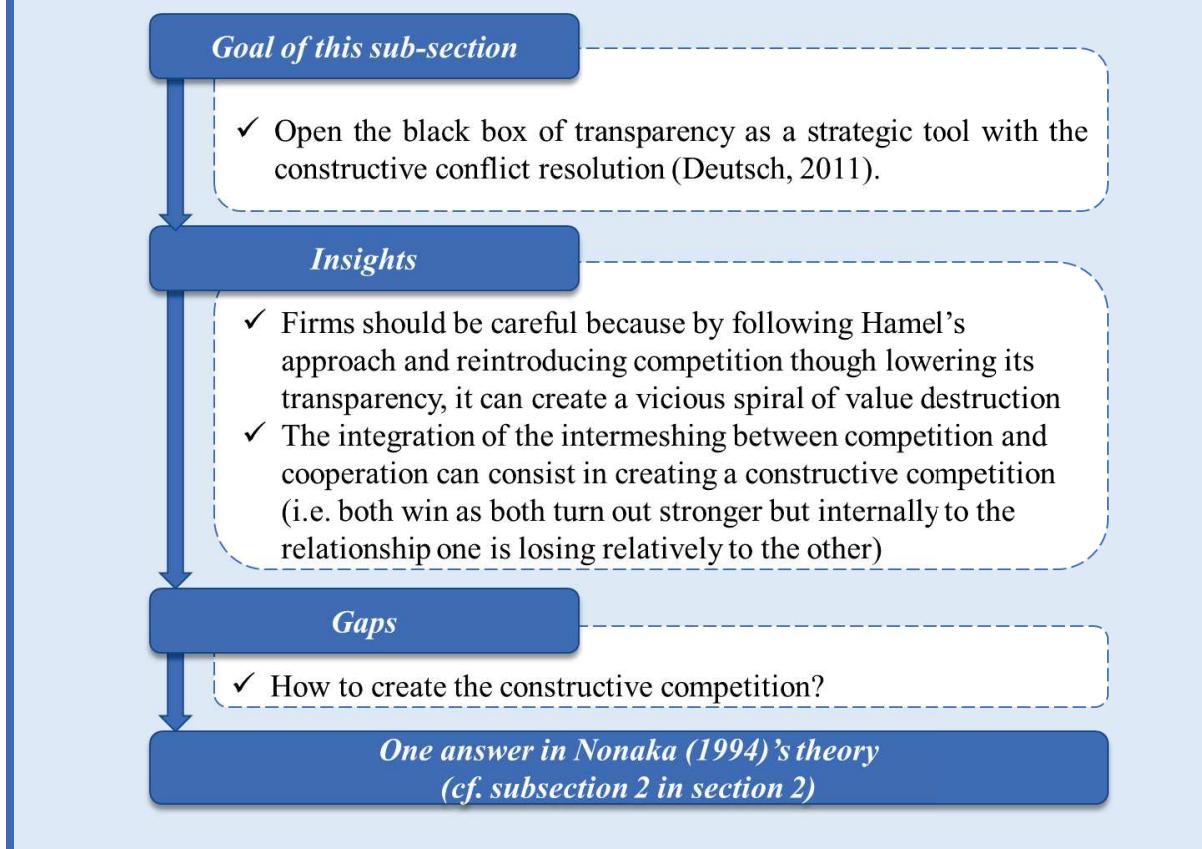
It is key to consider the dynamic virtuous effect of cooperation and the dynamic viscous effect of competition when deciding how to deal with a conflict as the knowledge sharing dilemma with a competitor. Indeed, through the theory of constructive conflict resolution, the common goal achievement is in a constant state of flux. Each member's actions continuously promote its realization by cooperation or hinders it by competition. This dynamic lens questions the relevance of actions as the reduction of transparency. When a firm reduces the transparency, it reintroduces competitive behavior in collaboration. This jeopardizes the positive and constructive collaboration. Reducing the transparency can be perceived as a competitive behavior and thus trigger this vicious, destructive process.

However, this theory does not consider that the competition should be reduced. It just highlights its potentially destructive effects when it is not managed. The intermeshing between cooperation and competition can have a positive effect. The competition needs to be managed into a constructive problem-solving to be positive. Thus, integrating the coopetition paradox can consist of looking actively to a constructive problem-solving and rejecting any destructive competitive action.

If this theory gives interesting insight, it does not give a concrete example of how to create the constructive competition resolution conflict which could be the perfect answer for maintaining a high intermeshing between cooperation and high competition.

Sum up of Deutsch's insight into knowledge transparency in coopetition

The core idea of the theory of cooperation and competition is that the accomplishment of each individual's or organization's goals is affected by the actions of others. Their goals are interdependent. This interdependence creates, by nature, conflicts such as the knowledge sharing dilemma. Facing these conflicts, the organizations can decide to solve them cooperatively or competitively. The competitive revolving conflict leads to one winner and one loser, but the loser does not lose without a fight, and thus it produces frustration, crying, and violence. The intermeshing between cooperation and competition will be positive only if they adopt a competition constructive problem solving strategy. They create fair procedures for resolving the conflict for a win/lose ending in which both players turn out stronger after the collaboration than before. Thus, both win even if there is a loser relative to the other. This mutual win is key in the organization which wants to promote interaction and co-creation. More research is needed on how a focal firm can create this competitive constructive conflict resolution in a coopetitive relationship. Based on the theory, actions as "reducing the transparency" can be considered as a competitive action and generate a dynamic and progressive process of value destruction. This insight questions the relevance of reducing the transparency.



2. Rethinking through the dynamic theory of organizational knowledge creation

Our goal is to open the black box of the management of knowledge transparency in coopetition projects by highlighting the existence of another choice than the minimization of knowledge transparency. To reach this goal we decided to use Nonaka's theory of dynamic knowledge creation. It is an influential and widely referenced theory that shed light on organizational creativity, learning, innovation, and change (Hislop, 2013; Nonaka & von Krogh, 2009). Some past research even argues that it is impossible to ignore Nonaka's theory when the research focuses on innovation and knowledge creation domains (Hislop, 2013). One proof of its huge influence is that one founding article of this theory was published in 1994 and has reached more than 20 thousand quotations in google scholar³⁴. Of course, there is a whole body of literature which looks at knowledge management and innovation without Nonaka's theory (Foss, Lyngsie, & Zahra, 2013). At no moment do we aim to be exhaustive in all the theories that could justify how to manage knowledge transparency. This theory is a relevant theory because it highlights an opposite way to behave relative to the current coopetition literature. The core idea of this theory is that knowledge interaction with an external partner can generate a virtuous process of organizational knowledge creation (i.e., a spiral of organizational knowledge creation). The corollary is that any action that reduces the knowledge conversation can hamper the knowledge creation. For us, minimizing the knowledge transparency is one of these actions that reduces the knowledge conversation and thus hampers the knowledge spiral.

The official origin of the theory can be associated with Nonaka (1994)'s article in organization science. This article was entitled "dynamic theory of organizational knowledge creation." This article and theory were a response to the inaccuracy of the contemporary dominated paradigm for firms belonging to a society of knowledge filled which dynamic environmental changes. Indeed, this dominant paradigm considered the organization as a "processes information," and its goal was to understand how to process information efficiently. By doing so, they had a passive and static view of the organization and knowledge creation. Thus, the dynamic theory of organizational knowledge creation aimed to change this

³⁴ On July 10, 2017, we find that the article, « A dynamic theory of organizational knowledge creation (1994), was quoted in 21297 articles on Google scholar.

research question into how to create organizational knowledge. They introduced a dynamic and active view of the organization in the organizational knowledge creation. In this paradigm, interaction is creating knowledge.

The dynamic theory of organizational knowledge creation is very broad. It includes reflection on “hypertext organization,” “knowledge systems,” “middle-up management,” the “organizational structure,” and “leadership” etc. In this Doctoral research, we review only some central and narrow elements of the theory and identify how we can use them to generate new insight into our subject of managing transparency in a coopetitive project. More precisely, we will highlight that one of the managerial solution called the creative chaos is a perfect illustration of how to create what Deutsch (2011) called the “competitive constructive conflict resolution.” To develop our argumentation, we process in two steps. First, we present the mechanism of knowledge creation at the individual and organizational level. Secondly, we present the spiral of knowledge creation and the organizational conditions that enable this spiral (2).

2.1. The mechanisms of knowledge creation

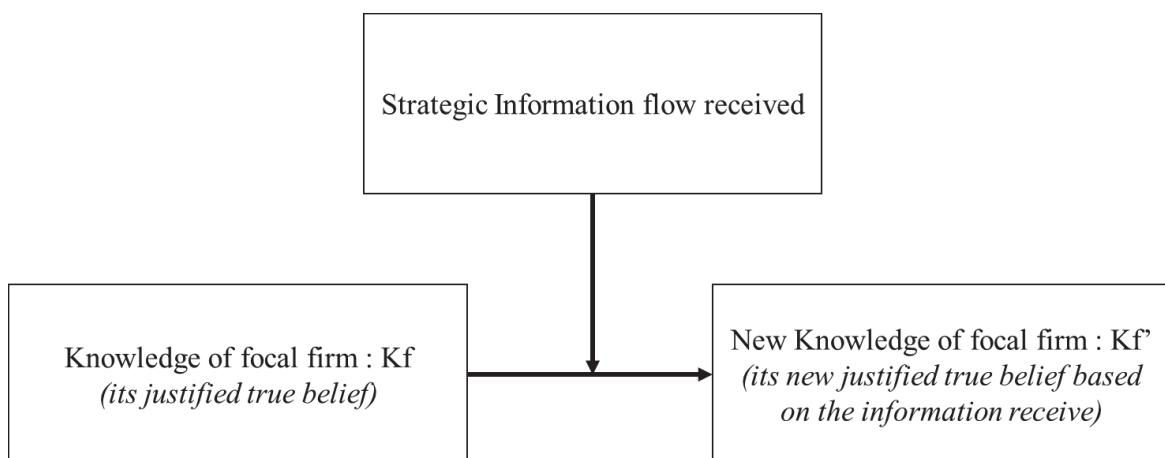
Knowledge creation relies first on the individuals. Thus, the organization creates knowledge not by itself but by making available and amplifying the knowledge created by individuals. Thus, in this section, to understand the organizational knowledge creation, we will first present the individual knowledge creation process and after the organizational knowledge process. Then, we will highlight the insights generated for our subject of managing transparency in a coopetitive project.

❖ The individual knowledge creation

Nonaka (1994)’s theory has the specificity to consider that without individuals there would be no knowledge. Knowledge is fundamentally possessed and embodied in an individual. More precisely, knowledge is a “justified true belief” (Nonaka, 1994, p. 15). This justified true belief gives the individual the ability to define and understand a situation and act accordingly. Thus, knowledge is not a formal logic or absolute reality (e.g., one plus one equals two). It is a human construction based on its personal beliefs which aim at getting continuously closer to the reality.

Knowledge creation is a continuous process to overcome the individual boundaries (Nonaka, von Krogh, & Voelpel, 2006). Individual knowledge is constrained by information and past learning. An individual gets through these constraints by acquiring a new context, a new view of the world and new knowledge. It happens through personal, new experience or interaction with the world. More concretely, human being works by analogy (Nonaka, 1994). Individual's analogy processes lead them to compare their initial beliefs to what they experience or what information³⁵ they receive from their environment. These analogies justify or improve their initial belief. It justifies the belief when the information received is in accordance with the initial belief, and it alters the belief when there are some discrepancies. Each improvement allows the individual to get closer to its perceived reality (cf. *Figure 24*). Knowledge is a dynamic and never-ending process which drives the individual action.

Figure 24 ~ Articulation between knowledge, strategic information and knowledge creation



Source: See Matilda Bez's doctoral research, 2017. own representation of Nonaka (1994) definition of the concepts

However, this argument needs to be nuanced; it depends on the content of the information. The process illustrated in *Figure 24* happens only if the information received is strategic. The information is strategic when it directly guides action (Gruber, 1989). If the information flow does not contain any strategic information, the beliefs are not going to be justified or altered. A good illustration is Nonaka (1994)'s telephone bill example. The telephone bill can reveal lots of long communications, but it does not necessarily mean that the content of the

³⁵ Information is the flow of messages that can change an individual's or organization's belief. This information transforms into knowledge when it enables the individual or organization to make previously invisible connections or ideas which are now considered as obvious (Nonaka, 1994).

communications was valuable. At the end of these communications, the individual may not change its beliefs and thus act similarly than before. Controversially, there can be only one very short communication which changes the receptor perception of the truth and influence its way of behaving. This nuance, is one of the main critics of past research which disproportions the emphasis on the role of information processing without looking at the value of the information received.

If knowledge is embodied in an individual, this knowledge can be improved by the strategic knowledge received. One way to do this is to interact with other individuals who may have different understandings of the same events (Nonaka, 1994). In that case, the knowledge creation emerges from the confrontation of the perspectives (i.e., dialogue between the individuals). Nonaka (2008) argues that one's knowledge is generated through multiple perspectives of human interaction. The creation of relationships with individuals that operate in the opposite direction shapes their knowledge.

Nonaka went further and argued that the real value-added of the interactions between the individuals is that it creates a dialogue between tacit and explicit knowledge. Explicit knowledge refers to knowledge readily articulated, codified, accessed and verbalized. Tacit knowledge refers to technical and cognitive knowledge which is difficult to articulate and verbalize. It can be a technical or cognitive tacit knowledge. The technical tacit knowledge concerned know-how, crafts, or skills. The cognitive tacit knowledge refers to the perception of the reality and the future (i.e., "what is and ought to be" p.15). The explicit knowledge is key in the transmission of the knowledge, but it is only the "tip of the iceberg" (p.16). It is the tacit knowledge that explains how the individual acts. Thus, to understand the roots of an individual act, the other individuals need to access not only the explicit knowledge but also the tacit knowledge. Baumard (2009b) used Sun Tzu to highlight that to win a war; you do not want to fight directly against the enemy but against the outmaneuver of the enemy. It is almost the same with learning; you do not want to learn what is done but understand why it is done like that. If we go back to our definition of knowledge: an individual looks not for the behavior to adopt but for the justification of a behavior.

❖ The organizational knowledge creation

If knowledge creation relies first on the individuals, the organization creates by generating the processes of making available and amplifying the knowledge created by individuals. There are four conversations allowing the organization to acces the explicit and tacit

knowledge of an individual. Through each knowledge conversation, a personal subjective knowledge is validated, connected to other individual and synthesized (Nonaka et al., 2006). These four conversations fit to four modes of knowledge creation: socialization (tacit to tacit), externalization (tacit to explicit), internalization (explicit to tacit) and combination (explicit to explicit) (cf. *Table 16*).

Table 16 ~ Nonaka (1994)'s modes of knowledge creation

	To tacit knowledge	To explicit knowledge
From tacit knowledge	Socialization	Externalization
From explicit knowledge	Internalization	Combination

Source: Nonaka, 1994 (p.19)

Each mode of knowledge creation relies on deeper organizational theory. For example, socialization refers to theories of organizational culture or combination which is rooted in information processing or even internalization to organizational learning³⁶. We quickly define each of Nonaka's (1994, 2008) knowledge creation modes :

- Socialization is the transformation from tacit to tacit. It does not require language; knowledge creation can happen through unique observation and imitation. It occurs when two individuals shared an experience or work together on a daily basis and over an extended period. The common experience combined with the daily work allows the dialogue and the observation. Thus, the individual is going to understand the technical and cognitive tacit knowledge of the other. If they have no common experience, it is very difficult to acquire the knowledge. Through time, it allows them to share working practices but also common systems of values and beliefs.
- Externalization is the transformation from tacit to explicit. Knowledge creation happens through sharing. It involves the movement from the individual level to the group level. This is happening during the justification process toward a group of peers. The individual's use language, images, modes, and concepts, etc. This articulation of knowledge by one person will involve them being questioned (possibly challenged) by peers to clarify and develop their knowledge and ideas. Dialogue is the key in this process.

³⁶ The purpose of this doctoral research is not to deepen these organizational theories, we use the existence of the four modes of knowledge creation to create new insights into the management of knowledge transparency.

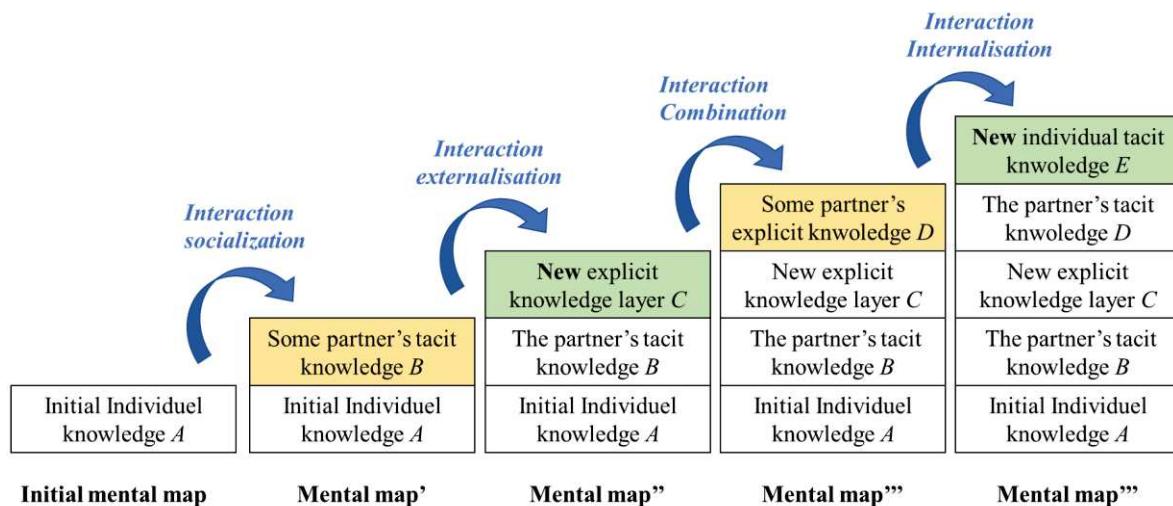
- Combination is the transformation from explicit to explicit. This happens through meetings and telephone conversations that the individuals are going to coordinate together disparate explicit knowledge. This new additional explicit knowledge formalizes a group level knowledge composed of each individual's knowledge.
- Internalization is the transformation from explicit to tacit. It moves from the organizational form to the individual. Knowledge creation happens through doing. Internalization occurs when the individual tries to reuse the explicit knowledge. For instance, several trial and errors lead to internalization.

The conversation modes are key because each of them allows the creation new layers of knowledge for an individual engaged in an interactive process (cf. *Figure 25 : the layer B through socialization, the layer C through externalization, the layer D through combination, and the layer E through internalization*).

For the record, Figure 25 highlights the knowledge creation process of one individual due to interaction. Simultaneously, the partner with whom the individual is interacting is also experimenting the same creation of knowledge layers. However, the speed and content of knowledge creation can differ. They are directly related to the initial belief and experiences of the individual.

This Figure 25 is our own visualization of the Nonaka's individual knowledge creation. Through this figure, we wanted to highlight a second crucial implication of Nonaka's insights. Even if each new layer of knowledge is creating new knowledge for the individual, only the externalization and internalization is extending the knowledge. According to Nonaka, it is this conversation between tacit and explicit knowledge that extends knowledge. A direct dialogue between tacit and explicit is needed. Two of the four modes allow this process: externalization (tacit to explicit) and internalization (explicit to tacit). Our personal interpretation of this argument is that socialization and combination consists in the creation of a new knowledge based on an already existing knowledge (*in yellow on Figure 25*). The knowledge is acquired through learning of the other individual knowledge for the socialization mode, and through coordination for the combination mode. On the contrary, externalization and internalization consist in the creation of a new knowledge by expanding in new directions the existing knowledge (*in green on Figure 25*).

Figure 25 ~ The creation of layers of knowledge on individual



Source: See Matilda Bez's doctoral research, 2017.

We are aware about the critiques concerning the distinction between tacit and explicit and these four modes of knowledge creation (Baumard, 1999; Glisby & Holden, 2003; Gourlay, 2006)³⁷. Some of the main critics' concern are: the unconvincing empirical evidence; the conceptual problem due to the difficulties to differentiate tacit and explicit; its limited universal applicability as it was embedded in a Japanese culture; none of the conversation mode is enough by itself. Even Nonaka, in 2009, refines the distinction between tacit and explicit as a continuum and no longer two types of knowledge (Nonaka & von Krogh, 2009). However, this conversation mode generated interesting insights for our research objective.

❖ Insight into coopetition literature and knowledge transparency

We use Nonaka's dynamic theory of organizational knowledge creation to generate two critical insights that serve as the conceptual scaffolding for reflection : (1) we highlight that the minimization of knowledge transparency is not enough because it might not protect from enabling of the competitor with tacit cognitive knowledge, (2) this minimization of knowledge transparency might not always be needed. Some knowledge is so embedded that by its intrinsic characteristic the knowledge is already protected. We develop each insight.

The literature of the management of coopetition highlighted specific actions that allow collaboration without taking the risk of the partner absorbing the knowledge (Baumard, 2009a; Fernandez & Chiambaretto, 2016). One of the actions consists in reducing the focal

³⁷ Moreover, some critics come from the redundancy between Nonaka's concepts and existing ones (for example with Kogut and Zander (1992) codified and tacit knowledge).

firm's transparency. However, even when the firms reduce the knowledge transparency, if the individuals between both firms are still interacting on a daily basis, the coopetitor may enable itself with some tacit cognitive knowledge. Indeed, the individual knowledge creation highlighted that from the moment there is interaction, there can be knowledge creation. Every human being creates knowledge through analogy. They continuously compare their justified true belief to what he observes (or receives). Thus, from the moment that one individual interacts with another, he will compare what he observes and receives to its "justified true belief. "This process will allow him to develop new tacit cognitive knowledge³⁸. We could suppose that any firm that accepts to let its employees interact with the employees of another firm implicitly accepts that both employees strengthen their tacit cognitive knowledge. Thus, reducing knowledge transparency might protect against explicit or technical knowledge absorption but not against enabling the partner to increase its tacit cognitive knowledge. Thus, in Fernandez & Chiambaretto (2016) case study of Astrium and Thales Alenia Space, we can suppose that the techniques used for reducing the partner capacity to absorb the knowledge shared are not enough for tacit cognitive knowledge. We do this prediction because the Fernandez & Chiambaretto highlighted that the employee interacts on a daily basis.

This cognitive tacit knowledge sharing would not be an issue if the core competitive advantage relied on explicit or technical tacit knowledge. However, Nonaka (1994) highlighted the importance of the tacit cognitive knowledge. This knowledge had already been highlighted as crucial. Baumard (2009b), by giving credit to Hirsh (1977), highlighted that the competitive action did not always rely on what the firm possessed. The competitive advantage in a dynamic environment is linked to the access and retention of the "pre-knowledge" of a shift in the industry³⁹. Even if a firm has a superior and non-imitable technology, it can be in danger by the industrial shift that will promote another technology. Thus, as far as we are concerned, no research went deep enough into the question of the management of the knowledge in coopetition to look if their managerial proposition allowed the retention of this pre-knowledge.

Moreover, based on the definition of knowledge, knowledge is embodied in individuals. It underscores that tacit knowledge as skill, experience, perception or history is by nature difficult to transfer. This acknowledgement has been highlighted by a whole stream of

³⁸ Of course, the tacit cognitive knowledge creation of everyone will fluctuate in content and speed.

³⁹ It explains why some R&D laboratories decide to share openly their results. Even if you have a superior and non

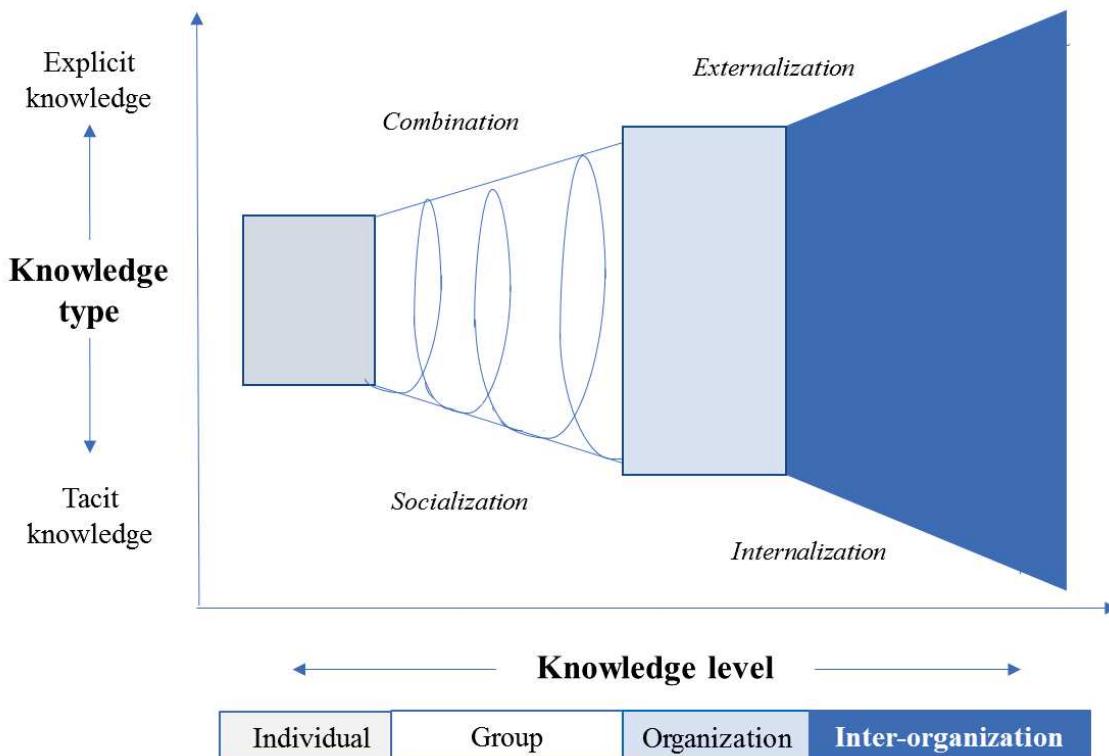
research interested in the stickiness of knowledge (Ghosh & Rosenkopf, 2015; Szulanski, 1996). If knowledge is by nature sticky, is it relevant to reduce the transparency? Does it generate necessary costs? Hamel (1991) gave the examples of firms which never managed to learn the skill of the partner. Thus, a firm can be in its action transparent, but the stickiness of the tacit knowledge hinders any knowledge internalization. Thus, reducing the transparency in this context is unnecessary.

Thus, knowledge transparency might (1) not protect against enabling the competitor if the individuals are interacting, and (2) reduce knowledge transparency, which is an unnecessary cost, as the knowledge is sticky.

2.2. The spiral of knowledge creation and its enabling conditions

Organizational knowledge creation is a specific form of individual knowledge creation. It relies on the management of these four modes of knowledge creation to create a continuous spiral of knowledge creation (Nonaka, 1994) (cf. *Figure 26*).

Figure 26 ~ Spiral of Organizational Knowledge creation (Nonaka, 1994)



Source: Nonaka (1994) with a minor drafting change. The change aimed at stressing the already existing inter-organizational level

The spiral of knowledge aims to make available and amplify knowledge created by individuals (Nonaka et al., 2006). The organization tries to generate interaction between the four modes of knowledge to reach the knowledge availability and amplification. When they are combined, they have two advantages: first they allow the amplification of the initial tacit knowledge; second, it allows to go the levels upward. Indeed, knowledge can go up the levels: from one individual to another (socialization), one individual to a group (externalization), from one group to the organization (combination), from one organization to an individual (internalization). It is the combination of multi-layers of knowledge and multilevel process that creates a spiral that allows the knowledge to reach larger scale and knowledge creation faster (Nonaka, 1994).

An organization increases the number of actors involved in the spiral to deepen the dynamic organizational knowledge creation. Involving more actors inside its organizational boundaries increases the value-added to the knowledge. The organization looks for actors outside the organizational boundaries to intensify, even more, the spiral of knowledge creation (Nonaka, 1994). In *Organizational knowledge* creation is a specific form of individual knowledge creation. It relies on the management of these four modes of knowledge creation to create a continuous spiral of knowledge creation (Nonaka, 1994) (cf. *Figure 26*).

Figure 26, the deep blue at the right side refers to inter-organizational level Nonaka even argues that by going beyond the boundaries of the organization, knowledge creation becomes “a continuous process with no ultimate end” (Nonaka, 1994, p. 26). Glisby and Holden (2003) look deeper into Nonaka’s external sharing of knowledge; they revealed that Nonaka’s spiral refers to only Japanese close and interlocking inter-organizational relations. According to them, in more arm's length inter-firm relations the sharing of tacit knowledge across organization boundaries occur less frequently. Our interpretation of these results is that to amplify the knowledge creation through interactions with an organization outside the boundaries of the firms, they must be engaged into a close and interlocking relationship. If not, there would not be the expected sharing of tacit knowledge.

A firm needs to look for knowledge conversion with actors beyond the boundaries of its organization. Indeed, if initially an internal and convergence process is needed to develop and improve its belief. After a while, this convergence can be hurtful because it will decrease the organization’s ability to create new knowledge. In that context, the firm needs to create a dialogue with external actors (beyond the boundary of the organization). This dialogue with

an external individual can expose previous invisible connections, transparent unknown ideas into obvious ideas, or highlight unexpected connection.

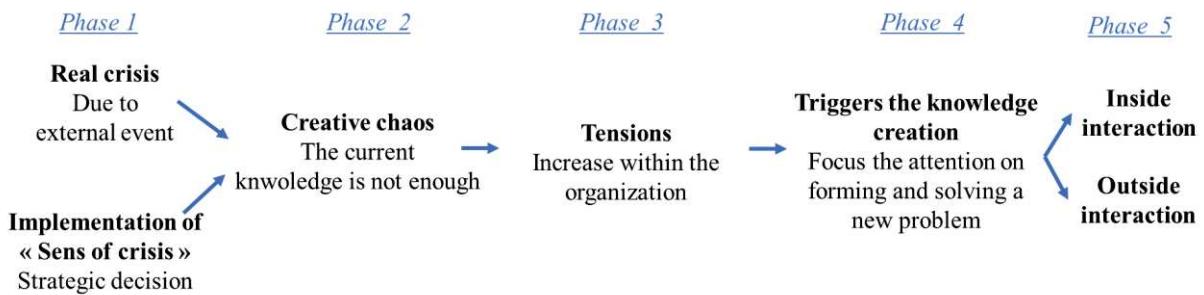
The organization can create a context that enables an effective organizational knowledge creation. We decided to highlight two main conditions to enable the knowledge creating spiral: creative chaos and redundancy of information (Nonaka, 1994; Nonaka & Takeuchi, 1995). We are aware that there are also individual enabling as the intention or the autonomy; and sometimes a fourth enabling condition is added referring to love, care, trust, and commitment (Nonaka, Toyama, & Konno, 2000). However, we focus in priority on these two “organization-wide” enabling conditions. For each, we present it quickly and then look at the insights this theory can generate for knowledge transparency challenge in coopetition projects.

❖ Fluctuation and creative chaos

Knowledge creation can be triggered by introducing of light fluctuation of the individual environment or by creating a whole creative chaos. The light fluctuation refers to what we developed before. It is to introduce environment fluctuation in one's individual environment. The individual will have to deal with contradictions in their tasks, goals, or visions. These contradictions allow to develop new meaning, and it is the contradiction that triggers the learning.

The creative chaos is different. It is a situation where the existing knowledge is not enough to reach the expected goal, or to perform a task. The individual is put in a situation where they have to give attention to forming and solving a new problem. As highlighted in *Figure 27*, the creative chaos can be due to a real crisis as a rapid decline of performance due to changes in technologies, a change in market needs, or the development of a significant competitive advantage by a competitor (Nonaka, 1994, p. 28). But it can also be deliberately implemented by the managers by proposing, for example, challenging goals. For example, Toyota created a creative chaos when it asked its employee to increase the fuel efficiency by 100%. Its demand seemed impossible because with the existing knowledge only a 50% efficiency increase was conceivable. In response, the employees rejected their initial thought about a direct injection engine and developed a hybrid car (Nonaka et al., 2000).

Figure 27 ~ Creative chaos triggers knowledge creation and knowledge interaction



Source: See Matilda Bez's doctoral research, 2017. – attempt to visualize the Nonaka's construct “the creative chaos”

The goal of a creative chaos is to breakdown the individual's routines, habits, and cognitive framework. When individuals repeat multiple times the same task, each repetition leads to the creation of routines. These routines reinforce the current belief and do not create a need or willingness for new knowledge. Individuals need to breakdown their routines and habits to create new knowledge. The organization needs to encourage the individuals to transcend their existing knowledge boundaries. The individuals are going to look for high interaction with another individual inside and outside the organization to transcend the current knowledge boundaries (cf. *Figure 27*). This situation increases the tension felt by the individual due to the contradiction between what is asked and what is possible. This tension is key because it is what triggers the knowledge creation.

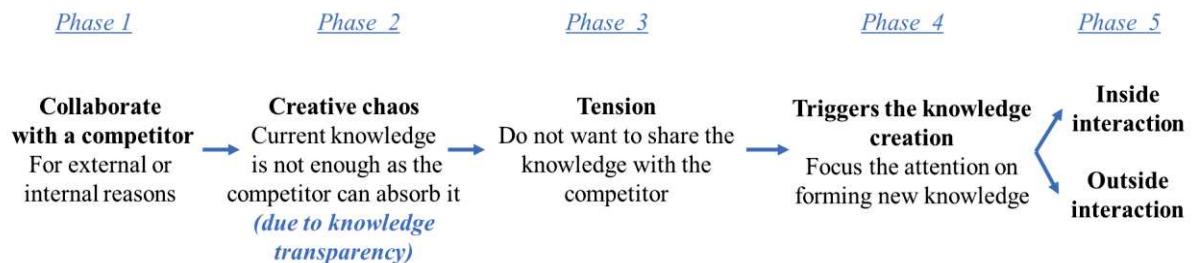
To conclude, creative chaos is one way to motivate the individuals to interact with other individuals and put forward knowledge creation. Creative chaos constrains individual to “think outside of the box.” This is vital in times of crisis (Nonaka et al., 2000).

Our own interpretation of the “creative chaos” is that trying to solve or reduce the tension generated by the “creative chaos” reduces the motivation to create new knowledge. This insight changes our way to perceive the problem of knowledge transparency between competitors. We schematized it with the Figure 28. The beginning of the process is in line with the coopetition literature:

1. A “real crisis” or a strategic decision can lead a firm to collaborate with its competitor
2. This collaboration creates a creative chaos because each knowledge share in the coopetitive project can potentially be reused by the partner. In case of the reuse by the partner, the existing knowledge is not enough to stay competitive.
3. As highlighted in the coopetition literature, it creates tensions

However, contrary to the coopetition literature that argues that this tension needs to be managed, the dynamic theory of organizational knowledge creation highlights that it is these tensions that trigger the organizational knowledge creation. Thus, the individuals will use the opportunities of knowledge interaction with a competitor to create a spiral of organizational knowledge creation.

Figure 28 ~ Knowledge transparency as a creative chaos that can trigger knowledge creation



Source: See Matilda Bez's doctoral research, 2017.

Thus, managers can foster the individuals' knowledge creation. One way of doing it could be to put the individual in a knowledge transparency situation with the competitor. As the competitor is likely to reuse the knowledge, the individual will have to focus their attention on forming new knowledge. Allowing knowledge transparency with a project involving a competitor fit to Nonaka's metaphor of creative chaos: putting the researchers upstairs without a ladder, but also sets the first floor on fire. By setting the first floor on fire, the creation of chaos, the researchers are forced to come up with novel ideas for tackling the problem. It triggers the creation. Here allows the transparency that can "put the first floor on fire" and thus trigger the knowledge creation and willingness to interact with the competitor.

This insight allows us to go even further in our reflection. If the creative chaos is perceived as a channel to transform a crisis into new opportunities, creative chaos is a means to develop a firm's dynamic capability (Teece et al., 1997). We can wonder if knowledge transparency with a competitor is not a way to develop a dynamic capability?

This argument needs to be nuanced. Indeed, in Nonaka (1994), the individuals need to reflect on their actions to generate a creative chaos and not a destructive chaos. Thus, if an individual does not reflect on the action of being transparent with a competitor, it can be dangerous. Indeed, he will not be committed to learn and create organizational knowledge for its company. Moreover, the creative chaos works if the individuals are free to act. They need to be allowed to come up with novel ways of tackling problems, even if these new ways lead

to reconsidering the fundamental thinking. Moreover, if widening and amplifying the knowledge through new interaction is needed, there is simultaneously a need for a convergence process. It is through convergence that the knowledge crystallizes into useful knowledge inside the organization.

Thus, the insight of this theory is not to always be totally transparent with an external partner; the goal is to use transparency with an external partner to go a step further in the knowledge creation. It allows feeding the organizational knowledge spiral. However, this transparency needs to happen under specific conditions as: a real reflection of the implication of this transparency at the individual level, a real freedom of the individual to experiment new knowledge and an internal crystallization process.

❖ Knowledge redundancy

In the dynamic theory of organizational knowledge creation, knowledge redundancy is an enabling condition for knowledge creation. Redundancy refers to intentional overlapping of information, but also to the overlapping of business activities and management responsibilities. This position can be perceived as counter-intuitive especially for western managers. Indeed in western culture, redundancy is connotated to “unnecessary duplication and waste” (Nonaka, 1994). This negative perception is still accurate. When we look at the Oxford dictionary, the first definition of redundancy is “the state of being not or no longer needed or useful.”⁴⁰ However, from the lens used is the organizational knowledge creation, there four main benefits from redundancy (cf. *Table 17*).

First, the degree of redundancy in a team determines the degree of knowledge diffusion in the team. Concretely, redundancy means overlapping of information. This overlapping allows a deeper sharing of extra tacit knowledge and the increase of the advice. The overlapping information helps the individuals to make sense of what the other is trying to do. In other words, redundancy allows the analogy process to work. By understanding what the other is trying to do, the individual increases its tacit knowledge but is also able to give advice based on its own “justified belief.” Through redundancy, an individual can go deeper into the understanding of operational activities and thus can help its counterpart (Nonaka et al., 2000). Moreover, an overlapping of the knowledge provides new information from new and different

⁴⁰ Definition given by the oxford dictionary the July 13th, 2017

perspectives. Nonaka (1994) calls it “Learning by intrusion” into the individual’s sphere of perception.

Second, the degree of redundancy generates an internal competition that speeds up the creation. If in a firm, there are two product-development groups in competition, they will develop different approaches to the same project. Each of the groups will argue over the advantages and disadvantageous of its project. This argument process will allow it to look at a variety of perspectives and develop a common understanding of the “best approach.” This internal competition leads to giving the leadership to the ablest individual or team. By redundancy and internal competition, an organization is a guarantee to have “the right man in the right place.”

Third, the degree of redundancy allows responding to more varieties of issues. The environment is complex and filled with varieties. To be able to respond to it, the same knowledge must be duplicated and adapt to its specificity. If there is no redundancy, the firm can respond only to one specific context. The necessary flexibility is ensured by information ‘redundancy’ (Nonaka, 1994, p. 29).

Fourth, the degree of redundancy allows monitoring the other. Indeed, the close interaction and trust upon the sharing of redundant information minimizes the possibility of cheating.

Firms look for knowledge redundancy to promote a deep knowledge sharing. Knowledge redundancy is an enabling condition which allows a deep sharing of tacit knowledge. Thus, when a firm creates a cooptitive project team in which the managerial functions are duplicated, they allow a deep sharing of a tacit knowledge. From this lens, this dual structural organization does not minimize the transparency, on the contrary, the transparency is extended to include tacit knowledge.

Table 17 ~ The benefits of knowledge redundancy in a team

Redundancy effect	Details
Diffusion of the knowledge due to overlapping	Share of extra knowledge (tacit knowledge) Ability to give advices
Internal competition	Leadership is given to the individual or team with the ability to best address the issues or problems Principle of redundancy of potential command
Eliminate/minimize the cheating	The close interaction and the overlapping of information allow an ability to monitor the other action.
Multiply the use of knowledge	The environment is complex and full with varieties. Redundancy allows to reuse the same knowledge to respond to bigger degree of varieties and contingencies. Redundancy is an answer to the requisite variety

Source: Sea Matilda Bez's doctoral research, 2017. based on the dynamic theory of organizational knowledge creation

2.3. Synthesis of the insight of the theory of organizational knowledge creation

The dynamic theory of organizational knowledge creation opens the black box of the mechanism of organizational knowledge creation. It highlights that its cornerstone is the knowledge interactions between individuals. This interaction needs to be intense as it needs to involve explicit, technical tacit knowledge and also tacit cognitive knowledge. This interaction generates a virtuous and never-ending knowledge creation. Nonaka (1994) uses the metaphor of a growing spiral. The more explicit and tacit knowledge are in conversation, the more connections between previous and existing knowledge will occur. It does not just increase the connections; it sheds light on unexpected connections (Nonaka, 1994). These unexpected connections drive innovation and industry shifts. Thus, when a firm wants to innovate, it is key to implement and manage this knowledge spiral. This spiral becomes a virtuous and never-ending knowledge creation process when it is implemented simultaneously inside and outside the boundaries of the organization. Interacting with an external partner is a way to feed this knowledge spiral continuously.

The existence of a virtuous and never-ending knowledge spiral when a firm interacts with external partners questions the relevance of the mechanism that limits the knowledge transparency (cf. *mechanism highlighted in section 1 of chapter 2*). The reduction of the knowledge transparency with an external partner as a competitor stops or reduces the intensity of the knowledge spiral. We do not question the relevance of this mechanism. Indeed, they are useful to catch up on existing knowledge held by a competitor. However, they seem in direct contradiction with shedding unexpected connections. Thus, it can jeopardize the knowledge creation and innovation. We sum up the main insights in Table 18.

Through our reflection on Nonaka, we stress out some insight into the question of “How to unlock and pursue the value creation of coopetition?” The first insight is that we need to consider the knowledge creation goal. Thus, the real issue behind the question to unlock and pursue the value creation is not “how to hinder the partner’s internalization of the existing knowledge that the focal firm share?” but “how to create knowledge with a competitor?”

The limits of this theory are that even if they argue that a firm should look outside the immediate environment such as competitors. They do not explain how to deal with the competitive dimension.

Table 18 ~ Insight from dynamic theory of organizational knowledge creation

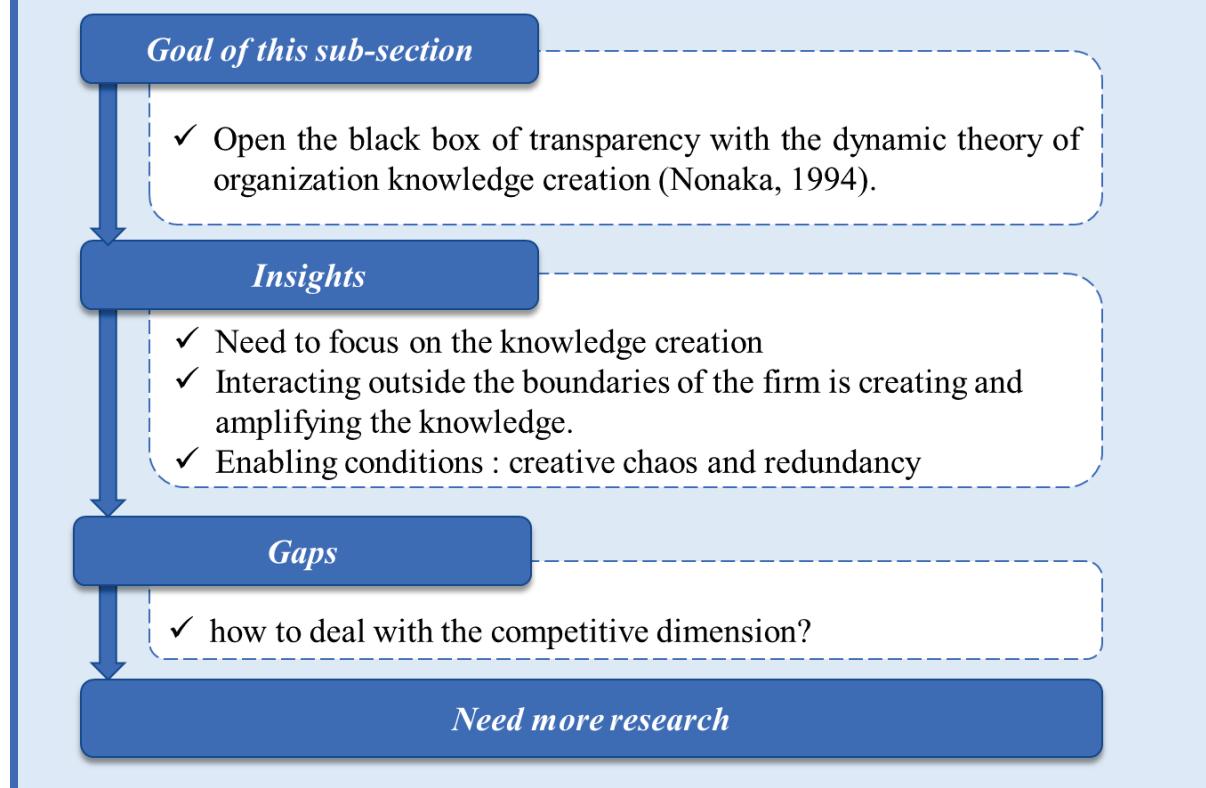
The dynamic theory of organizational knowledge creation	Insights adapted to knowledge transparency in coopetition project
Priority of type of knowledge for knowledge creation	High importance of tacit knowledge The issue in coopetition, might not be the explicit knowledge but the tacit knowledge
The organizational role	Highlights the shift from a static and passive in information processes framework to a dynamic and active role in a knowledge creation framework Needs to look at the knowledge transparency challenge through this lens of knowledge creation.
Modes of knowledge creation	Four modes of knowledge creation: socialization, internalization, externalization, combination Enable the four modes of knowledge creation to generate a spiral of knowledge creation.
Knowledge creation spiral	Involves individual inside and beyond the organization boundaries Interacts with the competitor could amplify for the knowledge creation of an organization
Arm's length dimension in the inter-organization relationship⁴¹	The more the relationship is arm's length, the less the sharing of tacit knowledge will occur Open the question: is it possible to share tacit knowledge and benefit from the knowledge creation amplification in an interorganizational relationship where competition occurs?

Source: Sea Matilda Bez's doctoral research, 2017.

⁴¹ According to Glisby and Hoden (2003) and not directly Nonaka.

Sum up of Nonaka's insight into knowledge transparency in coopetition

Through the dynamic theory of organizational knowledge creation, we stress out that interacting outside the boundaries of the firm is creating and amplifying the knowledge. Thus, any measure that limits the interaction as reducing the transparency could jeopardize the knowledge creation. Moreover, this theory presents two enabling conditions for knowledge creation: the creative chaos and redundancy. The creative chaos is particularly interesting because it is one concrete illustration of how a focal firm can create a constructive competition (Deutsch, 2011) and the redundancy allows the deep knowledge sharing and advice process. Thus, the theoretical insight of Nonaka leads to question the relevance of Hamel's approach of internalizing the knowledge sharing dilemma with low transparency. Nonaka's insight confirmed that is a real need to question this dominant approach of the coopetitive literature.

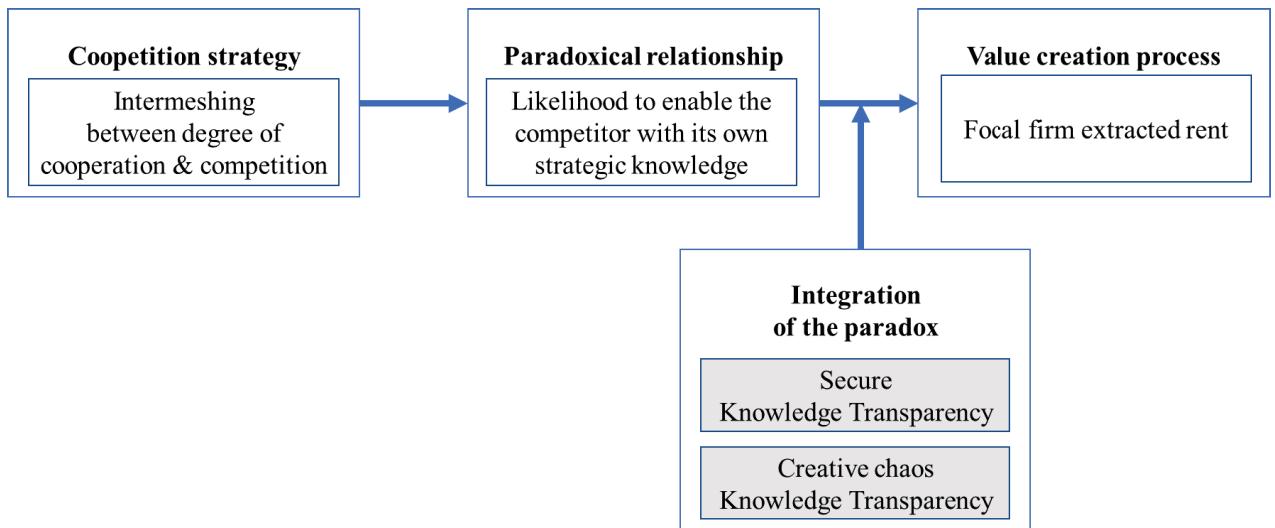


Conclusion Section 2

If we reuse the beating heart metaphor and its arrhythmia (cf. conclusion of section 1). Our theoretical reflection outside the coopetition literature allows us to identify the existence of a different type of “pacemaker (i.e., high knowledge transparency). We called it the “creative chaos knowledge transparency.” It relies on Deutsch's theory of conflict resolution and Nonaka's spiral of knowledge creation. It is based on the idea that what matters is the future knowledge creation more than the current knowledge. Their analysis of knowledge sharing is based on the fact that competitive relationships are filled with innovation and destructive creation. To survive a firm needs to innovate and renew its knowledge continuously. The interaction with a competitor between existing knowledge is the source of knowledge creation. Thus, the current knowledge is shared because what matters is not the current, but the new knowledge. Current knowledge is likely to be shared because future knowledge creation stimulates the focal firm. Thus, a high knowledge transparency is also as a pacemaker it stimulates the knowledge sharing.

To conclude, next to the traditional low transparency there is another potential way to integrate the paradox. We complete our theoretical framework (cf. Figure 29).

Figure 29 ~ The fifth and final step of our theoretical framework

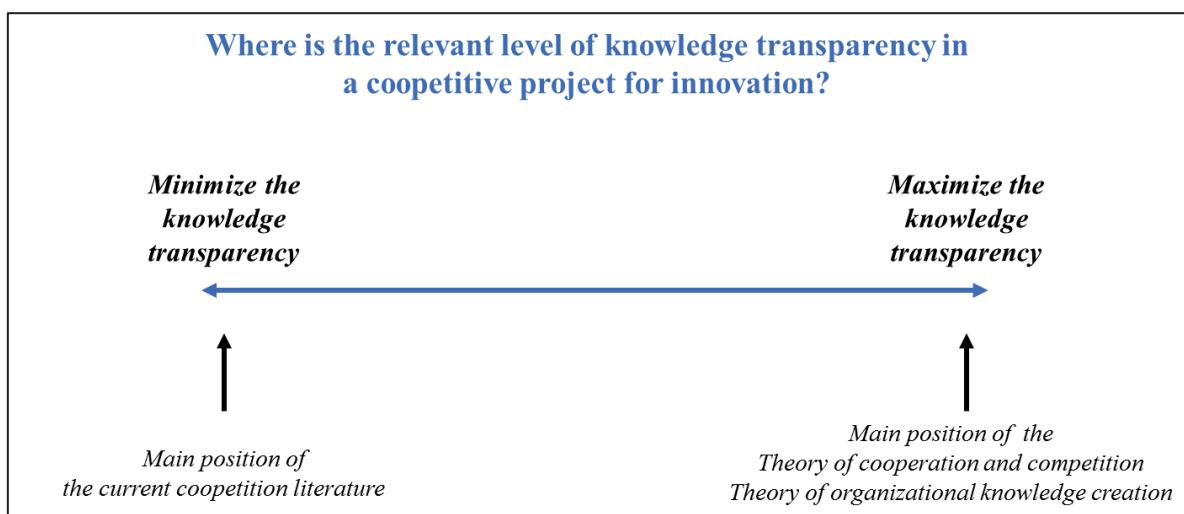


Conclusion of the chapter 2

This chapter is based on our conviction that the unique unit of analysis of the learning race is not enough to understand how to unlock and pursue the leveraging opportunity of the intermeshing of cooperation and competition. There is a need to add the knowledge creation.

Thus, by adding knowledge creation intent, we contributed to the coopetition literature by highlighting the potential complexity behind the principle of integration. There are multiple ways of integrating the paradox due to coopetition and thus the pursuit of these leveraging effects. Our chapter 2 highlights the existence of a continuum in knowledge transparency in with two extreme poles: minimize the transparency or maximize it (cf. *Figure 30*). Until now the coopetition literature has focused mainly on one of the poles (minimizing the knowledge transparency). But by using insight from other theories like the theory of cooperation and competition of Deutsch (1949b, 2011) and the dynamic theory of organizational knowledge creation of Nonaka (1994), we highlight that they might cost opportunities to be at this extreme left pole. We can wonder if a focal firm can be interested in going more towards the other side (i.e., a more transparent approach).

Figure 30 – Visualization of the theoretical question



Source: Sea Matilda Bez's doctoral research, 2017

Conclusion on our programmatic literature review

The business relationships between competitors is shifting from only competitive relationships to simultaneously cooperative and competitive ones. This specific business relationship is called “coopetition.” Being coopetitive in its relationships with its competitors creates additional rent opportunities due to the leveraging effects of the intermeshing of cooperation and competition. Thus, it unlocks some rents that the competitors could not reach by being only competitors. In some most extreme situation, being coopetitive is even a way to ensure the survival of the incumbent. However, if these coopetitive business relationships are appealing, their execution is complex. Coopetitive relationships are filled with strain and conflicts which can jeopardize the cooperation and thus benefit of the intermeshing. It is why we aim to dig deeper into the question of “how to unlock and pursue the leveraging effects of the intermeshing of cooperation and competition”?

Answering this question is the bigger intent of our current and future research. In this Doctoral research, we decided to contribute to this bigger research question by focusing on one specific paradox that locks away the leveraging effects of the intermeshing of cooperation and competition. This specific paradox is the knowledge sharing dilemma. When the cooperation and competition are highly intermeshed, the knowledge shared for the common collaborative project can enable the competitor with its own strategic knowledge. It can lead to the imitation and substitution of the core knowledge of the firm. Thus, to be able to benefit from the expected leveraging effect of cooperation and competition, the focal firm needs to overcome the strains and conflict due to knowledge sharing with a competitor and share the knowledge.

Our state of art of the coopetition literature highlighted one dominant way to integrate this knowledge sharing between competitors. They argue that the firms should reintroduce competition in knowledge sharing and look for a “restricted and secure knowledge transparency.” However, through some research outside the coopetition literature, we managed to construct a theoretical argument for an opposite way of integrating the paradox. We called it, the “creative chaos knowledge transparency.” Contrary to the traditional integration which minimizes the sharing and internalization of knowledge by the competitor to

the strict minimum, the second approach argues that the firms should not reduce the transparency and should even maximize it. Although both integrations are antagonistic regarding the ways to knowledge transparency, they both seem relevant. We need to confront both theoretical reflections to empirical facts.

Part 2 ~ Research Design & Manuscripts

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Introduction Part 2

A research design is a broad scientific inquiry going from framing a question to analyzing and reporting data (De Vaus, 2002). It goes beyond the presentation of the data collection and aims to present the logical structure of inquiry. The reliability of the inquiry is a question of whether an observation technique would yield the same data and results if it were possible to measure or observe the same thing several times independently. It is an “inquiry audit” to assess the consistency of both what was observed and the process by which it was observed (Babbie, 2013). The following is describing the two processes. First, we justify the consistency of what was observed by presenting our abductive research inquiry (cf. section 1), and then we justify the process by which the inquiry was nurtured with data (cf. section 2).

Chapter 1 ~ Research Design

A research design is a broad scientific inquiry going from framing a question to analyzing and reporting data (De Vaus, 2002). It goes beyond the presentation of the data collection and aims to present the logical structure of inquiry. The reliability of the inquiry is a question of whether an observation technique would yield the same data and results if it were possible to measure or observe the same thing several times independently. It is an “inquiry audit” to assess the consistency of both what was observed and the process by which it was observed (Babbie, 2013). The following is describing the two processes. First, we justify the consistency of what was observed by presenting our abductive research inquiry (cf. *Section 1*), and then we justify the process by which the inquiry was nurtured with data (cf. *Section 2*).

Section 1 ~ An abductive research inquiry

This section recounts our research inquiry and complements the theoretical framework. Indeed, our theoretical framework is a reconstruction of our final understanding of the research literature and does not highlight the research inquiry. For the record, the theoretical framework is constructed as a funnel. It first helps the reader to understand the significance of our narrow research by first highlighting the bigger story behind (i.e., the need to rethink the business relationship between competitors), and then justifying why we gradually narrow down to our research subject (i.e., the knowledge sharing dilemma with a competitor). Our research inquiry was much more complex. The puzzle of the doctoral research was specified through several loops of discovery. These loops consist of successive “going back and forth” between the theory and the empirical field. Thus, the consistency of what was observed relies on the drivers of comprehensive research (cf. *subsection 1*), then the abductive process (cf. *subsection 1*) and finally on our choice to write a thesis by publication/manuscripts instead of monograph (cf. *subsection 1*).

1. What drives our comprehensive inquiry?

In the last twenty years, our understanding of coopetition has grown from the numerous case studies (e.g., Ansari et al., 2016; Fernandez & Le Roy, 2015; Gnyawali & Park, 2011). Indeed, coopetition was a new, complex and poorly understood phenomena (Gnyawali & Park, 2011). The case study method was relevant to provide richer and deeper insights on coopetition (Eisenhardt, 1989; Langley, 1999; Yin, 2014)

There are usually two main ways to contribute to a growing research field. First, we can generalize the current findings through statistics. Second, we can specialize and deepen the current frameworks by providing more fine-grained case studies. However, the two different research directions rely on the idea that the empiric results of the first exploratory study fit to the current models and frameworks. The issue of our doctoral research is that the first exploratory study revealed surprising findings that were in contradiction with the current models and frameworks. The coopetition literature predicts that the condition to unlock and pursue the leveraging benefit of coopetition is to implement a safe and restricted knowledge sharing which reduce the competitor's ability to learn the core knowledge of the focal firm (Baumard, 2010a; Faems et al., 2010; Fernandez & Chiambaretto, 2016). But, the managers of our first exploratory study had a discourse which was much more "knowledge transparent" and "willing to enable the competitor" than the coopetition literature predicts. One solution to deal with such puzzles is to use comprehensive research. Indeed, comprehensive research allows you to understand why actors act differently from what is predicted by theory (Dumez, 2016). Therefore, this doctoral research aimed to bring a more comprehensive and nuanced understanding of the coopetition phenomenon. The expected outcomes of comprehensive research are a new theoretical framework or the revision of an existing one.

Comprehensive research relies on an abductive inquiry. Indeed the emergence of a new theoretical framework or revision of it results from a continuous and rectifying exchange between theories and facts (Dumez, 2016). The use of an abductive inquiry is not new or original. For instance, Chiambaretto (2013) and Berkowitz (2016) already used it to construct their theoretical reflection. Indeed, these past doctoral research highlighted the fruitful results of following an emerging idea from the field, which question the initial theoretical framework.

2. The abductive process of this doctoral research

Our inquiry is based on a continuous and rectifying exchange between theories and facts. We need to present each of the three loops of knowledge discovery to highlight the relevance of the inquiry leading to questioning the prevailing management in the coopetition literature.

Loop 1: The discovery of a puzzling observation

The abductive process refers to a reasoning process invoked to explain a puzzling observation (Aliseda, 2006). Although there is a whole debate on what is abduction and its position relative to induction and deduction, one main unanimous characteristic of abduction is that it always begins with a puzzling observation (Dumez, 2012). The observation is considered a puzzle when it does not fit the existing literature predictions (Aliseda, 2006)⁴².

This doctoral research is initially based on a puzzling observation in contradiction with the literature. Indeed, our first literature review of coopetition highlighted that coopetition was a highly fruitful strategy (e.g., Fernandez & Le Roy, 2010; Gnyawali & Park, 2011) but risky strategy (e.g., Park & Russo, 1996). Moreover, it highlights that the absence of management of the simultaneity of cooperation and competition can jeopardize the cooperation (e.g., Fernandez, Le Roy, & Gnyawali, 2014). Based on this first understanding of the coopetition literature, we engaged in an exploratory study to deepen our understanding of coopetition and to identify an interesting research question. Our goal was to interact with people directly involved in the management of one or several collaborations (cf. *Section 2 on data collected*). These first exploratory interviews confirmed that coopetition was a widespread strategy. All the interviews confirmed that it was common to be engaged in collaboration with a competitor. The fact that these firms are engaged in the alliance is not surprising; it is due to the selection of the sample. However, what was surprising is that they were all engaged in collaboration with direct competitors. PSA is working with Toyota or BMW, Total with Shell or Exxon, Sanofi with Bristol Myers Squibb, etc. It is surprising because we could have found that some companies deliberately exclude their direct competitors as a partner. It is the opposite in the interviewed firms. For instance, the recent global alliance management department of Pierre Fabre did not create a specific management for the collaboration

⁴² The puzzling can be a newness or an anomaly. Newness happens when the current existing literature does not explain it, and anomaly happens when the observation is in opposition to the prediction (Aliseda, 2006).

involving competitors as all their partners are more or less competitors. More precisely, one of the interviewees of Pierre Fabre argues:

“[We always need] to be very cautious because we do work almost only with competitors.” (one of Pierre Fabre employee).

The global alliance manager of Sanofi brought some nuance to this understanding and explained that the coopetitive relationships are legally restricted. No collaboration can create a monopoly regarding a specific type of drug. Thus, the two companies which have together almost all the market share on a specific drug cannot collaborate. However, it is really common to work with them on any other product. Being a competitor is not a barrier. For example:

“If there is a new cholesterol-lowering drug. The three best in the cholesterol drug market, as for example Amgen, Astra Zeneca and us, are not going to together develop a new cholesterol drug, it is obvious. But you inform me that Amgen has a product. In another class. It is not because we are in competition in the cholesterol market that we are not doing business with them regarding this new drug. Not necessarily a strategic alliance like we did with BMS, but at least a licensing or co-marketing or whatever. [...] the competition in terms of one product does not hinder the coopetition on in terms of another product” (one of Sanofi employee).

Similarly, the majority of Total's project of exploration and production of oil and gas involves one of its rival (i.e., one other major). One of the interviewees gave a concrete example of this high competition:

Based on their current successful exploration in an area called A, we began to discuss with our partners concerning the opportunities of expanding the exploration to the neighboring area called A'. However, at the end of the meeting, one of the counterparts of a rival company confesses that it was too late. He had already discussed this idea with his parent company (without sharing it with the other). And his parent firm had already won the access to this neighboring area A' alone. Thus, the rival had used the collaboration to improve its competitiveness at the expense of the others (sum up story of one of Total's employee).

Our exploratory study did not only confirm that coopetition was a widespread strategy, it was also highlighted that coopetition was a very promising strategy. For example, one of the interviewees of PSA justified this idea: "*the engine that they co-developed with BMW won 8 times the prize of best engine of the year*" (*one employee of PSA*). Likewise, one of the interviewees of Sanofi highlighted that their alliance with their rival Bristol Myers Squibb was tremendous and that Sanofi would not be the Sanofi of today without this successful collaboration. Indeed, "*their collaboration generated in total \$ 100 billion sales*"⁴³ (*Sanofi's alliance manager*). The fact that the alliance manager could give us a figure, and such a high figure, surprised us. It was a concrete proof that collaboration between competitors could be extremely beneficial. Until now, the coopetition literature has presented very few figures concerning how much a coopetitive relationship generates. Thus, we decided to dig deeper into this coopetitive relationship. We even wrote a narrative case study of this successful coopetition relationship (Bez, Le Roy, Pellegrin-Boucher, & Goursaud, 2014). It was published as a book chapter (cf. *annex I*).

If this narrative case highlighted that coopetition could be a very fruitful strategy, it also highlighted a puzzling result. Indeed, to reach this high level of innovation and commercial success, all the interviewees of Sanofi and BMS referred to a high level of knowledge sharing. Their sharing was very intensive and extensive. For instance, one research expert confirmed that they solved the problem together and that these solutions are the results of intensive sharing:

"We had to develop a test, [...] we met with people from BMS and people from Sanofi, i.e., There were people like me, I represented Sanofi; with me, there were development people who were responsible for implementing analyses [...] we were roughly four from each company who met just to see what we could offer. So, here, we exchanged experiences; we started working on the subject. It was a success because they allowed us to have access to raw material that we were not able to get by ourselves".

If the fact of sharing intensively and extensively is current in any cooperation without a competitor, it is in total opposition to the prevailing management of knowledge sharing in the coopetition literature (Baumard, 2010a; Faems et al., 2010; Fernandez & Chiambaretto,

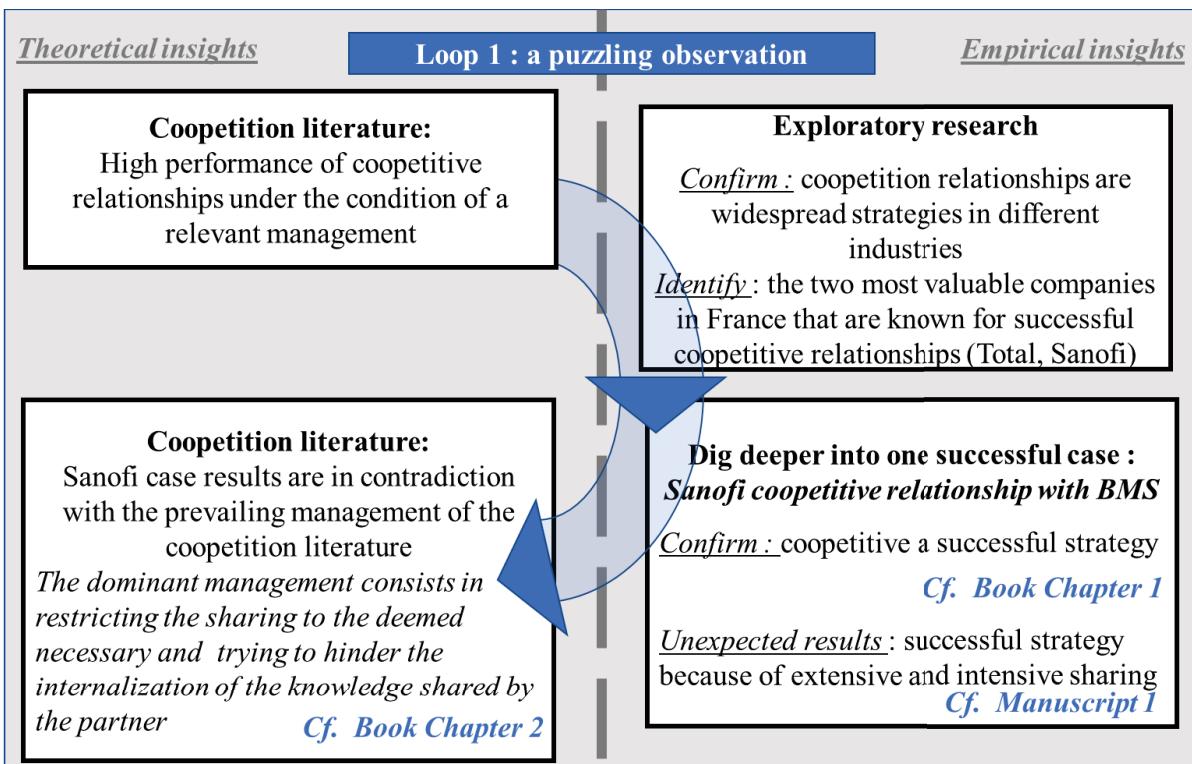
⁴³ Initially the discussion was in French and he evaluated at 100 billion euros sales (80 billion euros is an approximate conversion into US dollars).

2016). Indeed, in 2015⁴⁴, we wrote a book section in the book “Intelligence économique” (Bez, Le Roy, & Dameron, 2016). In this book, we did a state of the art of the coopetition literature and the tension due to knowledge sharing. Our conclusion based on the existing literature was that coopetition could be a successful strategy, but it could also become a win/lose or lose/lose relationship. Management of knowledge sharing is the missing link to guarantee a win/win relationship. This management consists of combining the principles of separation and integration. Combining both principles allowed the company to simultaneously share knowledge and protect it. Indeed, only knowledge which is critical for the project is shared. Moreover, the employees transform knowledge sharing to hinder the competitor’s ability to reuse it (Baumard, 2010b; Fernandez & Chiambaretto, 2016). Thus, the Sanofi’s case study was in contradiction with this book section based on our analysis of the coopetition literature (cf. *annex 2*).

Based on this puzzling observation, we decided to dig deeper into our case study and to understand what drives this counter-intuitive behavior (i.e., to share extensively and intensively strategic knowledge and even to enable the competitor). Thus, we did a longitudinal case study on the rent extracted by Sanofi from the knowledge sharing. During this data collection, that we will present later, we were aware of the potential bias of looking only at the rents extracted from knowledge sharing. Thus, we simultaneously looked at the negative reversal rent due to the competitor’s reuse of the knowledge. This case study led us to the draft our first version of the manuscript 1 of this doctoral research. The first loop process is depicted in *Figure 31*.

⁴⁴ Written in 2015 and published in 2016.

Figure 31~ A puzzling observation



Source: Sea Matilda Bez doctoral research

Loop 2: Shifting the puzzling observation into a problem

According to Popper (1976), any scientific approach begins with a problem. A problem is tension between scientific knowledge and ignorance (Dumez, 2016). The second loop of our inquiry consisted of making sure that our puzzling observation was a scientific problem.

We first went back to the literature on coopetition to find any element in the existing literature which could explain the extensive and intensive sharing. We found two case studies that confirm that knowledge sharing could be intensive and extensive even with a competitor (Gnyawali & Park, 2011; Granata, 2014). For instance, the Sony/Samsung case study highlights that Samsung enabled Sony with its OLED technology. The enabling was so intense that Sony put a new flat screen TV 11 inch with Samsung upgrade technology on the market before Samsung managed to do so. However, this enabling had a positive effect on Samsung. It helped Samsung and its OLED technology to win the technological standard battle against the two leaders of the flat screen TV. Indeed, the Samsung OLED technology benefited from the status and the manufacturing expertise of Sony (Gnyawali & Park, 2011). The whole value creation process confirmed that firms can share knowledge much more intensively and extensively than the dominating coopetition literature predicted (i.e. a

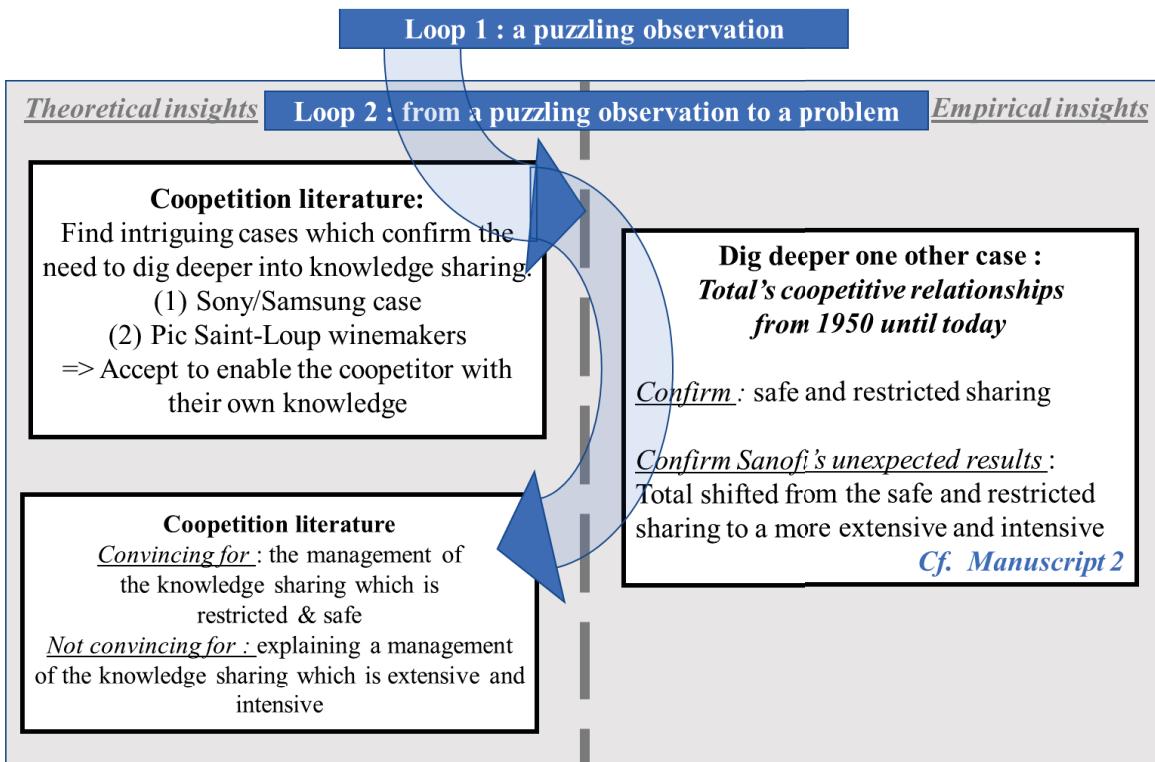
restricted and controlled sharing). Similarly, some Pic Saint Loup winemakers taught some of their core techniques to the weaker winemakers. Indeed, they needed to increase the brand image of the wine of the Pic Saint Loup area for their own success. One competitor with a low quality of wine had negative externality on the winemakers with a higher quality (Granata, 2014). In these two cases, the focal firm accepts to share its strategic knowledge and enable its competitor. This behavior stands in contradiction with the prevailing restricted and safe sharing in the coopetition literature (Baumard, 2010b; Fernandez & Chiambaretto, 2016). Although the two cases confirm the puzzle at the origin of this doctoral research, they do not provide an explanation (i.e., why and how).

To confirm and deepen our understanding of this puzzling observation, we chose to do a second case study on the oil and gas company Total. Total is not just the most valuable company in France⁴⁵, it is a company which have practiced coopetition since its creation in 1924. Moreover, it is a company which began managing knowledge sharing through restricted and safe sharing. However, in the 70s, it decided to shift to a more extensive and intensive knowledge sharing for some projects. Having a big company like Total which has a history of more than 90 years of coopetition relationships and that also decides to shift the way of managing the knowledge sharing questions by restricting the partner's reuse of the knowledge shared. We decided to write a second manuscript of this case study (cf. manuscript 2).

Thus, based on this second case study which triangulates Sanofi's insight of more extensive and intensive sharing, we confirmed that the literature on coopetition is relevant to explain the safe and restricted sharing, but not the extended and intensive sharing. Thus, behind the puzzling observation of intensive and extensive knowledge sharing with a competitor, the core problem is that the coopetition literature does not explain why and how a firm accept to enable the competitor (cf. figure 32).

⁴⁵ Ranking of 25/05/2016 based on market capitalization – extracted from Franck Gram - OBSAP presentation2016

Figure 32 ~ A Popperian problem



Source: Sea Matilda Bez doctoral research

Loop 3: Attempt to solve the scientific problem

Theories and deductive systems aim at explaining empirical phenomena. Any attempt to solve a scientific problem consists of looking for an explanation and thus a theory. A theory must be specified in terms of predicted effects that turn out to be empirically true or false and thus can enter into dialogue with data (Dumez, 2016).

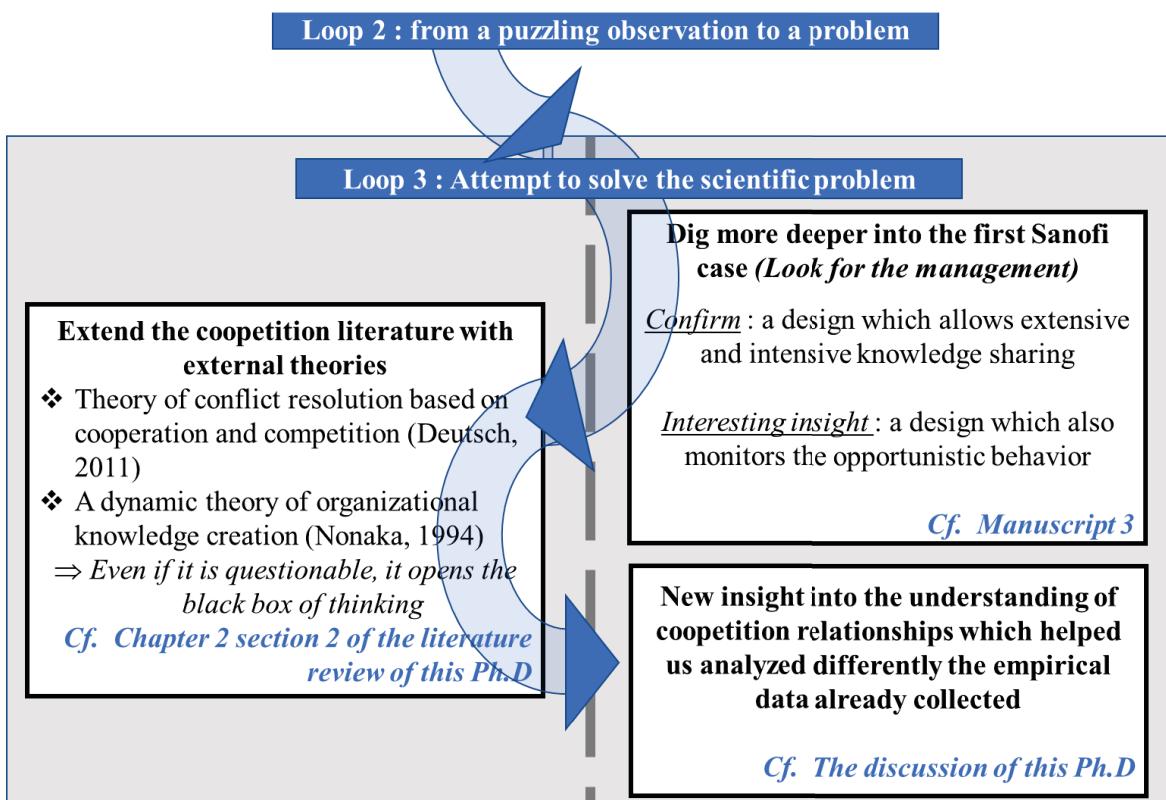
Before trying to find which theory could explain the puzzling observation at the origin of the scientific problem, we went back to the Sanofi case study to look at how this counter-intuitive management was implemented. We discovered that the chosen project design allowed for an extensive and intensive sharing, but that the reciprocity of sharing was carefully monitored.

By looking at theories beyond the coopetition literature, we identified two theories which could give a relevant explanation. The two theories are the theory of conflict resolution (Deutsch, 2011) and the dynamic theory of organizational knowledge creation (Nonaka, 2011). We aimed to specify them in a new manner that solves our current lack of knowledge. For instance, we argue that enabling the competitor is a deliberate action which creates a

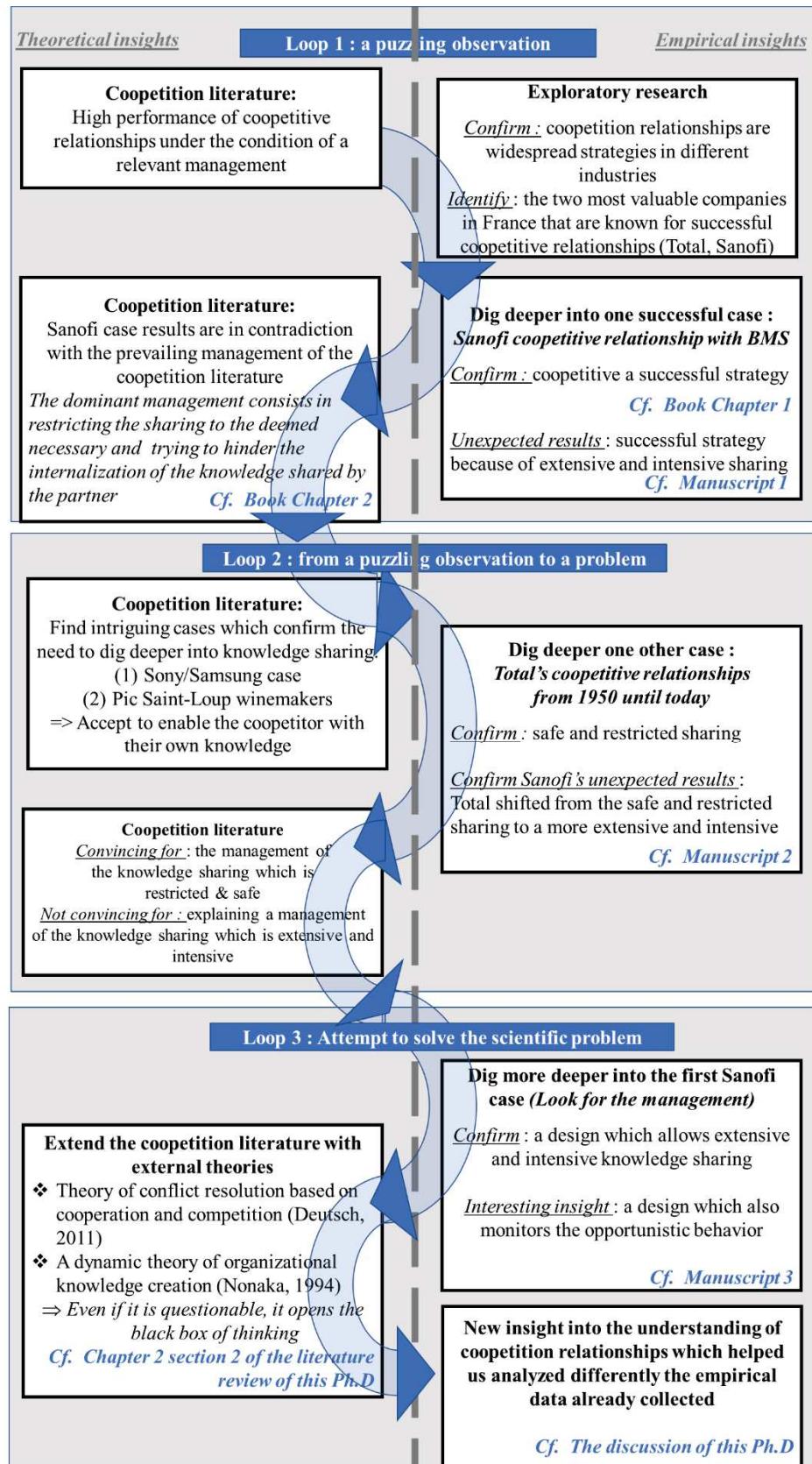
creative chaos. It creates strains and conflicts which trigger innovation. To survive, the focal firm is constrained to innovate.

We do not argue that these theories are the most relevant theories or that these theories fit perfectly. Indeed, Deutsch's theory can be used to create insight at the organizational level, but it was initially developed for inter-individual interactions. Similarly, Nonaka's theory is an organizational theory but it does not consider the competition dimension. However, both theories give a possible explanation of our puzzling initial observation and strengthen our research intent. They might be another way to manage the knowledge sharing in coopetitive relationships. The proof is that without a case study we cannot know a priori what the choice of the firm in a coopetitive relationship will be.

Figure 33 ~ Attempt to solve the scientific problem



Synthesis: A simplified visualization of the whole abductive process



This abductive process was presented as a linear process without doubt, trials, and errors. However, it is not how it happened in practice. Our investigation explored several directions that reinforced the choice presented above. For instance, we dug deeper into two research directions that we finally decided not to present in this doctoral research and to exploit later (cf. *Vignette 1*).

Vignette 1 ~ The Research directions which were not included in this Ph. D

The case study of Intra-firm coopetition

Coopetition is primarily an inter-firm phenomenon; however, coopetition also takes place within a firm between departments or subunits (Tsai, 2002; Padula & Dagnino, 2007). They are in coopetition because the units belong to the same firm and share upper-management, goals and strategies (i.e., cooperation) and they are simultaneously competing internally for resources and externally for market share (i.e., competition). There are research opportunities on intra-firm coopetition (Tidström, 2008; Walley, 2007).

These research opportunities were attractive because I had unique access to a longitudinal case study of intra-firm coopetition in the bank CIC Languedoc-Roussillon. It was a trade: a free conference on coopetition to all the employee of the CIC Languedoc-Roussillon for a total access to all the employees and the financial data. To exploit this huge opportunity, I partnered up with Anne-Sophie Fernandez. Together, we did the conference on coopetition which reinforced the directors' interest in the coopetition concept. Thus, we were able to carry out 21 semi-structured interviews. Moreover, we did direct observations of Management Committee meetings, Executive Committee meetings, and weekly steering committee meetings that were recorded over a seven-month period from March 2014 to September 2014.

However, during the doctoral research., as my understanding of inter-firm and intra-firm coopetition increased, it appeared that intra-coopetition and inter-firm coopetition are two different phenomena. Thus, even if the project was promising and began to highlight interesting results, we decided that this project would be a secondary project not part of this doctoral research. After this doctoral research, we will fully exploit the data.

Research of the cognitive aspect of coopetition

During my literature review, it clearly appeared that the cognitive approach could make substantial progress regarding our understanding of coopetition. Indeed, past research had highlighted the need to integrate the paradox dimension. To dig deeper into the integration of the paradox, I intended to evaluate how mental models and perceived behaviors differ across hierarchical levels and functions and to compare the cognitive values and beliefs of coopetition with behavioral aspects. This idea emerged after reading Tyler and Gnyawali (2009). However, I was quickly confronted to some limits due to my position of as a junior studying coopetition. My understanding of coopetition was not deep enough to be able to capture the manager's cognitive maps ~~on~~-in this matter. Thus, I decided to postpone this research direction until after the doctoral research. For the record, this direction was included in my first-year doctoral presentation (2014).

3. The choice of writing a doctoral research based on several manuscripts

There is no longer a debate concerning if it is possible or not to write a doctoral research based on several manuscripts. According to the French society of management, these article-based doctoral research are a reality⁴⁶. The only condition is that they need to reach the same level of deep, personal and scientific work as a monograph.

If we initially wanted to write a monograph to highlight the richness of our data and thus contribute to coopetition with a more fine-grained understanding, it appeared that the cornerstone of this doctoral research was not this fine-grained understanding of coopetition but its capacity to question the generalization of the prevailing management of knowledge sharing in competitive relationships. The strength and newness of this contribution is put forward by the abductive structure of inquiry. Thus, we emphasize the abductive process by gradually presenting our results in the format of manuscripts (cf. *Table 19*).

⁴⁶ According to the 2015 report of the French society of management.

Table 19 ~ The gradual results of our manuscripts.

Loop	Manuscript	Data collected	Intent of the manuscript	Contribution
1a	Le Patient anglais : lorsque l'alliance Sanofi et BMS donne naissance à une innovation médicale majeure	A longitudinal case study of Sanofi and BMS coopetitive relationship	Relate narratively a successful case of coopetition	Bring proof with figures regarding the success of coopetition strategy
1b	Coopétition : comment conjuguer protection et partage d'informations ?»,	Based on the coopetition literature	Reflection on the risk of sharing strategic information with a coopetitor and how to manage this risk afterward?	Highlight the need to manage knowledge sharing (restricted and ideally safe sharing)
1c	Coopétition et innovation radicale : Partager ses ressources avec son concurrent pour innover	A longitudinal case study of Sanofi's rents extracted from the coopetitive relationship with BMS (from 1993 to 2011)	Highlight that the rents extracted from a coopetitive relationships rely on an extensively and intensively knowledge sharing which can even enable the competitor	Explain the rational drivers behind the puzzling fact that the focal firm is sharing its knowledge extensively and intensively (<i>in contradiction with the prevailing management of coopetition</i>)
2	La coopétition technologique : pourquoi et comment partager sa technologie avec son concurrent	A longitudinal case study of Total's knowledge sharing strategy in oil and gas exploration & production project (from 1924 to today)	Explain why a firm like Total decided to shift from the prevailing management of knowledge in coopetitive relationship (i.e., safe and restricted knowledge sharing) to a more extensive and intensive	Confirm the rationality of the actions identified in the Sanofi case (which are in contradiction with the prevailing management of knowledge sharing in competition)
3	Managing coopetition: When the fallacy of transparency between competitors becomes a reality	A deep case study of the organizational design of the coopetitive relationship between Sanofi and BMS	Highlight how the organizational design favors or hinders the focal firm knowledge transparency (i.e. and thus impacts the likelihood of the coopetitor's knowledge learning and the opportunistic behavior	Explain how to execute this counter-intuitive sharing (deal with the increase of the opportunistic risk)

Section 2 ~ The data collection which nurtures our inquiry

Our research is based on an abductive research process. It is a continuous process of going back and forth between theory and data. The data play a role as crucial as the theory. The relevance of the whole inquiry depends on the collected data (cf. *subsection 1*). But the data collection is a difficult practice and needs to be executed carefully. Indeed, the relevance of the data collection depends on how the researcher managed the inherent risk of comprehensive research (cf. *subsection 2*).

1. The collected data

The research inquiry is based on three different data collections: one for the exploratory study, one for the Sanofi case study and one for the Total case study. The main source of data was face to face interviews. However, after the exploratory study, which led to the choice of the Sanofi case study and the Total case study, we began to write a narrative case based on secondary data and the exploratory interviews. Then we extended these narrative cases with interviews. The interviews allowed access to data not accessible through secondary data (Baumard, Donada, Ibert, & Xuereb, 2007). Moreover, we had the opportunity to participate in a two days emersion in one of Total's training for the employees involved in collaborations like joint ventures. We first present the primary data, then the secondary data and finally how we triangulated the data.

1.1. The primary data

In a comprehensive investigation, also called a qualitative one, there are multiple ways to collect data. We mainly used semi-structured interviews (59 interviewees, 80 hours of discussions), even if we extended it with some observation (i.e., a two-day observation). To bring clarity, we present the primary data based on the three projects: the exploratory study, the Sanofi case, and the Total case.

❖ The exploratory study's primary data

The first phase consisted of doing an exploratory study. The goal of the exploratory study was twofold: (1) identify an interesting subject for the practitioners which does not have a

scientific answer yet; (2) find interesting case studies and sponsors. To do so, I participated in multiple events as the “Association of Strategic Alliance Professionals” or the “Tuesdays of the Strategic and Competitive Intelligence of Paris Dauphine University.” During these events, the goal was to access potential individuals who worked in alliances and ask for interviews. Our sample was based on methodological opportunities and did not look for any statistical representativeness (cf. *Table 20*).

Table 20~The exploratory study

Alliance management department	Belonging to the strategy department	Belonging to the Financial department	Belonging to the legal department
Firm: Sanofi / Industry Pharmaceutical / Number of exploratory interviews: 4			
Group Manager, Alliances, and Partnerships (1 hour 50) Project manager of Plavix development (2 hours)	VP Government & Public Affairs (1 hour 20) R&D director (1 hour 05)		
Firm: Total / Industry Automobile / Number of exploratory interviews: 3			
Vice President Joint Venture Coordination in the Exploration Production (2 hours) Responsible Joint Ventures Coordination (1 hour)			Director of the Legal and agreement Department (1 hour)
Firm: PSA / Industry Total / Number of exploratory interviews: 4			
Global Alliance Manager (1 hour 20) Toyota-PSA Alliance Manager (1 hour 56)	Director of Strategy and Corporate Planning (1 hour 22 minutes)	Senior manager joint ventures and finance control (1 hour 59)	
Firm: Pierre Fabre / Industry Pharmaceutical / Number of exploratory interviews: 4			
Director of Global Alliance (4 hours in three times) External consultant on the alliance management (1 hours 43) Alliance manager assistant (24 minutes)			Intellectual property director (1 hour 17) Legal responsible for collaboration contract (1 hour 22)

Firm: Servier / Industry Pharmaceutical / Number of exploratory interviews: 1			
Global Alliance manager (53 minutes)			
Firm: Galderma / Industry Pharmaceutical / Number of exploratory interviews: 1			
Alliance manager (1 hour 22 minutes)			
Firm: ASG / Industry: Software / Number of exploratory interviews: 1			
Two Alliance managers (1 hour 12)			

❖ The Sanofi case study's primary data

The exploratory study allowed us to identify potential sponsors in the two case studies: Sanofi with its coopetitive relationship with BMS and Total coopetitive relationships for exploration and production.

Regarding Sanofi, a snowball sampling was a valid technique for identifying or locating people who worked on the Sanofi-BMS projects at different levels and during the whole project. For example, we managed to interview two key actors in the beginning of the project: the researcher who was part of the Sanofi team which discovered the drug, and the first alliance manager of Sanofi whose first mission was to manage this huge relationship with BMS (cf. *Table 21*).

However, after some interviews, we noticed that we were facing some of the disadvantages of snowball sampling, such as an oversampling of the marketing experts or top managers. To overcome this disadvantage, we used LinkedIn and identified all the individuals who referred to the Plavix or Approval in their LinkedIn presentations and asked them for an interview. We are aware of the fact that there is a bias because if they stress that they work on the Plavix in their LinkedIn profile, they are highly likely to have good experiences from the collaboration.

Table 21 ~ 27 Interviewees in the Sanofi/BMS project
(the number represents an anonymous number to replace the name)

The process Level of interviews	Beginning of the alliance	Development and production	After the product was commercialized for the first time
Top Managers in the firm			N° 14 – Sanofi's R&D director N° 19 – Director of the Montpellier area of R&D N° 26 – BMS's Director, Product and Portfolio Strategy
Global alliance managers	N° 9 – Sanofi's first Alliance manager and first Alliance manager in the project Sanofi-BMS		N° 4 – Sanofi's global alliance manager who is also directly in charge of Sanofi-BMS alliance N° 2 - Sanofi's Alliance manager of commercial alliances
Sanofi/BMS Project team managers	N° 16 – One of Sanofi's project chief of Plavix N° 10 – One of Sanofi's Project chief of Aprovel		N° 15 - Sanofi's project chief of Plavix
Sanofi/BMS Project team	N° 8 – Sanofi's Research expert in the project team which was part of Plavix's discovery team	N° 7 - clinical & Exploratory Pharmacology Department. N° 3 - New Product Marketing (publication) N° 11 – Toxicologist Expert N° 23 - BMS's Development expert	N° 17 – Marketing expert N° 24 – BMS's Marketing expert global N° 26 – BMS's Marketing expert global N° 27 – BMS's Marketing expert

Operational managers who were involved in the Sanofi/BMS project	N° 18 – The founder of Plavix N° 22 - Sanofi's Researcher who was involved in the team which discovered Plavix	N° 5 - Sanofi's Master Plan Project Coordinator (in charge of the construction of the production building) N° 20 - Sanofi's operational manager who oversaw the computer issue of the alliance moving from paper to data; and now the collaborative innovation director in Montpellier N° 22 - Sanofi's operational manager in charge of the clinical trial	N° 4 - Sanofi's Marketing Director for Plavix in Spain and France
Other	N° 11 – Director of Toxicology (hierarchical director of all the toxicologist experts involved in the project) N° 1 – senior expert who helped with specific toxicology issues N° 12 – senior expert who helped with specific toxicology issues		

Source: Sea Matilda Bez doctoral research

❖ The Total case study's primary data

For the Total case study, the legal director of Total sponsored our entry into Total. He put us in contact with the Responsible manager of Joint Ventures Coordination. This person became a cornerstone of the data-collection. I met him four times, and we had more than 9 hours of discussion. Moreover, he gave me the opportunity to observe a two days training for employees involved in, or managing, Joint-Ventures. These two days were a great opportunity to in terms of collecting data:

- I had informal discussions during two lunches, one dinner and one breakfast,
- I did three interviews (10/20 minutes) with an executive manager and with two assets managers,
- I discussed one whole afternoon with the JV coordinator. Thus, I took this opportunity to discuss the answers already collected on each question. I could do that because I already spent two afternoons with him and I was running out of questions,
- I attended the general presentation of the V.P Joint Venture Coordination on J.V in Total,
- Afterword, I contacted the employees enrolled in the training by email, and 14 of the 19 agreed to have a phone interview.

For the record, during the training, I have introduced a doctoral research student here to organize an "icebreaker game."

Table 22 ~ 19 Interviewees in the Total case study

Level	Interviewees (cumulative hours of the interviews)
Top Managers in the firm	<ul style="list-style-type: none"> ❖ Director of the Legal and agreement department (1 hour) ❖ Executive Director in charge of integrity (30 minutes) ❖ Vice President Joint Venture Coordination in the Exploration Production division (2 hours)
Global alliance managers	<ul style="list-style-type: none"> ❖ Joint-Ventures Coordinator 1 (9 hours) ❖ Joint-Ventures Coordinator 2 (49 minutes) ❖ Senior Legal Advisor (1 hour) ❖ Geosciences advisor for a specific area X (1 hour 20) ❖ Geosciences advisor for a specific area Y (33 minutes) ❖ Head of Audit for a specific area Z (54 minutes)
Involved in the Project team	<ul style="list-style-type: none"> ❖ Asset coordinator A (13 minutes) ❖ Asset manager B (30 minutes) ❖ Export Manager C (46 minutes) ❖ Assets manager D (40 minutes) ❖ Head of cost control (29 minutes)
Operational	<ul style="list-style-type: none"> ❖ Non-operated assets manager E (28 minutes) ❖ Reservoir engineer F (57 minutes) ❖ Assistant manager for offshore field optimization G (37 minutes) ❖ Ventures Commercial Representative G (50 minutes) ❖ Responsible affair H (54 minutes)

❖ Synthesis on primary data

The empirical material was gathered from 2013 to 2016 and consists mainly of interviews. A total amount of 59 semi-structured interviews has been carried out which represent more than 80 hours of interactions. These interviews lasted from 13 minutes to more than 2 hours (for the record, we met several times with our sponsor and we had 9 hours of cumulative interview)⁴⁷. The average length of an interview was 1 hour 30 minutes. The duration gap is due to the fact that they did not have the same role in the data collection. One was my sponsor in the Total company. We met several times and even organized a game for Total managers together. Thus, the time of the discussion between our formal recorded interview and the informal interview was around 9 hours. Some of the interviews were carried out with the intent to triangulate. Thus, I accepted any type of interview, even the ones that lasted only 10 minutes. The specificity of our data collection is that we managed to get access to five categories of data sources:

- Top managers that decide about the strategic directions of the firm,
- The global alliance managers that decide about the organizational design and the management of the collaborations (including those with competitors)
- The alliance manager of a project or project directors who oversee the project in collaboration
- The operational managers who are involved in the daily interactions with the competitor.

❖ The data collection process during the interviews

Each of the interviews followed the same interview guide (Cf. table 23). I always began by presenting the doctoral research and the concept of coopetition. It was not an issue when referring to “coopetition” because the goal was to narrow down the discussion to the interviewee’s actions and project design in a collaboration involving a competitor. Thus, I always began the interaction with the interviewee with the question:

⁴⁷ Some of the discussions were formal and recorded, some other were more informal and non-recorded. This non-recorded moments were key to our understanding of our the research subject.

« Could you describe your role in company X? And how did your role lead you to interact with the partner who is also a competitor? What was the purpose of this interaction? ».

Then, during the interview, I focused only on one or two projects which involved interacting with a competitor. I had a very long interview guide in order to be prepared for 2 hours of interviewing.

Table 23 ~ the interview guide

Insights on	The initial guide	Additional questions or improvements after some interviews
The localization & identification of the different contacts between employees from the two different firms	<p>With who are you interacting and when are you interacting with the partner firm?</p> <p>Who among the team members is in contact with employees of the other firm?</p>	<p>Additional questions:</p> <p>Could they help me to schematize the organization of an alliance and the localization of the contacts with the partner?</p> <p>Improvement:</p> <p>I decided to deliberately use the term partner and not competitor to not put emphasis on the competitor</p>
Learning opportunities	<p>Are their learning opportunities?</p> <p>Can you reuse the information learned during the project in another project?</p> <p>What? When? How? With whom?</p> <p>Are there risks linked to the sharing?</p> <p>Is there a risk that your proprietary knowledge and core technologies will be appropriated by the partner?</p> <p>What do they share/ What do they not share? (what are their drivers)?</p> <p>Are there benefits due to the sharing?</p> <p>Is the sharing reinforcing the partner, or is it a problem?</p> <p>Your private knowledge is imitated by the partner behind our back.</p> <p>Can you reuse the information shared in another project?</p> <p>Has some core knowledge sometimes been unconsciously or accidentally transferred to the partner (e.g., through daily communication and interaction)?</p>	<p>Improvement:</p> <p>I noticed it was easier to progress in 4 steps:</p> <p>What did you or your firm learn from the collaboration?</p> <p>[Intent: put the individual in a positive interaction, he is happy to highlight all the positive effects for his firm]</p> <p>Did the parent learn the same?</p> <p>Is the partner learning an issue?</p> <p>[Have deeper insights by recalling him all the benefit of sharing for his firm (question 1) and thus I suppose that the partner has the same learning process]</p> <p>Is it not naive to share everything?</p> <p>[When I ask what do you protect they always respond nothing when I frame my question like the question 4 they are always highlighting the existence of some knowledge which was not shared]</p>

	Does it happen that some employees share too much? If yes, does it mean too much for them?	
Drivers for information sharing/protecti on	<p>Do you receive information/directions concerning what information to share? The modality of sharing?</p> <p>Is our private knowledge likely to leak out since you do not pay much attention to protect it?</p> <p>Do you give information/directions concerning what information to share? The modality of sharing?</p> <p>Do you have a special recruitment for the individual involved in coopetition?</p> <p>What would be the competencies and qualities of the perfect employee who interacts with a coopetitor?</p> <p>Do you have special training?</p> <p>Do you have a special reward?</p> <p>Do you have punishment?</p>	<p>Improvement:</p> <p>I add an introduction to the questions:</p> <p>“I have never worked in an alliance thus I really do not know how to know what to share or not share. Thus, I am maybe going to ask some questions that seem silly”</p>
On the individual level	<p>Are you in competition or in cooperation with our counterpart?</p> <p>Is it possible to be only “cooperative”? or only competitive?</p> <p>Do they think that some employees need to integrate both dimensions? Why?</p> <p>How do you call the partner from other firms?</p> <p>Who are your competitors?</p> <p>Do you change your behavior/firm organization when the partner is or is not a competitor-in another project?</p> <p>What are the reasons for co-operating?</p>	<p>Improvement:</p> <p>I deliberately ask them to choose but after the goal is to discuss the two dimensions</p>
The “competitor dimension.”	<p>Why do you choose a competitor to be a partner?</p>	<p>Improvement:</p> <p>I add a question: “Do you care that your partner is a competitor? “Why?”</p>
Coopetition driv ers		<p>Improvement:</p> <p>I add the question: Did you notice some competitive action in the collaboration?</p>
Other questions	<p>What are the rules to manage a collaboration well?</p> <p>Are there rules on learning? If not why?</p>	
Contacts	<p>How were your colleagues or counterparts? Do you think I could contact them?</p>	

1.2. Secondary data

Even if our comprehensive research is mainly based on primary data, we used secondary data especially after the exploratory study phase (cf. *Table 24*). Indeed, before engaging in the interviews for the two case studies, we wrote a narrative case. Each of them was based on secondary data and the few interviews of the exploratory study. The secondary data gave us a real advantage because it allows having a good representation of the case study before doing interviews (Baumard et al., 2007). It helps to triangulate with secondary data during the interviewing and to go deeper into the understanding of the case by filling the gap not accessible by secondary data.

The secondary data was huge because (1) Sanofi and Total are public companies, thus they are constrained to a high degree of transparency in their annual reports, (2) the French press is publishing a lot concerning these two firms as they are the two leading firms in the French market capitalization ranking, (3) we were able as French researchers to triangulate the French and foreign press.

Table 24 ~ Summary of the secondary data used

Firm	Secondary data
Sanofi	<ul style="list-style-type: none"> ➤ 14 annual reports of BMS (in the period of marketing without generic so 1998 to 2012), ➤ 11 reports of activity and 11 Sanofi for 2002-2012 reference documents (for the years 1998 to 2001 we used professional press articles). ➤ Numerous press articles, consulting reports, written interviews on the product Plavix (in French and English)
Total	<ul style="list-style-type: none"> ➤ Total's annual reports from 2002 to 2016 ➤ Total's virtual database on its historical event accessible through their website ➤ The Book "The Petroleum Handbook" published in 1986 by Total's competitor Shell ➤ The book of the Association of International Petroleum Negotiators (AIPN) ➤ Numerous press articles, consulting reports, written interviews on the Total's exploration and production activities (in French and English)

Source: Sea Matilda Bez doctoral research.

1.3. Data triangulation

The data collection process generated huge and heterogeneous data. The use of multiple sources of evidence in case study research allows for the development of converging lines of inquiry. The multiple sources of information increase the accuracy of the findings (Yin, 2014). Data triangulation was not only executed when it comes to the sources of knowledge but also in terms of content.

Indeed, by having two case studies in two different sectors, we could compare the differences (i.e., compare the Sanofi case and the Total case). Moreover, by having two longitudinal cases, and more precisely having one where shifts in knowledge sharing mechanisms occurred, allows for studying changes (i.e., the Total case shifted from one mechanism to the opposite).

2. The risk and limits of the observation process

The goal of a comprehensive inquiry is to shed light on how the relevant players think, act and interact. These specific empirical observations are the cornerstones of the research because they nurture the abductive process. However, a comprehensive inquiry can easily miss this goal (Dumez, 2016). One type of safeguard is to proactively reflect during the data collection and analysis in terms of three inherent risks: the risk of the abstract actors, the risk of circularity and the risk of equifinality (Dumez, 2016). Moreover, it is key to question the external validity of the comprehensive research because by nature this research gives high importance to the field and the actors (Yin, 2014). In this section, we first discuss the external validity of the results and then the three inherent risks: the risk of the abstract actors, the risk of circularity and the risk of equifinality.

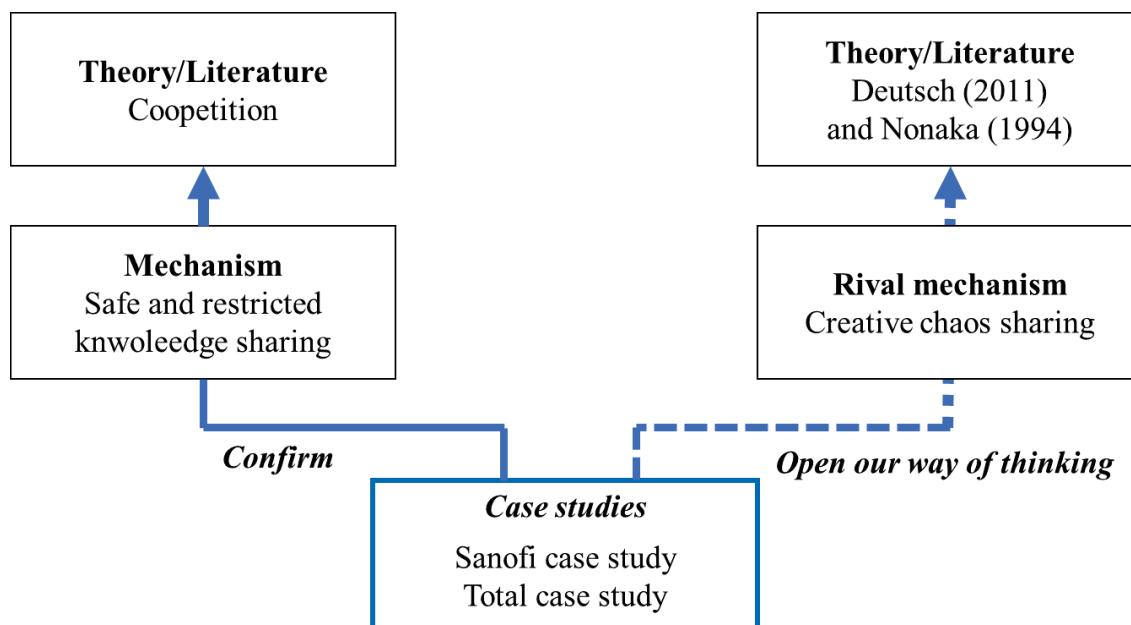
2.1. External validity

External validity concerns the question of to what extent the findings from a case study can be analytically generalized to other situations that were not part of the original study. It refers to the generalization of the research results. This generalization relies on the relevance of similar theoretical concepts (Yin, 2014). Our case studies highlighted the relevance of the mechanism adapted from Deutsch's (2011) and Nonaka's (1994) theories to explain a rival mechanism to the coopetition literature (i.e., the focal firm has extensive and intensive

knowledge sharing with a competitor instead of a safe and restricted one). Thus, our doctoral research highlights that the management of knowledge sharing is more complex than what is argued in the prevailing coopetition literature (cf. *Figure 34*). Indeed, the reality can rely on safe and restricted knowledge sharing, a creative chaos sharing or an in-between solution. For simplicity, we used dichotomies for knowledge sharing. However, we assume that they are the polar ends of a continuum and the focal firm's knowledge sharing is a position on this continuum (i.e., our case study revealed the relevance of both simultaneously). Thus, even if this research was driven by the case studies, we tried to have a conceptual reflection at a higher level than the specific case, visible through the continuum.

In this regard, the results obtained in this research might begin to offer an analytical generalization. However, this analytical generalization can be enhanced by more qualitative research and other theories. Moreover, after some further progress in our understanding, it could be interesting to try to use quantitative research and engage in a statistical generalization.

Figure 34~ analytically generalized



Source: See Matilda Bez Ph. D

2.2. The risk of the abstract actors

The first risk is to conduct a comprehensive research inquiry without showing how the actors think, act, engage in conflicts, debate, try out things, fail, and succeed (Dumez, 2016). This doctoral research intends to understand how to unlock and pursue the leveraging effects

of the intermeshing between cooperation and competition? Presented like that, the doctoral research is subject to a high risk of abstract actors. It is easy to forget the actor and to focus on the abstract causal relationship between the intermeshing of cooperation and competition and its outcomes. However, as we highlighted in the literature review, the intermeshing is a continuous flow of cooperative and competitive actions. Behind the intermeshing there are individuals who make knowledge sharing decision, implement a specific project design to favor the interest of their focal firm.

To overcome this issue, we made two decisions. First, we decided to narrow our research object to one driver of this leveraging effect which could be jeopardized by the simultaneity of cooperation and competition (i.e., the knowledge sharing). We made this decision because past research had identified a list of multiple variables that could be jeopardized by the simultaneity of cooperation and competition (Fernandez et al., 2014). Thus, it was impossible to implement a comprehensive research which is very time consuming on each of the variables. Moreover, there are recent calls for improving our understanding of coopetition by focusing on one variable such as the sharing and protecting of information (Fernandez & Chiambaretto, 2016).

The second decision was to specify the focal firm as a unit of analysis. According to Dumez (2016), the “crucial operation in managing such a risk [of abstract actors] is to define the unit of analysis” (p.17). Indeed, with a clear unit of analysis, we are able to guide our analysis of actors’ intentions, speech, and interactions. In this doctoral research, the unit of analysis is the focal firm. This choice is based on the current literature review of coopetition; firms engage in coopetitive relationships because the firm expects to privately realize more benefits from the share of the potential to mutually create value than doing it alone (Gnyawali & Charleton, 2017). Thus, any managerial decision such as knowledge sharing is driven by the private benefit of the focal firm. Our choice fits the existing research which takes a firm-level analysis and focuses on the business (for-profit) context (Fernandez & Chiambaretto, 2016; Gnyawali & Charleton, 2017).

Thus, to overcome the risk of abstract actors, we decided to analyze the actors’ intentions, and actions for defending their focal firm’s interest when interacting or managing the known interactions with a competitor (cf. *Figure 35 & Figure 36*).

Figure 35 ~visualization of the unit of analysis in the Sanofi case study

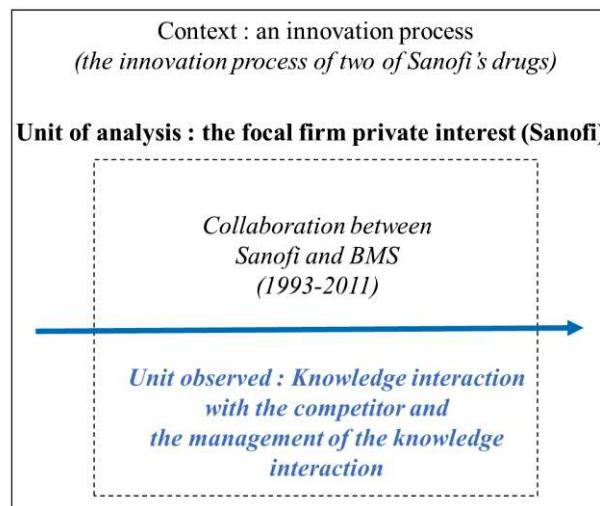
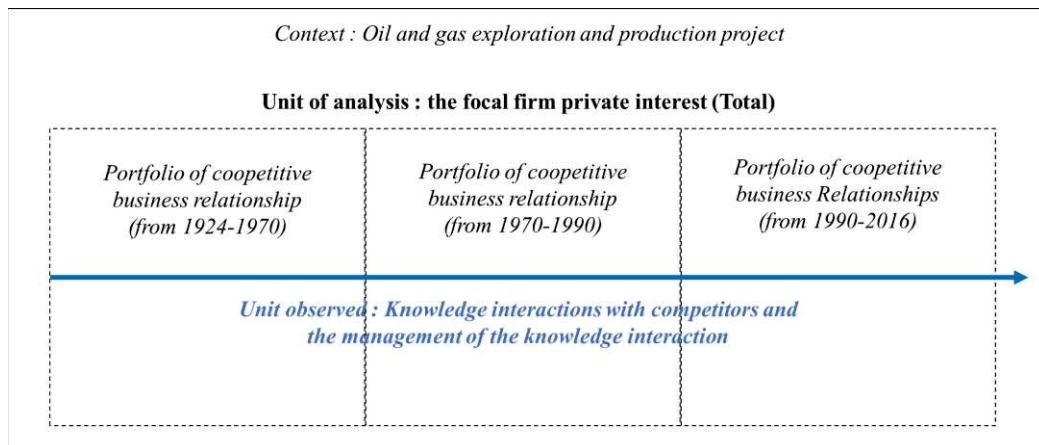


Figure 36 ~ visualization of the unit of analysis in the Total case study



2.3. The risk of circularity

Relevant theories are often general, abstract and decontextualized. It might be easy to find material elements to confirm a theory or to see only what confirms a theory (Dumez, 2016). This risk threatens all comprehensive research, even the most rigorous one. For the record, Deutsch's (2011) reflection on the human being could explain this risk. Indeed, any human being tends to act positively towards what can be beneficial and negatively towards what can be hurtful. This very simple law explains the survival of human beings which happened during this doctoral research. We tended to obstruct what is not confirming to our theoretical framework and to focus on what confirms it.

There are two possibilities to solve the risk of circularity. First, the data collection should only help to focus the research inquiry. The data collection should not be organized following

the theory. Trying to structure the data collection depending on the theory leads to an increased risk of circularity. Second, the researchers can try to manage this risk by transforming the theory into predictable observations. Thus, when looking at the data, it is possible to confirm, or not confirm, the fit between the prediction and the reality.

Thus, to manage the risk of circularity, the data collection and the analysis should be two independent processes (Dumez, 2016). Our doctoral research follows, almost unintentionally this advice, because the prediction of a safe and restricted sharing and creative chaos sharing resulted from the abductive process. Thus, when we initially collected the data and wrote the narrative story of Sanofi and Total, we did not look for confirming or denying the two types of sharing. The collected data had a converging but different intent. It enabled us to understand the performance of a coopetition strategy, the localization of the knowledge flow, the learning opportunities and the outcomes of these learning opportunities.

In retrospect, it is interesting to notice that even when we are aware of the risk of circularity and use rival mechanism to solve it, it is possible that we suffer from it. Indeed, during the analysis, I was initially obstructing any data that did not fit with the safe and restricted sharing. After a while, when I notice this bias, I fell in the other extreme and obstructed any data confirming safe and restricted sharing. The lesson learned is that if the data fit perfectly to what you predict there is an issue. The reality is complex, and most of the time it is a mix of several elements.

2.4. The risk of equifinality

Another major risk of comprehensive research is that the same final state may be reached from different initial conditions and in different ways. Thus, it is key to always explore several explanations for a phenomenon. For each observed phenomenon, we must consider several rival hypotheses and test them. Thus, the data collection needs to enable identifying a competing explanation which is empirically compelling. Thus, we need to look for evidence that supports our favorite theory but also evidence that disproves our initial explanation (De Vaus, 2002, p. 9). Being able to look at the evidence and rival explanations in the data collection and analysis is a first way to prevent the risk of equifinality. The idea is to have a mutually exclusive hypothesis. This doctoral research has the advantage to create mutually exclusive mechanisms for unlocking and pursuing the leveraging effect of the simultaneous cooperative and competitive relationship.

Table 25 ~ Two mutually exclusive mechanisms

	The safe and restricted knowledge sharing	The creative chaos
The partner learning	Hinder	Foster
The strain and conflict due to knowledge sharing	Reduced (by reducing the knowledge transparency)	Increased and maintained (by increasing the knowledge transparency)
The core idea behind	The strain and conflict due to knowledge sharing hinder the sharing and thus the project success	The strain and conflict due to knowledge sharing constraint to innovate

Source: See Matilda Bez

To solve this risk of equifinality, we followed Berkowitz (2016) advice, we decided to be involved in other projects in order to confront the possible interpretation and not be locked only in the coopetition theoretical framework. This led us to a visit at Berkeley in order to learn more about open-innovation. It appeared that the open innovation literature relies on the same idea of a safe and restricted sharing as the coopetition literature do. During my interaction with Henry Chesbrough, the father of open innovation, he confirmed that in some of the cases he had observed that the firms were much more extensively sharing knowledge than what the open literature argued. Based on these discussion, we decided to investigate the topic further during a postdoctoral position that I will do under his supervision next year.

Conclusion Chapter 1

To conclude, our position as a researcher is simultaneously active and passive. It is passive because it is based on an initial theoretical framework from the coopetition literature which helped to focus our inquiry and predict a safe and restricted sharing. However, the systematic and triangulated occurrence of extensive and intensive knowledge sharing questioned the generalization of safe and restricted sharing. Thus, we shifted from a passive to an active researcher. This led us through several loops between theories and facts in order to extend the coopetition theoretical framework with external theories, such as Deutsch (2011) and Nonaka (1994).

Chapter 2 ~The Manuscripts

Manuscripts	Title	Authors
Manuscript 1	Coopetition et innovation radicale : Partager ses ressources avec son concurrent pour innover	BEZ, S.M LE ROY, F DAMERON, S.
Manuscript 2	La coopétition technologique: pourquoi et comment partager sa technologie avec son concurrent ?	BEZ, S.M
Manuscript 3	Managing coopetition: When the fallacy of transparency between competitors becomes a reality	BEZ, S.M LE ROY, F DAMERON, S.

Manuscript 1 ~ Coopetition and radical innovation: sharing its resources

1. General information

French title : Coopétition et innovation radicale : Partager ses ressources avec son concurrent pour innover

The authors: Sea Matilda Bez, Frédéric Le Roy and Stéphanie Dameron

The involvement of the doctoral student Sea Matilda Bez:

- ✓ The full data collection
- ✓ The full data analysis
- ✓ Co-reflection on the ideas with the authors
- ✓ All the first drafting of the article
- ✓ Main part of the improvements suggested by the co-authors

The current state of the manuscript:

- ✓ Second round of Management International
Ranking: FNEGE 2016: rank 2 - strategy; CNRS 2016: rank 3 - International strategy

Previous versions:

- ✓ March 2017: First round version for Management International
- ✓ June 2016: Conference AIMS
- ✓ September 2015: Writing workshop of l'AEGIS
- ✓ November 2014: Book chapter about the case study (cf. annex 1)

Remark: The article passed the first round with major modification in June 2017 and we just resubmitted the article, end of September 2017 (the article in this doctoral research document is the second-round version)

2. Extended abstract

2.1. The content of the research

- ❖ The coopetition strategy for radical innovation: an interesting and important phenomenon

In this manuscript, we investigate a focal firm's use of coopetition strategy to foster its radical innovation capabilities. Although the literature on coopetition provides successful cases, this strategy is still a puzzle. On the one hand, coopetition strategy is a highly performant strategy for radical innovation. The focal firm's innovation capability increases by relying on a wider resource portfolio composed of the focal firm and its competitor resources. On the other hand, it can end in a win/lose relationship which can even threaten the focal firm's survival. The competitor can use the collaboration to internalize the focal firm's competitive advantage. Thus, there is a real academic controversy about the relevance of this strategy implemented by more and more firms.

- ❖ The drivers of taking the risk of sharing strategic resources with a competitor: a question without yet an answer

We decided to generate insight into this puzzling decision of coopetition strategy for radical innovation by looking deeper into the question of *why do firms take the risk of sharing their strategic resources with a competitor?* Until now, most of the past research questioned the performance of the coopetition strategy. Thus, they questioned the relevance and benefit of this strategy. Now the qualitative case studies and quantitative studies have reached a point that the high potential of coopetition is not questioned anymore. The question is about its execution. The competitors need to share their strategic resources to unlock this potential for radical innovation. By involving the sharing of strategic resources with a competitor, the execution is risky. This can lead to arming the competitor with its own weapon. Thus, the research question: “can it be beneficial to coopetition for radical innovation?” or a shift in the research question: “does this strategy’s benefit overcome the risk?”

One response given done by the past research is to restrict the collaboration between competitors to the less risky activities. However, there is ambiguity about these less risky activities. Some argue that the benefit overcomes the risk only with the activities far from the clients, others only with the activities of pre-launch. This ambiguity is the proof that more

research is needed to understand why firms take the risk of sharing their strategic resources with a competitor.

2.2. Our research inquiry

Our research inquiry is composed of two steps. Our first step involved looking through the literature for some explanations. It appears that the recombination of resources between competitors generates specific leveraging effects that a collaboration with non-competitor could not generate, and for which the resources sharing is a kind of “price to pay for superior rents.” In our second step, we decided to explore more deeply this puzzling strategy with a longitudinal case study on two radical innovation projects of the pharmaceutical company Sanofi: Plavix and Aprovel. These projects were interesting because to leverage the success of these two projects, Sanofi decided to intensively and extensively share all its strategic resources with its strong competitor BMS.

2.3. A sample of the manuscript 1 contributions

N°	Insight of the theoretical background	The insight of our case	Insight from the confrontation of the literature and the case
1	Coopetition is a risky strategy for radical innovation because it relies on the sharing of resources which can foster imitation and opportunism	By sharing strategic resources with a competitor, Sanofi increased BMS's capacity to imitate its strategic knowledge and be opportunistic	Confirms that coopetition is a risky strategy
2	Based on this risk, firms should not cooperate or narrow the cooperation on less risky activities	Despite the sharing of resources which reveals to generate imitation and opportunism, Sanofi shared extensively and intensively its resources. It concerned all the activities from the development to the promotion	Opens the possibilities of using coopetition for radical innovation in a much broader way than predicted by the coopetition literature. Thus, we contradict some research by arguing that the partner's internalization of the resource is not an insurmountable barrier to engage in coopetition.

	<p>There are three main leveraging effects of collaborating with a competitor (relatively to a non-competitor):</p> <p>3 Access to the competitor's resources</p> <p> Emulation</p> <p> Extension of the commercialization opportunities</p>	<p>By sharing its strategic resources with BMS (its discoveries, knowledge about Plavix and the European market), Sanofi benefits from: (1) BMS help regards financing the project, the best practices, sales forces, etc.; (2) BMS challenged and improved Sanofi's decision. It increased the commercialization opportunities (with benefit from BMS sales forces and status)</p>	<p>Confirms the leveraging effects and goes further by arguing that only a strong competitor can allow the three-leveraging effects simultaneously.</p> <p>Moreover, the stronger the competitor is, the stronger the leveraging effects will be</p>
4	<p>The execution of the coopetition strategy for radical innovation relies on the recombination of resources and thus on resources sharing</p>	<p>Sanofi and BMS are so positively independent in this radical innovation project that if the partner is weak on one of its tasks, the other enables the weaker one</p>	<p>The execution of the coopetition relies on resource sharing but also on accepting to enable the competitor (in contradiction with the practices of coopetition which consist in sharing the resources without allowing the partner to internalize them)</p>

2.4. The insight for this doctoral research

- ✓ This article is the first building block to develop a proposition arguing that restricting the resources sharing locks away the positive leveraging effect of coopetition.
- ✓ In addition, it opens up our way of thinking. Hamel's approach of cooperation which is behind most of the research in coopetition is maybe not always relevant. The focal firm might have a bigger intent than just pooling together the best-existing knowledge or internalize the partner's knowledge. In this case, we might need to rethink our ways of managing coopetition. Managing coopetition by restricting the partner's knowledge internalization might not be relevant.
- ✓ Furthermore, our article highlights the key role of the goal positive interdependence between two competitors. This positive interdependence shifts the collaboration intent from only sharing the resources to help the competitors enable its weaker know-how. It

increases the need to rethink the relationship between competitors as simultaneously cooperative and competitive. Moreover, it gives credit to Deutsch's approach of cooperation and competition based on positive and negative interdependence.

3. The Manuscript 1

RÉSUMÉ

Les recherches antérieures, s'intéressant à l'impact de la coopétition sur l'innovation radicale, aboutissent à des résultats contradictoires. Certaines recherches montrent que les risques liés à la coopétition sont trop élevés pour qu'elle ait un impact positif sur l'innovation radicale. D'autres recherches montrent, *a contrario*, que coopérer avec un concurrent peut avoir un impact positif sur l'innovation radicale. La question de l'impact de la coopétition sur l'innovation radicale reste donc posée. Afin d'y apporter des éléments de réponse, nous analysons, de façon longitudinale, deux projets d'innovation menés par Sanofi et son concurrent Bristol-Myers Squibb (BMS). Cette étude de cas montre qu'un partage intensif et extensif de ressources avec un concurrent permet le succès des projets d'innovation radicale.

Mots clés : coopétition, innovation, performance, longitudinale.

INTRODUCTION

Les recherches dédiées à l'impact de la coopétition sur l'innovation aboutissent à des résultats relativement opposés. Les tenants de la coopétition considèrent qu'elle favorise le progrès technologique et le développement de la capacité d'innovation (Gnyawali et Park, 2011; Bouncken & Fredrich, 2012; Ritala *et al.*, 2016). Elle permettrait de combiner les ressources stratégiques des coopéteurs et, ainsi, d'augmenter la rapidité de la mise en marché des produits innovants et, par suite, leur succès commercial (Bouncken & Fredrich, 2012; Estrada, Faims, & de Faria, 2016).

Pour d'autres auteurs, plus critiques, la coopétition ne pourrait pas produire un effet positif sur l'innovation (Nieto et Santamaría, 2007; Santamaria et Surroca, 2011). En effet, la crainte d'un pillage de compétences empêcherait les coopéteurs d'entrer dans une vraie relation de confiance. Elle empêcherait la combinaison de ressources stratégiques à l'origine de l'avantage coopétitif (Baumard, 2010a).

Ces contradictions entre les tenants de la coopétition et ses opposants tiennent à la nature paradoxale de la coopétition. En effet, en partageant ses ressources stratégiques avec son concurrent, une entreprise augmente sa capacité d'innovation. Mais, dans le même temps, elle donne à ce concurrent la possibilité de s'approprier les ressources qu'elle partage et, ensuite, d'utiliser ces ressources contre elle (Bouncken, Fredrich, Ritala, & Kraus, 2017; Hamel,

1991; Mention, 2011). Fernandez *et al.* (2014) considèrent, ainsi, que la coopétition conduit à armer son coopéteur.

Le problème est d'autant plus important que l'innovation est radicale. En effet, dans ce cas, il est nécessaire de partager intensément ses ressources avec son coopéteur (Fernandez *et al.*, 2017). Ce partage augmente les chances de succès de l'innovation, mais augmente également le risque de pillage de connaissances. Pour certains auteurs, il faut réduire ce risque, et donc limiter le partage des ressources à des phases précompétitives en R&D (Bengtsson et Kock, 2000). Pour d'autres auteurs, le partage est nécessaire, et doit même être intense pour aboutir à des innovations radicales (Le Roy et Fernandez, 2015). Ces oppositions montrent que le débat est loin d'être clos. Il convient donc de continuer à s'interroger sur la pertinence du recours à la coopétition pour l'innovation radicale.

Dans cette perspective, le niveau d'analyse retenu ici est celui du projet d'innovation. Dans les recherches antérieures, l'analyse se fait plutôt au niveau de l'entreprise. Des liens statistiques sont établis entre le fait d'adopter, ou non, une stratégie de coopétition, et le fait d'être, ou non, innovant. Or, la coopération entre concurrents ne porte jamais sur l'ensemble des activités. Elle est restreinte à certains maillons de la chaîne de valeur, certains marchés ou certains produits (Bouncken, Fredrich, Ritala, & Kraus, 2017; Fernandez & Le Roy, 2015). Pour établir l'impact de la coopétition sur l'innovation, il semble donc nécessaire de se situer à l'endroit de la coopération, c'est-à-dire au niveau d'un projet d'innovation.

Sur le plan de l'argumentation théorique, cette recherche est fondée sur l'idée que les gains potentiels de la coopétition sont supérieurs aux risques qu'elle génère. En effet, la coopétition est considérée ici comme susceptible d'engendrer trois effets de levier : un effet de levier lié à la combinaison de ressources, un effet de levier lié à l'émulation et un effet de levier lié à l'amplification du champ de commercialisation. Ces trois effets de levier sont également présents quand le partenaire n'est pas un concurrent (Hitt, Dacin, Levitas, Arregle, & Borza, 2000; Lavie, 2006), mais nous considérons qu'ils seront d'autant plus forts que le partenaire est un concurrent.

Afin d'évaluer la portée de cette argumentation, nous avons étudié de manière longitudinale deux projets d'innovation radicale menés en commun par Sanofi et son concurrent Bristol-Myers Squibb (BMS), le Plavix et l'Aprovel. Ces projets ont été extrêmement profitables pour Sanofi et BMS, puisqu'ils ont abouti à la création de deux

médicaments très innovants, qui ont généré 100 milliards de dollars de recettes sur la période (1993-2011).

De façon générale, les résultats de la recherche montrent que la coopétition est une bien une stratégie qui conduit à l'innovation radicale. Les résultats montrent, également, que cet impact positif est conditionné au fait les coopéteurs partagent pleinement leurs ressources stratégiques, en allant même jusqu'à accepter de se renforcer réciproquement. Le partage des ressources stratégiques n'est pas cantonné à une simple phase précompétitive de R&D. Bien au contraire, il est extensif et intensif, à la fois dans les phases de développement des produits et dans les phases de lancement des produits.

La présentation de la recherche est structurée d'une manière classique. Dans la première section, nous exposons notre cadre théorique sur le lien entre la coopétition, le partage de ressources et l'innovation. Puis, dans la seconde section, nous expliquons la méthodologie de la recherche. Dans une troisième section, nous présentons les résultats de notre étude de cas longitudinale. Pour conclure, nous confrontons les éléments trouvés dans notre cas à la littérature.

COOPÉTITION, PARTAGE DE RESSOURCES STRATÉGIQUES ET INNOVATION

La coopétition pour l'innovation radicale : une stratégie trop risquée ?

Les premières recherches portant sur l'impact de la coopétition sur l'innovation sont plutôt sceptiques vis-à-vis de l'efficacité de ce type de stratégie (Cassiman, Di Guardo, & Valentini, 2009; Nieto & Santamaría, 2007). En effet, la coopétition pour l'innovation n'est pas sans risque. Elle implique d'ouvrir son processus d'innovation à son concurrent, ce qui n'est pas anodin. Les entreprises procèdent ainsi pour bénéficier des effets de synergies nés de la combinaison de leurs ressources stratégiques avec celles de leur concurrent. Toutefois, en choisissant d'ouvrir son projet d'innovation radicale à un concurrent, l'entreprise prend le risque que ce coopéteur s'approprie ses ressources stratégiques (Ritala & Hurmelinna-Laukkanen, 2009). Ce risque est particulièrement élevé quand le partenaire est un concurrent relativement à un non-concurrent. Le concurrent a, par nature, la volonté et la capacité de s'approprier les ressources stratégiques de son coopéteur. Sa position de concurrent lui permet, par un mécanisme d'observation et de comparaison, d'identifier et de comprendre plus facilement quelles sont les ressources stratégiques de l'entreprise (Hamel, 1991).

L'appropriation par le coopéteur est susceptible d'avoir deux impacts négatifs. Le premier est lié à la relation de coopération. Si le coopéteur s'approprie les ressources de

l'entreprise, le pouvoir de négociation de cette entreprise diminue. Or, ce pouvoir de négociation détermine la part de la rente créée en commun avec le coopétiteur que l'entreprise va pouvoir capturer (Hamel, 1991). L'appropriation de la connaissance ne va pas uniquement affaiblir la position de l'entreprise à l'intérieur de leur relation mais aussi à l'extérieur (i.e. sur le marché). Le concurrent pourra directement réutiliser la connaissance qu'il s'est approprié dans un autre projet, un autre produit, ou sur un autre marché géographique. L'appropriation de la connaissance par son coopétiteur entraîne l'érosion de la valeur des ressources stratégiques détenues par une entreprise. Ce risque est lié au fait que le partenaire est un concurrent. Si le partenaire n'est pas un concurrent, le renforcer avec sa connaissance stratégique n'impacte pas directement et négativement l'entreprise.

Ouvrir son projet d'innovation radicale à un concurrent est une stratégie potentiellement dangereuse à cause de ce risque d'appropriation, également nommé risque de « fuite de connaissances » (Ritala & Hurmelinna-Laukkanen, 2009) ou même de « pillage » (Fernandez et al., 2017). Compte tenu de ce risque, certaines recherches soutiennent que la coopétition pour l'innovation, et surtout l'innovation radicale, n'est pas souhaitable, puisqu'elle repose sur le fait d'accepter que son coopétiteur s'approprie ses ressources stratégiques. La peur de l'appropriation empêcherait un réel partage des ressources et, donc, la possibilité pour la coopétition d'avoir des effets positifs sur l'innovation (Cassiman, Di Guardo, & Valentini, 2009; Nieto & Santamaría, 2007). Le partage ne serait possible que très en amont, dans les phases pré-competitives (Bengtsson et Kock, 2000).

La coopétition pour l'innovation radicale : une vraie bonne idée ?

D'autres recherches ont une approche plus optimiste de l'impact de la coopétition sur l'innovation (Quintana-García & Benavides-Velasco, 2004; Gnyawali & Park, 2011; Bouncken & Fredrich, 2012; Ritala, 2012; Fernandez et al., 2017). Dans ces recherches, un projet d'innovation est considéré comme à plus grand potentiel s'il est mené en intégrant les ressources d'un concurrent, que ces ressources soient financières, technologiques, managériales, etc. Le projet bénéficie ainsi des échanges d'informations et de connaissances des coopétiteurs, tout autant que de leur notoriété (Gnyawali & Madhavan, 2001). Cette possibilité de combiner les ressources rend la coopétition particulièrement adaptée à des projets d'innovation ambitieux.

De façon générale, les recherches sur la coopération et les alliances considèrent que le critère principal du choix du partenaire dépend des effets de levier potentiels des ressources

du partenaire par rapport aux ressources de l'entreprise (Hitt, Dacin, Levitas, Arregle, & Borza, 2000; Lavie, 2006). Les alliances et partenariats génèrent trois types d'effet de levier : un effet de levier lié à la combinaison des ressources, un effet de levier lié à l'émulation et un effet de levier lié à l'amplification du champ de commercialisation. Nous considérons ici que ces trois effets de levier sont potentiellement plus forts quand le partenaire est un concurrent.

Le premier effet de levier est lié à la combinaison des ressources entre les partenaires. De façon générale, la coopération permet de combiner des ressources complémentaires et, donc, d'augmenter le potentiel d'innovation. Cet effet de levier est potentiellement plus fort quand les partenaires sont également des concurrents (Bouncken & Kraus, 2013; Gnyawali & Park, 2011). En effet, deux entreprises en concurrence sur un même marché ont certaines ressources qui sont similaires et d'autres ressources qui leur sont spécifiques (Hamel, 1991). Le fait d'avoir des ressources similaires permet de les combiner très facilement. Des concurrents ont des produits proches, des processus de production proches, des langages proches, etc. Ils peuvent donc très rapidement se comprendre et combiner leurs ressources de façon efficiente. Dans le même temps, ils ont des ressources spécifiques. C'est cette spécificité des ressources qui rend attractive une entreprise pour ses concurrents (Luo, Rindfleisch, & Tse, 2007; Peng & Bourne, 2009). En y accédant par la coopération, une entreprise complète son portefeuille de ressources et augmente ainsi sa capacité d'innovation.

Dans cette perspective, plus une entreprise dispose de ressources, plus elle est attractive pour ses concurrents. Par exemple, dans le marché de la TV écran plat, Samsung a accepté de partager ses connaissances technologiques sur le LCD avec Sony, afin de rivaliser avec le plasma, qui était le standard technologique des leaders Sharp et Philipps. En échange, Samsung a bénéficié de la notoriété de Sony, de son expertise en tant que leader dans la fabrication des télévisions traditionnelles, et aussi d'un avantage financier, en partageant le coût du développement (Gnyawali & Park, 2011).

La combinaison des ressources entre partenaires produit un deuxième effet de levier qui est l'émulation (Dameron, 2004). Cette émulation est beaucoup plus forte quand les partenaires sont également des concurrents (Depeyre & Dumez, 2007). En effet, deux entreprises concurrentes sur un même marché ont une connaissance forte de ce marché et de l'industrie dans laquelle elles évoluent (Gnyawali and Park, 2009, 2011; Quintana-Garcia and Benavides-Velasco, 2004; Ritala and Hurmelinna-Laukkonen, 2009). Deux concurrents peuvent, par expérience et observation comprendre les décisions complexes de l'autre. Cette compréhension leur permet ensuite de challenger les décisions des uns et des autres. C'est un

processus d'émulation des idées par un processus qu'il est possible de qualifier de *meilleur de la classe*. Ainsi, plus les entreprises partagent des connaissances et des choix stratégiques pour un projet d'innovation avec un concurrent, plus ce dernier pourra challenger les décisions.

Le troisième effet de levier est lié au fait d'amplifier le champ de commercialisation. Cette amplification est potentiellement très forte quand la coopération se fait avec un concurrent (Bouncken et al., 2015; Ritala, 2012). En effet, une entreprise peut étendre le potentiel de son marché actuel, et même créer un nouveau marché, en combinant sa propre notoriété et son réseau de distribution avec ceux de son concurrent (Ritala et al., 2014). Plus le concurrent a un champ d'action important, plus les effets de levier liés à l'amplification seront positifs. Le fait que le partenaire soit un concurrent augmente donc potentiellement le succès commercial de l'innovation. A titre d'exemple, au travers d'une joint-venture commune avec Général Motors, Toyota a pu vendre sa voiture « la Corolla » sur le marché américain, alors que Toyota n'avait pas accès à ce marché avant la coopération (Gast, Filser, Gundolf, & Kraus, 2015).

La proposition de recherche

Les recherches antérieures portant sur l'impact de la coopétition sur l'innovation radicale peuvent être clivées en deux grandes approches. Dans la première, les risques de pillage de connaissance induits par la coopétition sont considérés comme trop élevés pour permettre la confiance nécessaire à la réussite du projet d'innovation. Dans la seconde, les opportunités liées à la coopération sont considérées comme d'autant plus fortes que le partenaire est un concurrent. Ces opportunités poussent les entreprises concurrentes à coopérer intensément entre elles malgré le risque de pillage de connaissances. Nous nous inscrivons dans cette approche, en considérant que les gains liés aux trois effets de levier engendrés par la coopétition sont supérieurs aux risques liés au pillage des connaissances.

METHODE

Une étude de cas longitudinale centrée sur un projet d'innovation radicale

Afin d'évaluer l'impact de la coopétition sur l'innovation, et dans la lignée de Gnyawali et Park (2011) et d'Ansari et al. (2016), cette recherche s'appuie sur la méthode de l'étude de cas longitudinale. La coopétition est un phénomène multi-facettes et paradoxal, qui nécessite d'avoir recours à ce type de méthode (Gnyawali et Park, 2011). Elle permet d'étudier les phénomènes complexes qui évoluent dans le temps (Dodgson, Mathews, Kastelle, & Hu,

2008; Langley, 1999). Par ailleurs, focaliser la recherche sur un cas exemplaire permet de créer des connaissances nouvelles sur un phénomène contre-intuitif en identifiant les dimensions clés (Yin, 2014).

Le choix du cas

L'étude de cas porte sur deux projets d'innovation radicale de Sanofi, le Plavix et l'Aprovel. Ces deux médicaments ont révolutionné le domaine de la cardiologie et de l'hypertension. Ce sont des cas exemplaires de blockbusters, c'est-à-dire de médicaments très innovants, dont le pic de chiffre d'affaires annuel dépasse le milliard de dollars. Le Plavix a été utilisé par 92 millions de patients dans 115 pays. Il a été dans le palmarès des cinq premiers blockbusters mondiaux pendant plusieurs années. Il a dépassé le milliard de dollars de chiffre d'affaires pendant 10 ans. L'Aprovel a également eu un fort impact sur le marché de l'hypertension, puisqu'il proposait un nouveau mécanisme d'action qui rendait obsolète le mécanisme utilisé par les médicaments leaders traitant l'hypertension. Bien que son ampleur soit de moindre importance que le Plavix, il a tout de même été commercialisé dans plus de 80 pays et a connu de très bonnes ventes (i.e. son pic a été de 2 milliards d'euros pour l'année 2009).

La collecte des données

L'étude de cas a commencé par une collecte de données secondaires. Ces données secondaires permettent d'avoir une bonne représentation d'une étude de cas, avant même de faire des entretiens (Baumard et al., 2007). De plus, en comparaison avec des données primaires, les données secondaires peuvent être considérées comme plus objectives lorsqu'il s'agit d'étudier des performances économiques et financières. L'analyse financière des projets sur la période a été rendu possible par les nombreux articles, rapports de consultant, études, interviews écrites publiés sur le sujet. Par ailleurs, Sanofi est une entreprise française et Bristol-Myers Squibb (BMS) une entreprise américaine. Nous avons eu la possibilité d'accéder aux informations dans la langue du pays de chacune des entreprises. Ainsi, nous avons pu écrire une première histoire narrative constituée à partir des données secondaires suivantes :

- quatorze rapports annuels de BMS sur toute la période de commercialisation (de 1998 à 2012) ;

- onze rapports d'activité et onze documents de référence de Sanofi de 2002 à 2012 (pour les années de 1998 à 2001 nous avons utilisé des articles de presse professionnelle),

- de nombreux articles, rapports de consultants, études, interviews écrites publiés suite au succès des médicaments de l'alliance,

Ensuite, nous avons complété cette base de données par des données primaires. Nous avons effectué vingt-sept entretiens avec des personnes impliquées dans le projet Plavix. Ces entretiens se sont déroulés entre 2014 et 2016. Nous avons principalement interrogé des personnes de Sanofi (vingt-deux au sein de Sanofi et cinq au sein de BMS). Nous avons cherché des interlocuteurs à tous les niveaux : les dirigeants, comme le directeur R&D de Sanofi ou les deux directeurs du management des alliances de Sanofi qui ont aussi occupé la fonction de managers d'alliance des projets Plavix et Aprovel, des cadres intermédiaires en charge direct des projets, comme les chefs projets ou les directeurs marketing, les opérationnels en contact quotidien avec BMS et, enfin, un des chercheurs qui participait à la découverte du Plavix avant la collaboration.

Les données primaires ont permis de corroborer et de compléter l'histoire narrative. De plus, nous avons pu accéder à des informations non dévoilées dans les données secondaires comme : (1) les effets de la coopération pour Sanofi, pour les produits, et pour les individus interviewés, (2) la localisation et des exemples de contenu des flux de ressources stratégiques entre les deux entreprises, (3) les déterminants de ces flux de ressources, (4) les opportunités d'internalisation des connaissances (dans un sens comme dans l'autre), (5) les comportements opportunistes de BMS,

Le traitement des données

Les données primaires et secondaires ont été codées en deux temps. Une première série de codage avait pour objectif de constituer le récit narratif du cas et de s'assurer 1) qu'il concernait deux concurrents et (2) des innovations radicales, (3) qu'il y avait un partage de ressources stratégiques, et (4) que le projet avait été un succès. Nous souhaitions nous assurer que la coopétition entre Sanofi et BMS était bien un cas réussi de coopétition et qu'il y avait bien au deux produits radicalement innovants. Puis, un deuxième tour de codage a été entrepris pour isoler et comprendre pourquoi Sanofi partageait ses ressources stratégiques avec BMS et quels étaient les effets de ce partage pour Sanofi et les projets d'innovation.

LE CAS DU PLAVIX ET APROVEL : SANOFI PARTAGE SES RESSOURCES STRATÉGIQUES

Sanofi et Bristol-Myers Squibb (BMS) sont deux entreprises significatives dans l'industrie pharmaceutique, qui ont coopéré ensemble pour développer et commercialiser deux molécules trouvées par Sanofi. Pour comprendre ce cas, il faut d'abord le replacer dans son contexte et appréhender les caractéristiques des deux projets d'innovation de Sanofi (i.e. Plavix et Aprovel). En effet, leur fort degré d'innovation et le niveau élevé de risque ont contraint Sanofi à ouvrir ces molécules à un partenaire extérieur. Puis, nous analyserons le choix de Sanofi d'ouvrir ses molécules à un concurrent comme BMS, BMS s'étant comporté à plusieurs reprises de manière opportuniste. Si cette sous-section questionne la pertinence de partager ses ressources stratégiques avec un concurrent, les deux sections suivantes montrent l'intérêt stratégique de faire ce choix. En effet, coopérer avec un concurrent fort est apparu comme le seul moyen pour maximiser les rentes potentielles de projets innovants aussi radicalement que le Plavix ou Aprovel.

Le Plavix et Aprovel : deux projets de Sanofi très innovants et très risqués

Au début des années 1990, Sanofi était une entreprise de taille intermédiaire, filiale de Elf Aquitaine. Son objectif stratégique, comme toute entreprise pharmaceutique, était de trouver des nouveaux médicaments. Sanofi avait, par le passé, déjà réussi à développer et commercialiser un blockbuster appelé Ticlid. Les blockbusters ont un rôle clé pour les entreprises pharmaceutiques comme Sanofi, car non seulement ils permettent d'avoir un projet profitable, mais, surtout, ils financent le développement de nombreux autres médicaments.

Le problème du Ticlid, un antiplaquettaire efficace contre les accidents cardio-vasculaires, résidait dans ses nombreux effets indésirables comme des saignements abondants. Une équipe de recherche interne à Sanofi cherchait donc un médicament pour remplacer le Ticlid. Ils ont, alors, découvert une molécule appelée le Clopidogrel, qui deviendra le Plavix. Cette molécule a officiellement été découverte et synthétisée pour la première fois en 1986, lorsque deux chimistes de Sanofi déposent un brevet sur cette molécule. Dans le même temps, une autre équipe en interne trouve et dépose le brevet sur une seconde molécule, l'Irbesartan, qui deviendra l'Aprovel. La particularité du projet Plavix et Aprovel est leur caractère fortement innovant. La découverte du Plavix va s'avérer être un évènement « d'importance historique majeure » dans le domaine de la cardiologie (*extrait de l'interview de Dr Thomas Tu, Groupe*

*de cardiologie de Louisville)*⁴⁸. C'est le premier antiagrégant plaquettaire à avoir réussi à réduire le risque d'attaque cardiaque, ainsi que la mortalité liée à ces attaques cardiaques sur une grande variété de patients. De plus, par comparaison aux médicaments antérieurs, il empêche les plaquettes sanguines de s'agglutiner sans engendrer de saignements importants (i.e. effets secondaires liés à l'utilisation des médicaments antérieurs comme le Ticlid). De manière similaire, l'Aprovel va aussi avoir un degré d'innovation important, en particulier dans le traitement de l'hypertension. Ce dernier propose un mécanisme d'action différent et potentiellement plus efficace que ceux proposés par le leader du marché de l'hypertension de l'époque (en l'occurrence BMS). La commercialisation de l'Aprovel pouvait totalement changer les rapports de force des entreprises pharmaceutiques dans le traitement de l'hypertension.

Cependant, dans l'industrie pharmaceutique, découvrir des molécules prometteuses n'est pas suffisant pour aboutir à un blockbuster. Premièrement, le processus pour générer le médicament est coûteux (cf. citation 1 et 2 dans le tableau 1), long et risqué (cf. citation 3 dans le tableau 1). Transformer une molécule en un médicament commercialisable n'est pas sans faille. En effet, depuis les années 1990, seule une molécule découverte sur dix réussit à devenir un médicament commercialisable. Ce risque d'échec était particulièrement élevé pour le Plavix, car Sanofi devait démontrer sa supériorité par rapport à l'aspirine, un médicament de faible de prix, avec très peu d'effet indésirable et, surtout, véritablement implanté dans les habitudes des médecins et des patients. Pour produire un blockbuster, il n'est pas suffisant de réussir à commercialiser le médicament. Il faut assurer une diffusion rapide et mondiale de ce dernier (cf. citation 4 dans le tableau 1). La rapidité était particulièrement importante pour le succès de l'Aprovel. Des concurrents comme BMS avaient leurs propres projets en interne. Sanofi avait deux désavantages supplémentaires. Le premier, spécifique à l'Aprovel, était lié à sa méconnaissance du marché de l'hypertension. En effet, jusqu'à la découverte accidentelle de l'Aprovel, Sanofi avait été totalement absent de ce marché. Ainsi, Sanofi n'avait aucune notoriété, aucun contact avec les leaders d'opinion, aucune connaissance de l'historique de ce marché *etc.* Le deuxième désavantage concernant les deux molécules résidait dans le fait que pour maximiser la diffusion du médicament, il était vital d'avoir une notoriété forte et une force de vente efficace aux Etats-Unis. Les Etats-Unis représentaient le premier pays du point de vue de la consommation de médicaments.

⁴⁸ O'Riordan, 2012, "So Long, Plavix, What a ride!", Medscape.

Tableau 1 ~ Les causes de la coopétition entre BMS et Sanofi

N°	Répondants	Citations	Cause
1	Directeur marketing produits Plavix	« Voilà. Donc, il y a tous ces aspects-là de Joint-Venture. Et puis, vous avez la première cause, je dirais, de coopération qui pour moi, sont les coûts de développement. »	Coût du développement
2	Alliance Manager Sanofi	« Pour Sanofi il y avait la volonté de trouver un partenaire, qui accepte de partager les coûts de développement et de lancement. Elf Aquitaine, qui était quand même une société pétrolière, n'avait pas envie de s'engouffrer [dans ces projets] à risque. Parce que c'est toujours à risque, des centaines de millions dans ce développement. C'est ce qui a poussé Sanofi à chercher un partenaire mondial pour développer et commercialiser les produits. Dans la tête c'était vraiment co-développement et co-commercialisation. »	Limites du financement interne
3	Chef de projet industriel Plavix	« Et puis c'est aussi de limiter le risque parce que si on passe 10 ans, 15 ans à développer un médicament en interne avec nos chercheurs, bon on dépend, ils voient finalement ce médicament, on n'arrivera pas à le sortir soit parce qu'il est trop cher à produire, soit parce qu'il y trop d'effets secondaires, soit X, en fait, c'est de l'argent qu'on a perdu, et donc, en fait, on a pris ce risque-là. Tandis que là, en fait, on déplace le risque. »	Durée et risque du projet
4	Chef de projet Sanofi Plavix	« On s'est dit pour avoir une chance que notre produit fasse un chiffre d'affaires très important, il faut se trouver dans une certaine position sur le marché parce qu'il y avait plusieurs produits dans la même classe pharmaceutique qui étaient développés dans la même indication. Donc l'idée c'était la vitesse. Il fallait, vite et bien. »	Vitesse de développement

Source : les auteurs

Sanofi avait donc une probabilité élevée de ne pas réussir le développement ou la commercialisation d'une molécule voire des deux. Ce niveau de risque élevé, combiné au degré élevé d'innovation attendu, conduisit Sanofi à rechercher un partenaire pour les deux molécules.

Sanofi et BMS s'engagent dans une relation simultanément coopérative et compétitive

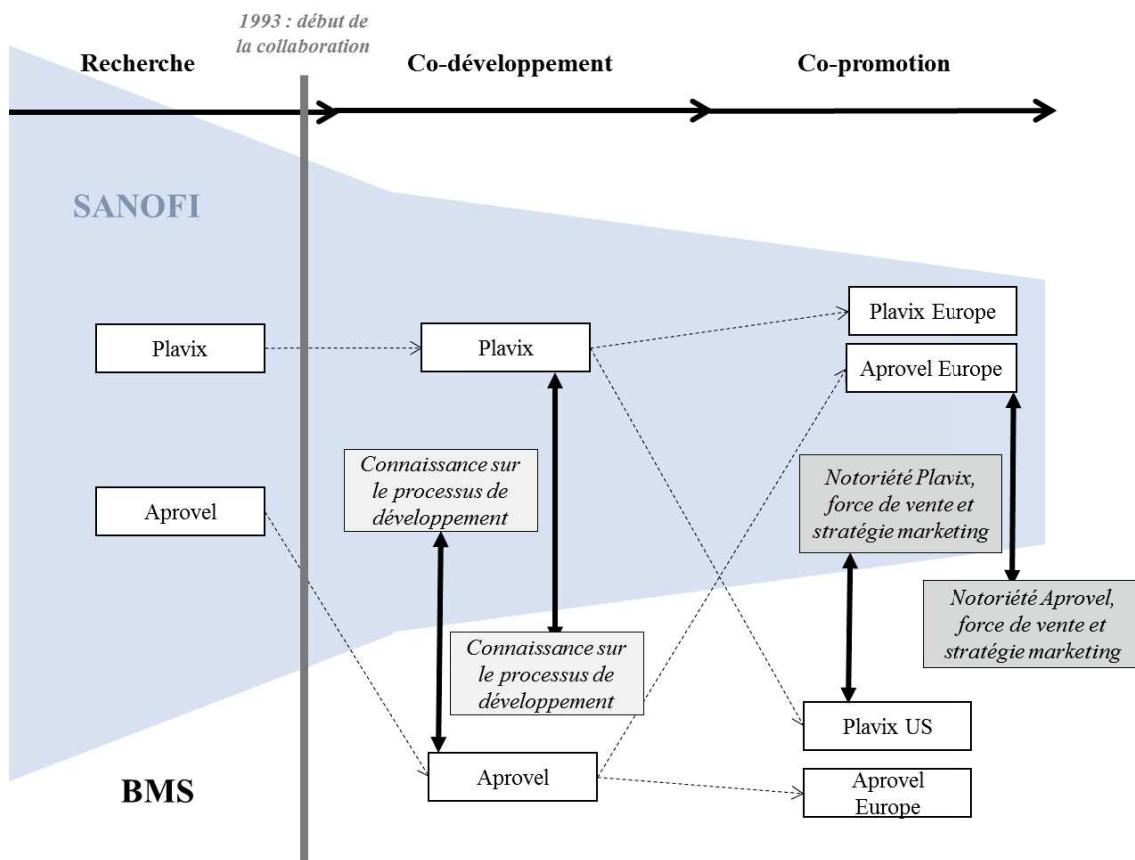
Le groupe pharmaceutique américain BMS s'est rapidement révélé très intéressé par une collaboration pour le co-développement et la co-commercialisation des deux molécules. Sanofi s'est donc engagée dans une relation de coopération avec BMS. Un des premiers

managers d'alliance de Sanofi met en avant les raisons pour lesquelles BMS était intéressée par le Plavix et l'Aprovel :

Quand on est allé leur présenter les deux produits, dans les années 92/93. BMS, immédiatement, s'est révélé très intéressé, et était reconnu comme un partenaire privilégié. On a mis sur la table Plavix, en disant, nous ce marché on le connaît, on est les seuls dans le monde entier à avoir un traitement antiagrégant plaquettaire, différent de l'aspirine, appelé la Ticlopidine. Avec un mécanisme différent de l'aspirine, nous on est sûr que ça va rapporter par rapport à l'aspirine, être le traitement de référence dans le domaine cardio-vasculaire Et on a entrepris une énorme étude de phase trois appelée Caprie, 19 000 patients, pour montrer ses effets contre les récidives d'infarctus ou d'AVC. On va dire qu'ils ont pris [le Plavix] un peu comme un bonus, ou comme une cerise sur le gâteau, mais ils étaient vraiment très intéressés par l'Aprovel. Donc les premiers accords globaux ont été signés en 1993.

La particularité de l'accord, signé entre Sanofi et BMS en 1993, résidait dans le fait qu'il ne se limitait pas à une molécule, mais intégrait les deux molécules découvertes par Sanofi (*cf.* Plavix et Aprovel sur la figure 1). Chaque entreprise prenait en charge les opérations du médicament pour laquelle elle possédait une expertise supérieure, en tant que leader actuel du marché (i.e. Sanofi pour le Plavix et BMS pour l'Aprovel). Cependant, ce n'était pas parce qu'ils se répartissaient l'opérationnalisation qu'ils ne partageaient pas leurs ressources. En effet, toutes les décisions de co-développement étaient prises en commun.

Figure 1 ~ La coopération entre Sanofi et BMS



Source : les auteurs

Chacun apportait ses ressources, ses savoir-faire, ses expériences dans le développement des deux produits. De plus, l'accord ne se limitait pas au co-développement, mais incluait la co-promotion des deux médicaments. Dans les pays où la co-promotion était autorisée, les deux entreprises ont combiné leurs forces de vente pour faire la promotion d'un seul produit sous le même nom. Pour la co-promotion, la commercialisation dépendait non plus de l'expertise dans le médicament, mais de l'expertise et de la force de vente géographique.

BMS était en charge principalement du plus gros marché, c'est-à-dire les Etats-Unis, et Sanofi des marchés des autres pays. Pour la commercialisation, toutes les décisions étaient prises en commun. Ainsi, la coopération avec BMS était extensive, dans le sens où elle intégrait aussi bien le développement que la promotion, et intensive, dans le sens où elle impliquait un partage des ressources et des connaissances de manière continue. Un des directeurs du *life cycle management* du Plavix, qui a travaillé plus de 15 ans sur le Plavix, résume bien cette idée de partage extensif et intensif :

J'étais sur le développement [du Plavix] à l'international, [lorsqu'on a commencé à coopérer] on a continué le développement clinique. On a mis

*en place les essais. C'est là qu'on m'a dit : « Attention ! Il faut que tu inclus un de tes collègues de chez BMS ou plusieurs dans les discussions. »
Et on a commencé à travailler vraiment main dans la main.*

Bien que Sanofi se soit engagé dans une relation de coopération extensive avec BMS, la relation entre les deux entreprises pharmaceutiques n'était pas uniquement coopérative. En effet, leur relation était aussi fortement compétitive. A l'origine la compétition était faible car leurs marchés étaient géographiquement distincts (Sanofi en Europe et BMS aux Etats-Unis). Toutefois, depuis les années 1980, les marchés de Sanofi et de BMS s'entremêlaient de plus en plus, et chacun cherchait à s'implanter sur le territoire géographique de l'autre. Cette intensification de la compétition s'explique par les mutations du secteur pharmaceutique de l'époque. Sanofi et BMS faisaient face à un raccourcissement du cycle de vie des médicaments et une très forte augmentation du coût de la R&D. A titre d'exemple, le coût de R&D associé à un médicament était évalué à 138 millions de dollars en 1975, contre 1,3 milliards de dollars aujourd'hui.

Face à ces changements, BMS et Sanofi ressentaient le besoin de rentabiliser leur investissement en R&D, en raccourcissant le temps de mise sur le marché et en recherchant une commercialisation au niveau mondial de blockbusters. Sanofi et BMS entreprenaient des actions pour augmenter la force de vente dans le territoire de prédilection de l'autre. Par exemple, à la fin des années 1990, Sanofi a racheté Sterling Drug, la filiale pharmaceutique américaine de Kodak. Ce rachat lui permettait d'avoir une force de vente américaine et, donc, lui ouvrait le marché américain. De manière similaire, BMS était déjà présent sur le marché européen et cherchait à renforcer son accès. Sa présence sur ce marché se justifiait par le fait que Sanofi et BMS étaient des concurrents directs sur la vente de paracétamol dans certains pays européens.

Si leurs marchés s'entremêlaient, les deux entreprises étaient également en compétition concernant leurs ressources. Ces ressources pouvaient prendre plusieurs formes, allant des relations privilégiées avec des leaders d'opinion, aux savoir-faire nécessaires à la réussite du développement et de la commercialisation de médicament. Ce savoir-faire similaire se matérialisait par le fait que Sanofi et de BMS avaient, par le passé, réussi à commercialiser des blockbusters. BMS présentait un léger avantage et affichait une réussite plus importante que Sanofi.

La concurrence a bien eu lieu pendant la collaboration. Par exemple, BMS a cherché à plusieurs reprises à maximiser sa performance, même si cela se faisait au détriment de Sanofi. Ces actions compétitives ont pris plusieurs formes. Premièrement, lorsque BMS s'est rendu compte du potentiel du marché des antiagrégants plaquettaires, il a tenté de créer un médicament concurrent au Plavix avec les connaissances apprises sur le Plavix. Deuxièmement, au début de la mise en vente de l'Aprovel, les forces de vente de BMS favorisaient un produit interne moins efficace que l'Aprovel. Troisièmement, dans des pays comme l'Espagne, interdisant la co-promotion, les deux entreprises ont proposé deux produits différents et concurrents. BMS a réduit ses prix unilatéralement pour capturer toutes les ventes sur le marché espagnol.

Partager pour accéder aux ressources stratégiques de BMS

Le fait de mener le projet en coopération avec BMS a été source de nombreux avantages pour Sanofi. Premièrement, Sanofi n'aurait jamais pu financer seule des coûts aussi importants que ceux requis par le Plavix et l'Aprovel. Les coûts de développement peuvent ainsi être estimés à 2.350 milliards d'euros. Ils ont été partagés équitablement entre Sanofi et BMS. En ouvrant ses deux inventions à BMS, Sanofi n'a financé que la moitié des coûts – soit 1.175 milliards d'euros – ce qui rendit possible le développement simultané des deux molécules. Au-delà des économies de coûts de développement, la coopération a permis à Sanofi d'économiser les coûts de fabrication et de marketing des produits vendus par BMS. Un des membres de l'équipe interne de Sanofi qui a découvert le Plavix explique que son entreprise n'aurait pas pu faire le développement seule :

A ce moment-là, Sanofi avait plusieurs produits dans son portefeuille, et il n'y avait pas réellement, il y avait pas la possibilité d'engager un développement [...]. La phase 3, ce sont les essais cliniques, des grands essais cliniques sur un grand nombre de patients. Et donc à ce moment-là, Sanofi n'avait pas la possibilité de faire par elle-même, elle avait pas les moyens.

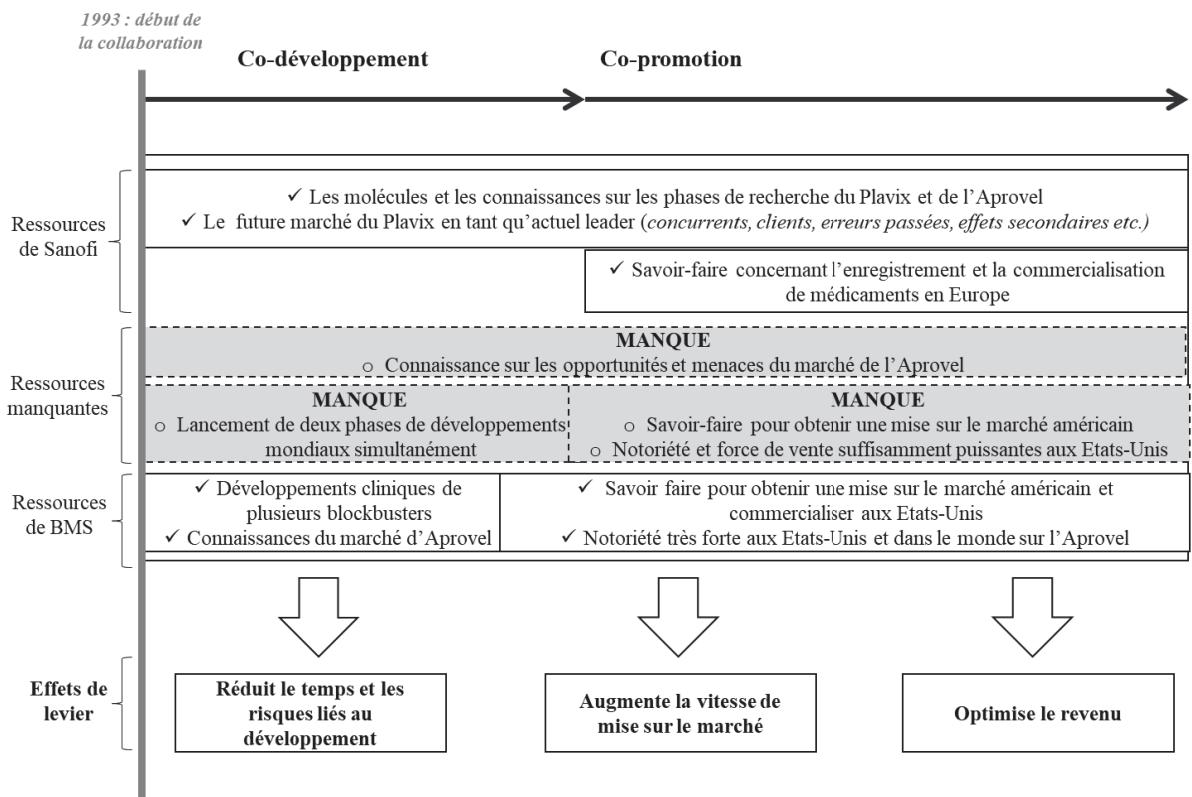
Le deuxième avantage pour Sanofi est la baisse du risque. Les projets de R&D dans le secteur pharmaceutique ne sont pas uniquement longs et coûteux. Ils sont aussi risqués. En ne finançant que la moitié des coûts, Sanofi réduisait de fait le risque. Un conseiller scientifique senior toxicologie explique qu'ouvrir le processus d'innovation à BMS permettait de partager les coûts financiers et donc réduire le risque :

Pourquoi ? Parce que ça permet d'externaliser le risque. Ça c'est le grand leitmotiv de nos grands chefs.

Le troisième effet positif est lié au risque d'échec. En coopérant sur le développement et la commercialisation avec BMS, Sanofi a pu bénéficier des ressources et de l'expérience de BMS, ce qui a augmenté l'efficacité de son processus d'innovation. Son processus d'innovation a gagné en (1) rapidité de développement et en probabilité de réussite, (2) en rapidité de mise sur le marché et (3) en intensité des rentes tirées de l'innovation (cf. *Figure 2*). Ces effets positifs ont été possibles car Sanofi et BMS ont partagé et associé leurs ressources et savoirs du début de la collaboration jusqu'à la fin, c'est-à-dire du développement à la commercialisation.

Plusieurs personnes interrogées ont donné des exemples concrets des problèmes que Sanofi a pu régler grâce aux connaissances partagées par BMS. Par exemple, Sanofi avait un problème pour la mise sur le marché américain du Plavix. Sanofi pouvait démontrer la performance supérieure du Plavix mais il ne pouvait pas l'expliquer. Ne pas pouvoir l'expliquer est une raison potentielle de refus de mise sur le marché des autorités américaines. En coopérant avec BMS, Sanofi a réussi à mettre en place une stratégie qui a convaincu les autorités. Cette stratégie a consisté à engager le plus vaste essai clinique de l'époque, c'est-à-dire un essai clinique sur 130 000 personnes (relativement aux 300 personnes nécessaires pour un médicament traitant un cancer). Cette stratégie n'a été possible que parce que BMS a apporté sa notoriété et ses connaissances du processus de décision de la FDA.

Figure 2 ~ Les trois effets de levier liés aux ressources de BMS



Source : les auteurs

Partager pour éviter la défaillance d'un des deux coopétiteurs

Un des directeurs des produits de cardiologie de Sanofi explique que la coopération entre Sanofi et BMS forme un système interdépendant dans lequel l'échec de l'autre peut conduire à son propre échec :

Vous pouvez réussir à un endroit mais rater à un autre et donc tout rater quoi. Car si vous ne réussissez pas tout, vous ratez.

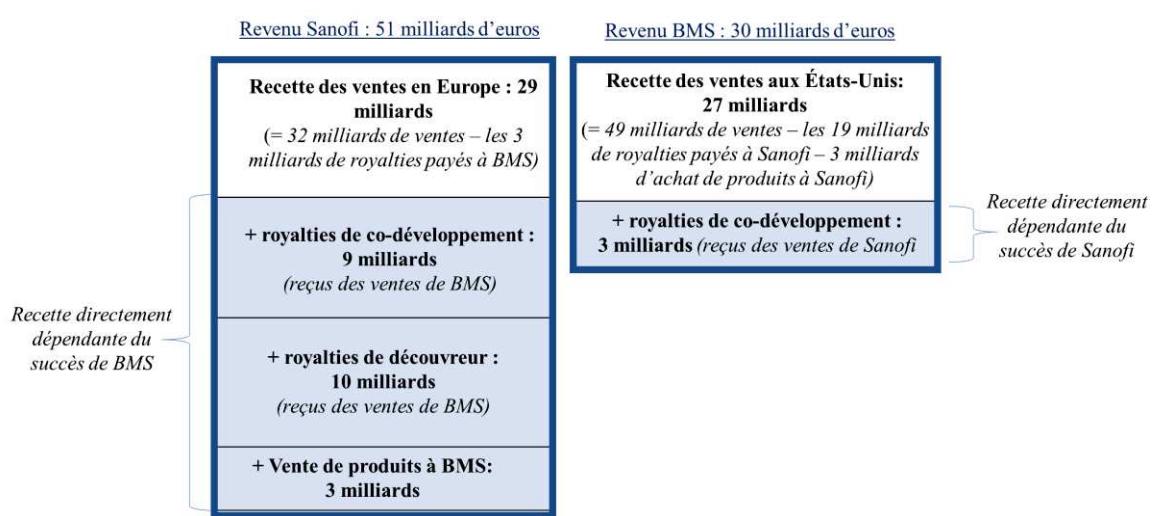
Les montants investis étant très élevés, ni Sanofi ni BMS ne pouvaient se permettre que l'un ou l'autre soit défaillant ou que les stratégies développées ne soient pas efficientes. Ainsi, si le coopéteur est faible, il est nécessaire de le renforcer pour assurer le succès du projet en commun. Ce fut le cas quand BMS a envoyé deux équipes pour former les équipes de Sanofi et les aider à réussir l'audit de l'autorité américaine (FDA). Si Sanofi avait échoué durant l'audit, BMS n'aurait pas pu commercialiser les médicaments. Donc, BMS a renforcé délibérément Sanofi avec ses propres connaissances. De manière identique, Sanofi a envoyé une équipe d'experts aider BMS à résoudre son problème de production du Plavix. Un ancien manager de l'alliance Sanofi-BMS soutient ainsi que les deux entreprises ont alors engagé dans le processus leurs meilleurs experts :

Face à ce souci de fabrication, on a mis tout le monde, tous les meilleurs experts de BMS et de Sanofi devant le truc/devant le problème pour trouver une solution.

Sanofi n'a pas aidé BMS par altruisme mais parce qu'une défaillance de BMS aurait impacté négativement sa propre réussite. Le système de capture de valeur rendait Sanofi et BMS dépendants de la réussite de l'autre. Précisément, Sanofi touchait des royalties de découvreur et de développeur sur chaque vente de BMS aux Etats-Unis. Ces royalties ont représenté dix-neuf milliards d'euros (neuf milliards pour la découverte et dix milliards pour le co-développement). Ainsi, plus BMS réussissait à maximiser ses ventes, plus Sanofi gagnait de royalties. Sanofi partageait donc toutes les connaissances ou ressources qui pouvaient aider BMS à vendre plus. Réciproquement, Sanofi a versé trois milliards d'euros de royalties à BMS au titre du co-développement.

Dans les recettes finales, Sanofi a gagné 32 milliards d'euros sur ses ventes propres et 19 milliards au titre des royalties (ce à quoi s'ajoutent trois milliards de ventes directes de produit à BMS). Trois milliards doivent être déduits de ces recettes au titre des royalties versés à BMS. De son côté, BMS a réalisé 49 milliards d'euros de vente directe et a perçu trois milliards de royalties de la part de Sanofi. Mais elle a dû régler 19 milliards de royalties à Sanofi (ainsi que trois milliards pour l'achat de produits). Autrement dit, plus Sanofi réalise de ventes, plus BMS gagne de l'argent, et réciproquement (cf. *Figure 3*).

Figure 3 ~ Interdépendance de gains entre Sanofi et BMS



Source : les auteurs

DISCUSSION

Les recherches antérieures aboutissent à des résultats contradictoires. Certaines recherches considèrent que la coopétition ne permet pas l'innovation radicale, alors que d'autres recherches considèrent qu'elle est particulièrement propice pour l'innovation radicale. Les résultats de la recherche vont dans le sens d'un impact positif de la coopétition sur l'innovation radicale.

Le risque d'appropriation des ressources comme frein à la coopétition

Les recherches antérieures mettent en évidence un risque important dans les projets de coopétition : le risque que le concurrent s'approprie les ressources stratégiques partagées par l'entreprise et les utilisent contre elle. Ce risque, communément admis, a été au centre de nombreux articles sur la coopétition (Baumard, 2010b; Fernandez & Chiambaretto, 2016; Ritala, Olander, Michailova, & Husted, 2015). Il est problématique car il peut affaiblir la rente capturée dans le projet et la position concurrentielle de l'entreprise (Hamel, 1991).

L'étude de cas confirme ces effets négatifs de la coopétition. En partageant ses ressources stratégiques avec son concurrent, Sanofi a dû gérer des comportements d'opportunistes liés à la capacité de BMS à s'approprier les ressources stratégiques. En effet, partager ouvertement ses recherches sur le Plavix, mais aussi sa connaissance fine du marché des antiagrégants plaquettaires, a permis à BMS de se rendre compte des opportunités de ce marché sur lequel il était absent. BMS a donc cherché à développer un produit concurrent au Plavix. Le développement de ce produit n'a pas réussi et a échoué juste avant la commercialisation. Sanofi a donc évité de justesse une situation où il aurait armé son propre concurrent en partageant ouvertement ses ressources.

Face à ce risque réel, certains auteurs soutiennent que la coopétition ne peut pas aboutir à une innovation. Les entreprises auraient trop peur. Cette peur affecterait la modalité de partage et donc les rentes positives de la coopétition (Nieto & Santamaría, 2007; Santamaría & Surroca, 2011). D'autres chercheurs adoptent une position plus nuancée. Ils considèrent que la coopétition peut avoir des effets positifs mais uniquement sur les activités les moins « dommageables », car plus loin du client (Bengtsson & Kock, 2000a; Walley, 2007).

L'étude de cas questionne la pertinence de ces arguments, puisque le partage n'a pas été réduit malgré la réalisation concrète de l'appropriation des connaissances par le concurrent. En effet, dans ses deux projets d'innovation radicale, Sanofi a continué de partager ses

ressources stratégiques, malgré le fait que BMS tentait de faire en interne un produit concurrent avec une partie des ressources que Sanofi avait partagées.

Le partage entrepris par Sanofi est donc en contradiction avec ces études antérieures. Sanofi a partagé ses ressources de manière extensive et intensive. De manière extensive, car le partage concernait toutes les activités du processus d'innovation radicale, du développement à la commercialisation. De manière intensive, car les experts s'entraidaient et partageaient leur savoir mais aussi leurs expériences. L'étude de cas permet donc de soutenir l'idée que l'appropriation des connaissances par un concurrent n'empêche pas le partage de connaissance de se poursuivre. La question est donc la suivante : pour quelles raisons les entreprises acceptent-elles de prendre ce risque ?

Partager ses ressources stratégiques pour obtenir des effets de levier

L'analyse des recherches antérieures a permis de mettre en évidence les effets de levier que représente le partage de ressources entre concurrents : (1) l'accès aux ressources manquantes possédées par le concurrent (Bouncken & Kraus, 2013; Gnyawali & Park, 2011), (2) l'émulation avec des décisions qui peuvent être challengées (Dameron, 2004; Depeyre & Dumez, 2007), (3) l'extension des opportunités de commercialisation (Bouncken et al., 2015; Ritala, 2012).

L'étude de cas confirme que coopérer avec un concurrent disposant de beaucoup de ressources permet de bénéficier de ces trois effets de levier. BMS faisait partie des cinq premières entreprises pharmaceutiques. C'était un des leaders sur le plus grand des marchés géographiques, les Etats-Unis, et le leader du marché de l'hypertension, marché sur lequel Sanofi entrait avec Aprovel.

Ces caractéristiques ont eu plusieurs effets positifs pour Sanofi. Premièrement, BMS était un partenaire fort financièrement, et prêt à prendre le risque de deux développements simultanés d'innovation radicale. Ainsi, Sanofi n'a pas eu à choisir entre les deux médicaments. Deuxièmement, BMS a pris en charge le développement de l'Aprovel, car sa position de leader lui donnait un avantage concurrentiel fort. De plus, ses connaissances étaient assez génériques pour réussir à challenger et aider Sanofi sur le développement du Plavix, un produit et un marché qu'il ne connaissait pas. En coopérant avec BMS, Sanofi a augmenté ses chances de succès du projet d'innovation. Troisièmement, la notoriété, du réseau de vente de BMS aux Etats-Unis et son savoir-faire en matière de lancement et

commercialisation de blockbusters ont permis à Sanofi de maximiser les ventes des deux médicaments.

Nous soutenons donc qu'une entreprise augmente ses chances de réussir un projet d'innovation radicale en coopétition en choisissant un concurrent disposant de ressources importantes, et en partageant ses ressources stratégiques de manière extensive et intensive sur toutes les activités de projet d'innovation radicale (i.e. du développement et de la commercialisation).

Accepter de renforcer son concurrent

La dernière contribution de cette étude est un résultat contre-intuitif : dans un projet d'innovation radicale une entreprise obtient d'autant plus de résultats positifs qu'elle accepte de renforcer son concurrent. En effet, les systèmes de capture de valeur de Sanofi et BMS dans les deux projets sont en interdépendance positive. La réussite de l'un dépend de la réussite de l'autre. Ainsi, aucun des deux ne peut se permettre d'avoir un partenaire « faible ». Sa faiblesse peut compromettre le projet ou le montant des rentes.

Quand les montants investis et les rentes attendues sont élevés, l'entreprise a intérêt à aider le concurrent et à le renforcer pour le bon déroulement et le succès du projet. Ce résultat mérite d'être creusé car il semble être en contradiction avec les principaux fondements du management de la coopétition. En effet, de nombreuses recherches mettent en avant des outils de management pour partager les ressources stratégiques sans prendre le risque que le partenaire puisse se renforcer et les réutiliser (e.g. Baumard, 2010a; Paul Chiambaretto & Fernandez, 2016).

IMPACT MANAGERIAL/IMPACT MANAGERIAL

Nos résultats peuvent apporter un éclairage nouveau pour les dirigeants. Premièrement, le cas montre que partager ses ressources stratégiques avec un concurrent peut générer des effets de levier sur le processus d'innovation. Ces effets de levier sont plus forts si le partenaire est un concurrent, et d'autant plus fort que le concurrent dispose de ressources importantes.

Deuxièmement, notre étude de cas confirme qu'un partage des ressources stratégiques avec un concurrent conduit ce concurrent à tenter de se les approprier et, donc, à les réutiliser d'une manière opportuniste. L'acceptation de ce risque, même quand il se réalise, sans remise en cause du partage des ressources avec le concurrent, est une condition de la réussite de la

stratégie de coopétition. La création d'un système de capture de valeur à partir de royalties réciproques encourage le partage de ressources malgré les risques d'opportunisme.

Cela amène aussi à se comporter de manière contre-intuitive : si l'entreprise aide le coopéteur à se renforcer, elle augmente également ses propres performances. Une stratégie de coopétition implique donc bien une « révolution cognitive » (Brandenburger & Nalebuff, 1996) : dans une stratégie de coopétition, les entreprises sont amenées à partager leurs ressources stratégiques avec leurs concurrents et ainsi à les renforcer.

CONCLUSION

Pour certains auteurs, les stratégies de coopétition comporteraient plus de risques que d'opportunités. La stratégie de coopétition repose sur le partage de ressources stratégiques. Or, ce partage peut être nuisible si le coopéteur réussit à se les appropier et à les réutiliser de façon concurrentielle. Pour d'autres auteurs, les stratégies de coopétition permettraient d'augmenter les capacités d'innovation des entreprises.

L'étude de cas réalisée ici permet de donner un éclairage nouveau à cette réflexion sur les effets de la coopétition. Elle met en évidence les effets de levier liés au partage de ses ressources stratégiques avec un concurrent. Ces effets de levier sont potentiellement d'autant plus forts que le partenaire est un rival puissant et qu'il dispose de ressources importantes.

Ce cas questionne donc la pertinence de l'action intuitive qui consiste à ne pas partager ou à réduire le partage quand le partenaire est un concurrent. Il questionne même le fait d'interrompre le partage quand le concurrent se comporte effectivement de manière opportuniste ! Lorsque le projet porte sur une innovation radicale, le niveau de risque, le coût de financement et le manque de ressources renforcent le coût d'opportunité lié au fait de ne pas partager.

Ce cas montre aussi que les entreprises vont au-delà du fait de partager leurs ressources avec un concurrent et cherchent véritablement à renforcer leur concurrent. Ce résultat est encore plus contre-intuitif que le précédent. Ce comportement est induit par le système de capture de rentes du projet qui dépend de la réussite du coopéteur. Ne pas l'aider génère un coût d'opportunité ou un risque d'échec.

Ces résultats ne sauraient être acceptés que relativement aux limites de la recherche. Il s'agit, en l'occurrence, d'une étude de cas unique. Il convient de garder une certaine prudence quant aux possibilités de généralisation des résultats. Toutefois, nous considérons que le cas

étudié est relativement illustratif de la complexité des stratégies de coopétition pour l'innovation radicale.

Ainsi, nous pensons que les résultats ont une certaine portée pour les projets d'innovation radicale dans les industries aux caractéristiques proches de celles de l'industrie pharmaceutique, c'est-à-dire des industries de hautes technologies globalisées. La validité des résultats sur des industries moins technologiques et moins globales reste à établir. De nouvelles recherches sont donc nécessaires pour mettre en évidence la portée des résultats obtenus dans ce type de contexte.

De façon plus générale, cette étude fait naître de nouvelles perspectives qui méritent des approfondissements. La coopétition est par nature une stratégie risquée, ce qui pousse les dirigeants à la redouter, et ce qui provoque également une méfiance de certains chercheurs quant à son efficacité. Or, l'étude de cas montre que la coopétition peut apporter des bénéfices très importants aux entreprises. Toute la question est donc de déterminer les facteurs qui permettent d'éviter les dommages liés aux stratégies de coopétition pour profiter de ses effets de levier.

Dans ce questionnement, un point central offre de nombreuses pistes de recherche au management de la coopétition. Plusieurs auteurs ont argumenté sur le fait que le management de la coopétition est possible et est nécessaire pour rendre cette stratégie performante (Dameron & Torset, 2014; Fernandez et al., 2017; Le Roy & Czakon, 2016). Quels sont les dispositifs managériaux efficaces pour gérer la coopétition à son avantage ? Cette question reste aujourd'hui relativement ouverte. Répondre à celle-ci semble essentiel pour faire avancer la connaissance sur la coopétition et les conditions de son succès.

Manuscript 2 ~ Technological coopetition: why and how share technology with a competitor?

1. General information

French title: La coopétition technologique: pourquoi et comment partager sa technologie avec son concurrent ?

The author: Sea Matilda Bez

The involvement of the doctoral student Sea Matilda Bez :

- ✓ The entirety of the paper

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Remark: This manuscript is the one we send to Innovations after having been accepted with minor revisions

2. Extended abstract

2.1. The content of the research

- ❖ The management of sharing/protecting dilemma in coopetition: an interesting and important phenomenon

In this manuscript, we investigate firms' management of coopetitive strategy for radical innovation, and more precisely the management of the sharing/protecting dilemma. In factif coopetition can be a highly performing strategy, it can also end as a win-lose relationship. One of the well-documented risks of coopetition is that the competitor internalizes the core technology shared by the focal firm in the coopetitive project. Thus, the focal firm involved in a coopetition strategy faces a dilemma: share its technology to ensure the success of the project, or not share it to protect its technology against any imitation. A whole specific sub-stream of the coopetition literature argues that it is possible to overcome this sharing/protecting dilemma and that the management is the missing link between the strategy coopetition and its performance. Understanding how to manage this dilemma is mandatory in order to be able to unlock the opportunities of coopetition strategies.

- ❖ The drivers of a project design which increase the risk of sharing knowledge: a question without yet an answer

Recently, the management of coopetition literature identified a project design that allows using its technology in a coopetitive project without taking the risk of the competitor internalizing it. More concretely, it consists of implementing a “separate project team” also called a “plug in structure.” The idea is to divide the project into tasks, execute the tasks internally and share only the results of the tasks. As the technology is used only during the internal execution of the tasks, the technology contributes to the project’s success without taking the risk of being internalized by the competitor. If this project design seems to be the relevant and safe solution to overcome the dilemma of sharing/protection, the empirical case reveals that some competitors implement a much riskier project design. They implement a coopetition project team which relies on the sharing of technology. Thus, they prefer to share their technology and take a higher risk of technology internalization. This choice of a riskier project design is puzzling. Why does the firm prefer to implement this riskier project design?

When do firms choose to share their technology with their competitors (instead of only combining the results)?

One response given by recent research is that the firm chooses this riskier design depending on the expected output of the relationship. Firms are constrained to use this riskier project design when the coopetitive project is highly risky and has a higher degree of innovativeness. If this response seems relevant, it has only been confirmed by one unique case study. Moreover, there might be other responses which might depend on other level known to influence the management of coopetition (e.g., the nature of the relationship, the actor characteristics, or the environmental characteristics).

2.2. Our research inquiry

Our research inquiry is composed of two steps. In our first step, we looked through the literature for some criteria which could impact the decision of sharing or not the technology (i.e., choose a more or less risky project design). It appears that there could be multilevel drivers. In our second step, we decided to explore more deeply this puzzling choice of a riskier project design by studying an oil and gas petroleum company, which in the 70s, shifted from implementing only “safer” project design to the implementation of simultaneously “safer” and “riskier” project design.

2.3. Sample of the main contributions

Nº	Insight of the theoretical background	The insight of our case	Insight from the confrontation of the literature and the case
1	<p>There are two substreams of the literature of coopetition.</p> <p>The first one looks for practices to simultaneously reach the common project goal without sharing the technology (e.g., implementing separate project teams) The second one looks for practices to manage the risk of being involved in a project in which coopetitors share their technology (e.g., managing the opportunism in a coopetitive project team)</p>	<p>Total used both practices:</p> <p>Since Total has an attractive technology for its competitor, Total uses these separate project teams.</p> <p>Since the 70s, Total began to implement coopetitive project teams with a high technology sharing</p>	<p>Confirms the empirical relevance of both the research stream.</p> <p>Extends our knowledge by highlighting that none of them is superior to the other. Both can be used simultaneously by the same firm.</p>
2	<p>The choice of a more risky design is due to the expected outcomes of the coopetition relationship (i.e., degree of innovation and risk)</p>	<p>There are lots of reasons which explains why Total began to implement more riskier project teams :</p> <p>environmental characteristics (e.g., technological convergence, the intensity of the competition)</p> <p>nature of the relationship (reciprocal resource attractivity)</p> <p>actor characteristics (e.g., the perception of vulnerability, capacity to integrate the paradox)</p>	<p>Extends the explanation:</p> <p>Renews a competitive advantage strengthen by changes in the environment</p> <p>Positive interdependence to a competitor's resources to generate additional rent</p> <p>A shift from technological efficiency to co-creation of a new technology</p> <p>A coopetitive mindset that accepts the sacrifice of some technology</p>
3	<p>Numerous typologies of coopetition</p>	<p>None of them explain Total choice of sharing or not the technology</p>	<p>Creates a new typology: basic coopetition versus advance coopetition.</p> <p>The former is an easy coopetition strategy to implement and which does not need a coopetitive mindset. The latter relies on a coopetitive mindset which allows the competitor to accept sacrificing some core technology for a bigger intent as renewing their competitive advantage</p>

2.4. The insight for this doctoral research

- ✓ This article is the building blocks to develop a proposition arguing that there are several multi-levels of drivers which explain why firms accept to share their technology in a coopetitive project. It questions the possibility to consider this sharing as unusual in our global context characterized by the convergence of technology, a high intensity of competition and continuous renewal of the technology.
- ✓ In addition, it opens up our way of thinking. Hamel's approach of cooperation which is behind most of the research in coopetition is maybe not always relevant. The focal firm might have a bigger intent that pools together the best-existing knowledge or internalizes the partner's knowledge. Firms might look for the renewal of the technology shared. In that case, allowing the competitor to internalize this technology is from time to time a relevant sacrifice.
- ✓ Our article also highlights the key role of the coopetition mindset. If implementing a separate project team can be done with a competitive mindset, the coopetitive project team based on sharing the technology needs to be a coopetitive one. The top managers need to understand their positive interdependence ("you sink, I sink too"). Only the top managers understanding their simultaneous positive and negative interdependence with their competitor can implement the advance coopetition.

3. The Manuscript 2

ABSTRACT

Sharing technology on a project involving a competitor is counterintuitive. Indeed, the competitor will be able to internalize the technology and use it against the company who initially shared it. While a project design which drastically reduces the risk of internalization of technology exists, some companies prefer to use riskier project designs that promote internalization. Our study explores this intriguing behavior using an in-depth and longitudinal case study from a company that has made a choice to move from only project design deemed "safer," to sometimes using "riskier". Our results show that this choice is strategic and many variables are encouraging this riskier structure. The change of project design reveals a change in the representation of the market relationship between competitors.

Keywords: coopetition, technology sharing, innovation strategy, project design, internalization

RÉSUMÉ

Partager sa technologie dans un projet impliquant un concurrent est contre-intuitif. En effet, le concurrent va pouvoir internaliser la technologie et la réutiliser contre l'entreprise qui l'a initialement partagée. Alors qu'il existe des structures projets réputées plus sûres car elles permettent de réduire drastiquement le risque d'internalisation des technologies, certaines entreprises préfèrent avoir recours à des structures projets plus risquées qui favorisent l'internalisation. Notre étude explore ce comportement intrigant à l'aide d'une étude de cas approfondie et longitudinale d'une entreprise qui a fait le choix de passer d'une simple structure projet, réputée plus « sûre », à des structures parfois « plus risquées ». Nos résultats montrent non seulement que ce choix est stratégique, mais qu'il existe de nombreuses variables encourageant cette structure plus risquée. Ce changement de structure de projet révèle un changement de représentation des relations de marché entre les concurrents.

Mots-clés : coopétition, partage de technologie, stratégie d'innovation, structure projet, internalisation des technologies

INTRODUCTION

La coopération entre entreprises concurrentes pour développer une nouvelle technologie est une stratégie de plus en plus courante (Gnyawali, Park, 2011). On retrouve cette stratégie de coopétition technologique dans des domaines variés allant des semi-conducteurs (Browning, *et al.*, 1995) à la télécommunication (Yami, Nemeh, 2014), en passant par l'aérospatiale (Fernandez, Le Roy, 2015) et la pharmaceutique (Bez *et al.*, 2014). Les recherches antérieures ont permis le développement des connaissances sur la coopétition technologique (e.g., Fernandez, Chiambaretto, 2016; Gnyawali, Park, 2011; Le Roy, Fernandez, 2015; Park, Russo, 1996; Ritala *et al.*, 2015). Ces recherches mettent en évidence les difficultés liées au partage de technologie entre concurrents. En effet, partager sa technologie avec un concurrent signifie la rendre accessible et potentiellement réutilisable par ce concurrent (Park, Russo, 1996). Par suite, les coopétiteurs doivent arbitrer entre le fait de partager pleinement leurs technologies pour augmenter les possibilités d'innovation, et le fait de limiter ce partage des technologies pour contrôler le risque de voir ces technologies réutilisées par un concurrent (Estrada *et al.*, 2016; Ritala *et al.*, 2015). Toute la question est donc de déterminer pourquoi et comment partager la technologie entre concurrents.

Dans ce questionnement, la littérature a identifié deux structures de projet pour manager la coopétition technologique : l'équipe projet séparée et l'équipe projet coopétitive (Fernandez *et al.*, 2017). Ces deux structures de projet font référence à deux manières différentes de faire de la coopétition technologique. En effet, même si elles s'accordent sur le besoin d'utiliser et de combiner les technologies stratégiques des concurrents, elles s'opposent sur la nécessité de partager la technologie (*i.e.*, mettre ou non des barrières organisationnelles à l'accès et à la réutilisation de la technologie). Il y a donc un débat sur la nécessité de partager la technologie (Fernandez *et al.*, 2017).

En résumé, la controverse sur les déterminants et les pratiques du partage de technologie est loin d'être close. Cette recherche se propose de contribuer à ce débat en étudiant de façon approfondie un cas de coopétition technologique. L'étude de cas choisie porte sur les projets d'exploration et de production (E&P) de pétrole et de gaz de l'entreprise Total.

Cette recherche contribue à la connaissance sur trois points. Premièrement, elle confirme l'existence de deux managements différents en matière de partage de technologie (*i.e.*, l'équipe projet séparée et l'équipe projet coopétitive). Deuxièmement, elle montre que les déterminants du partage de la technologie entre concurrents sont nombreux et multi-niveaux. In fine, cette recherche identifie une nouvelle typologie de la coopétition distinguant

la coopétition basique de la coopétition avancée. Cette nouvelle typologie complète les typologies existantes et améliore la compréhension de la coopétition.

LA COOPÉTITION TECHNOLOGIQUE ET LE PARTAGE DE LA TECHNOLOGIE STRATÉGIQUE

La coopétition est avant tout une révolution cognitive dans laquelle la coopération et la compétition peuvent se produire simultanément entre des acteurs, qui deviennent des partenaires-adversaires (Brandenburger & Nalebuff, 1996; Gnyawali et al., 2016). Cette simultanéité de la compétition et de la coopération est le fondement même de la notion de coopétition. Elle est à la base d'un avantage concurrentiel (Quintana-García & Benavides-Velasco, 2004; Ritala & Hurmelinna-Laukkonen, 2009). En effet, la combinaison des capacités et des ressources de concurrents directs génère plus de valeur qu'une entreprise seule ou qu'une entreprise avec d'autres partenaires non-concurrents (Bouncken & Fredrich, 2012; Gnyawali & Park, 2011). Les recherches antérieures ont mis en avant la variété des activités pouvant concerner la coopétition : allant de la R&D à l'innovation technologique, en passant par la logistique, la production, voire même la vente (Bengtsson, Kock, 2000; Pellegrin-Boucher *et al.*, 2013). Un des résultats issu de cette littérature est le rôle clé de la coopétition dans le développement de nouvelles technologies (Bouncken, à paraître; Gnyawali, Park, 2011). Le développement d'une nouvelle technologie est un processus coûteux, incertain et long. De plus, la nouvelle technologie développée peut être rapidement remplacée par une autre technologie encore plus performante avant même que les investissements ne soient rentabilisés. Face à ces défis, partager et combiner ses technologies entre concurrents est une solution pour gagner en rapidité de mise sur le marché, réduire le coût de développement ainsi que le risque de développement (Ritala & Hurmelinna-Laukkonen, 2009). Dit autrement, partager ses technologies maximise les chances de succès du développement d'une nouvelle technologie. En utilisant une approche par les ressources, les recherches antérieures vont même plus loin et soutiennent que le partage doit impliquer des ressources stratégiques pour profiter de la valeur créée par la présence simultanée de coopération et de compétition (Gnyawali & Charleton, 2017). Une entreprise ne devient attractive pour un projet de coopétition technologique qu'à partir du moment où elle possède et accepte de partager ses technologies qui lui génèrent des rentes (Fernandez, Chiambaretto, 2016; Gnyawali, Charleton, 2017). De plus, la valeur capturée dans une stratégie de coopétition technologique dépend directement de la valeur créée et donc des ressources stratégiques apportées initialement. Ainsi, si une entreprise ne partage pas une de ses

technologies stratégiques, elle réduit la valeur capturée du projet commun. Par exemple, lorsque les deux concurrents de l'aérospatiale Astrium et TAS se sont alliés pour codévelopper un satellite innovant, le projet n'atteignit pas la performance attendue. Les équipes opérationnelles refusaient de partager les technologies nécessaires pour la cocréation de ce satellite radicalement nouveau. Elles jugeaient ces technologies trop stratégiques pour être partagées. Ce n'est qu'à partir du moment où elles ont réussi à partager les technologies stratégiques que le projet a pu aboutir à un satellite innovant (Fernandez & Le Roy, 2010).

Néanmoins, si ce partage de technologie permet à une entreprise de capturer de la valeur et même de développer un avantage concurrentiel, ne pas partager ses technologies est aussi une stratégie pertinente. En effet, le partage de technologie dans une stratégie de coopétition technologique peut simultanément nuire à l'avantage concurrentiel actuel ou futur de l'entreprise. Bouncken et Kraus (2013) parlent des deux côtés d'une même pièce : il n'est pas possible de bénéficier des avantages du partage de technologie avec un concurrent sans prendre le risque d'une détérioration de son avantage concurrentiel actuel ou futur. Partager sa technologie avec un concurrent implique de prendre le risque de subir un comportement opportuniste du concurrent (S. H. Park & Russo, 1996), une fuite de connaissances involontaire (Dyer & Singh, 1998) et une course à l'apprentissage (Hamel, 1991). Par exemple, lors de la coopération entre les deux groupes pharmaceutiques concurrents, Sanofi et Bristol Myers Squibb, ce dernier a utilisé les connaissances et technologies partagées par Sanofi pour tenter de développer un produit concurrent à celui qu'ils développaient ensemble (Bez et al., 2014).

Ainsi, avant de s'impliquer dans une relation de coopétition, les entreprises sont confrontées à un paradoxe. Elles peuvent partager leur technologie avec un concurrent pour maximiser la valeur créée, tout en prenant le risque de s'affaiblir à long terme en rendant leur technologie accessible et réutilisable par le concurrent. Ou bien, elles décident de ne pas partager pour ne pas risquer une fuite involontaire de technologie, prenant alors le risque de réduire la valeur potentielle créée.

LE MANAGEMENT DE LA COOPETITION : PARTAGER OU NE PAS PARTAGER SA TECHNOLOGIE

Un courant de recherche spécialisé sur le management de la coopétition s'est développé suite aux résultats empiriques ambivalents de l'impact de la coopétition sur le développement de nouvelles technologies (Arranz & de Arroyabe, 2008; Nieto & Santamaría, 2007; Santamaria & Surroca, 2011). Ce courant repose sur l'idée que le management est le lien

manquant entre le coopétition et la performance de la stratégie de coopétition (Le Roy & Czakon, 2016). Sans un management adéquat, la relation théorique gagnant-gagnant de la coopétition pourrait devenir une relation gagnant-perdant (S. H. Park & Russo, 1996). L'objectif de ce courant de recherche est de comprendre comment maximiser les bénéfices de la coopétition sans partager les technologies stratégiques (*i.e.*, sans prendre le risque de perte dû à l'internalisation des technologies par le concurrent). Baumard (2010, p.93) parle de réussir à « partager sans partager ». Plus concrètement, Fernandez et Chiambaretto (2016) montrent qu'il est possible de monter des parois de protection qui permettent de contribuer au projet avec sa technologie sans prendre le risque de l'internalisation.

Une des contributions de ce courant est d'avoir identifié une solution organisationnelle qui permette d'utiliser simultanément les technologies des concurrents sans prendre le risque de l'internalisation de ces dernières par le concurrent (*e.g.*, Faems, Janssens,, Van Looy, 2010; Fernandez *et al.*, 2017; Oxley, Sampson, 2004). Cette dernière consiste à mettre en place une équipe projet séparée (Fernandez *et al.*, 2017) aussi connue sous le nom de structure « plugin » de Hamel (1991). Concrètement, le projet commun est segmenté en tâches ou en modules, puis chaque coopétiteur effectue en interne les tâches qui lui sont attribuées. A aucun moment la technologie n'est partagée. Seul les *outcomes* de son utilisation le sont. Cette structure limite l'accès à sa technologie par le concurrent tout en contribuant activement au succès du projet. Cette structure est présentée comme la structure optimale contre le risque d'internalisation des connaissances par le concurrent (Faems *et al.*, 2010).

Cependant, les études exploratoires, sur des cas de coopétition réussis, mettent aussi en avant des structures de projet différentes : *équipe projet coopétitive* (Fernandez *et al.*, 2017). Dans une équipe projet coopétitive, les équipes des deux entreprises concurrentes sont mélangées et travaillent ensemble quotidiennement. Cette organisation implique des interactions intenses et régulières basées sur le partage réciproque de technologies. Cette structure de projet est contre-intuitive car, en augmentant les interactions entre concurrents, elle augmente le risque d'internalisation des technologies par le concurrent.

Cependant, la coexistence de ces deux structures de projet a été confirmée empiriquement par une étude de cas sur les projets de coopération entre les deux concurrents de l'aérospatiale Airbus et Thalès (Fernandez *et al.*, 2017), mais aussi dans l'industrie de la défense décrite par Depeyre, Dumez (2007). En effet, une relecture de l'étude de cas de Depeyre, Dumez

(2007)⁴⁹ sous l'angle du partage de technologies permet d'identifier deux partages différents de technologie. La première forme consiste à ne pas partager les technologies. La coopération entre concurrents se base sur des concurrents fournissant des composants bien spécifiques (*i.e.*, premières formes de coopétition datant des années 1993 à 2000). Par la suite, face à un projet complexe impliquant une technologie tellement nouvelle, une deuxième forme de coopétition basée sur le partage de technologie a été identifiée. Cette dernière recherche l'interaction intense et le partage de technologie entre les deux équipes. L'interaction est tellement importante que les « deux firmes vont apprendre l'une de l'autre au cours de leur travail commun et chacune va pouvoir, au long de cet apprentissage, compléter en dynamique ses capacités avec celles qui lui manquaient » (Depeyre & Dumez, 2007, p. 108). Cette dernière étude de cas illustre bien les enjeux différents des stratégies de coopétition technologique basées sur le partage ou l'absence de partage de technologie. Si les entreprises font le choix de partager leurs technologies, elles favorisent le développement d'une technologie totalement nouvelle, mais elles prennent le risque de renforcer le concurrent. Fernandez et al. (2014) parlent d'armer son concurrent avec ses propres armes.

Jusqu'à présent, peu de recherches en coopétition ont exploré les déterminants du partage, ou non, de technologie dans les relations de coopétition technologique (à l'exception de certains travaux comme Fernandez *et al.*, 2017). La littérature sur le management de la coopétition s'est principalement attachée à discuter la capacité ou non des individus à intégrer le paradoxe et à en déduire des principes de management. A ce stade, il devient intéressant de comprendre quels sont les déterminants de ce partage ou non de technologie.

L'ÉTUDE QUALITATIVE

L'objectif de cette recherche est de mieux comprendre les déterminants du partage ou du non partage de technologie dans les stratégies de coopétition technologique. Afin d'identifier les déterminants et d'avoir une compréhension dynamique de ces différentes modalités de partage, nous avons étudié les stratégies de coopétition technologique dans les activités d'exploration et production (E&P) du groupe pétrolier Total, de sa création à aujourd'hui. L'étude de cas est la méthode recommandée quand l'objectif est de comprendre les aspects dynamiques et paradoxaux de la coopétition (Fernandez & Chiambaretto, 2016; Gnyawali &

⁴⁹ L'étude de cas de Depeyre, Dumez (2007) n'avait pas pour objectif d'étudier le partage de technologie. Ils analysaient les interactions stratégiques entre client et fournisseur afin de mettre en avant le rôle du client dans le développement du phénomène de coopétition.

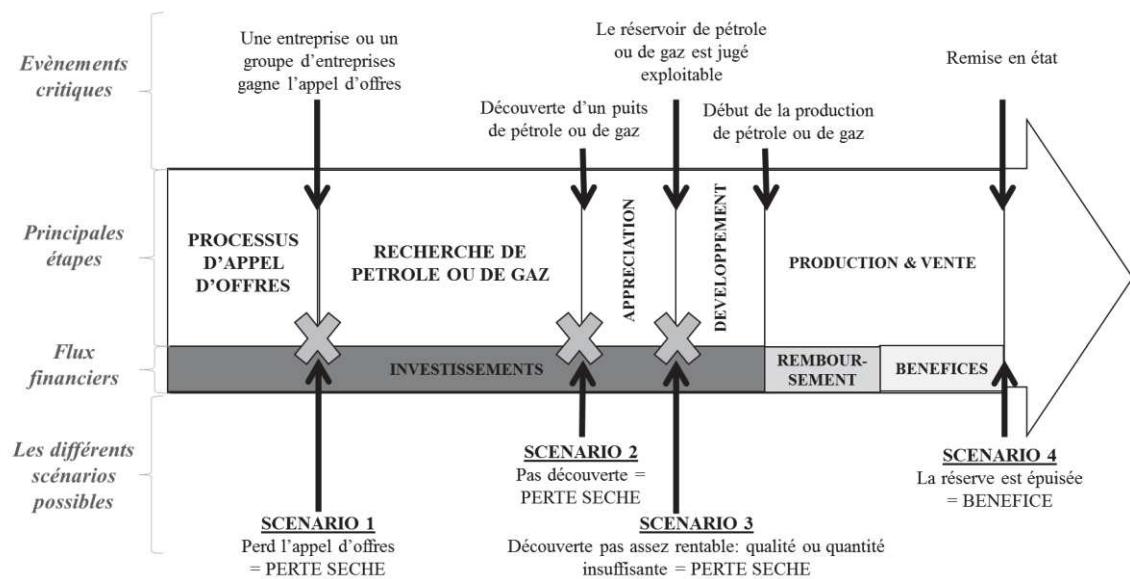
Park, 2011). Une approche longitudinale permet une compréhension holistique du phénomène à étudier (Dumez, 2013; Eisenhardt, 1989; Yin, 2014).

L'étude de cas choisie porte sur les projets d'E&P de pétrole et de gaz de l'entreprise Total. Total compte plus de soixante-dix années d'expérience en matière de coopération technologique. Elle fait donc figure de modèle en matière de coopération réussie entre grands groupes concurrents, nécessitant le développement d'une nouvelle technologie. De plus, dans les années 70, elle devient même emblématique grâce à ses choix stratégiques ; de simples structures de projet dites « sûres » (*i.e.*, équipe projet séparée), Total est passée par la suite à des structures parfois plus risquées (*i.e.*, équipe projet commune). Ces deux structures continuent même de coexister au sein de l'organisation Total. De plus, en choisissant d'étudier les activités d'E&P de pétrole et de gaz d'une entreprise comme Total, nous étudions des projets longs, coûteux, complexes et risqués :

- Longs : la durée moyenne des projets d'E&P réussis s'étend sur une vingtaine d'années.
- Coûteux : quelle que soit l'issue du projet, les montants investis sont importants. Avant de trouver un réservoir de pétrole potentiellement exploitable, une entreprise fore 2 à 10 puits. Or, un puits sur terre coûte entre 25 et 40 millions d'euros, et un puits off-shore (*i.e.*, un puits haute mer) coûte entre 650 et 900 millions d'euros. Une campagne d'exploration, (*i.e.*, la partie « investissement » en gris foncé sur la figure 1) peut représenter un coût allant de 200 millions d'euros à 50 milliards d'euros. En cas d'échec, le montant investi est une perte sèche.
- Complexes et risqués : car la probabilité d'arrêt du projet avant d'être considéré comme réussi est élevée (cf. figure 1 - les croix matérialisent trois événements critiques conduisant à l'arrêt du projet).

Dans des projets longs, coûteux, complexes et risqués, la technologie joue, par définition, un rôle clé dans l'avantage concurrentiel de l'entreprise.

Figure 1 – L’activité d’E&P : un processus long, coûteux et risqué



Source : auteur

Notre étude de cas repose sur une collecte de données secondaires et primaires. Ces derniers ont permis de créer un résumé narratif des stratégies d’E&P de Total, de sa création en 1920 jusqu’à aujourd’hui (cf. tableau 2). Pour s’assurer de la validité interne de nos données, chaque évènement critique ou modalité de partage identifié, a été triangulé par des sources différentes.

Dans le but de ne pas biaiser ce dernier, nous avons constitué le résumé narratif avant de définir la grille d’analyse de cet article (Dumez, 2016). La grille d’analyse utilisée est une grille inspirée de la carte conceptuelle de Dorn et al. (2016). En effet, à partir d’une synthèse systématique de la littérature de la coopétition, les auteurs ont identifié 4 niveaux pouvant impacter les pratiques de management de la coopétition : (1) la nature de la relation, (2) les outputs de la relation, (3) les caractéristiques des acteurs et, (4) les caractéristiques de l’environnement.

Tableau 2 - Nature et source des données

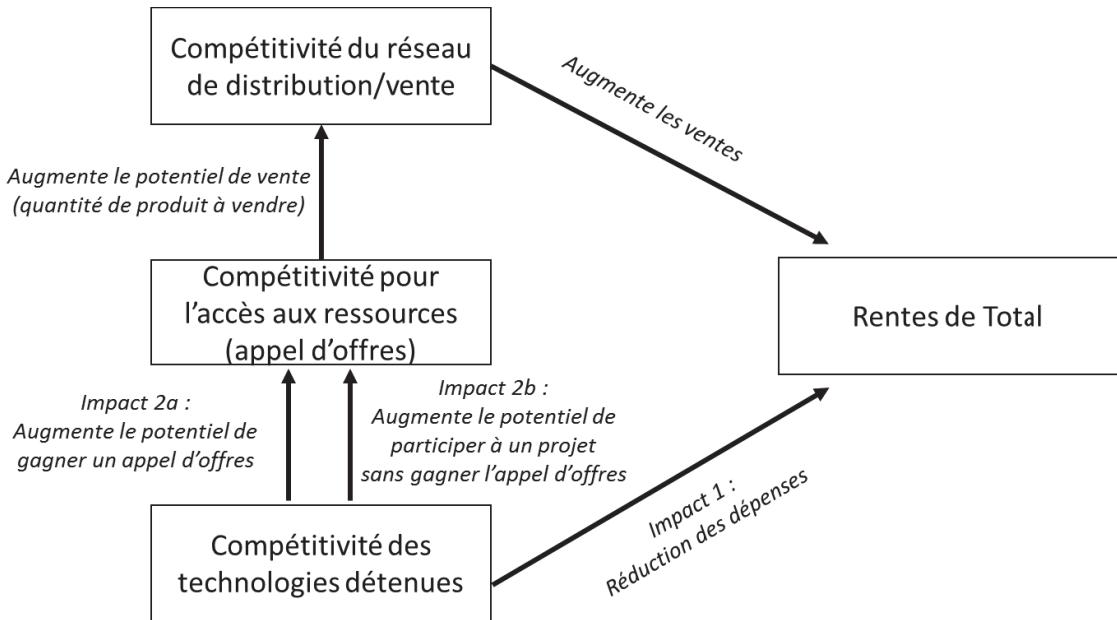
Nature des données	Détails
Entretiens	<p>Nombre : Vingt personnes (dont une avec laquelle nous avons fait plusieurs entretiens).</p> <p>Modalité de collecte : Entretiens semi-directifs réalisés en face à face ou par téléphone.</p> <p>Durée moyenne : 50 minutes (à l'exception d'une des personnes avec laquelle plusieurs entretiens ont été effectués pour une durée totale de 9h).</p> <p>Trois niveaux de responsabilité :</p> <ul style="list-style-type: none"> - quatre entretiens avec les hauts dirigeants, au sein de la maison mère de Total, qui interviennent dans les décisions de coopération dans les projets d'exploration et production au niveau global ; - sept entretiens avec des managers d'actifs spécifiques, qui ont une vision globale et une influence sur les décisions au niveau de l'ensemble des projets avec un partenaire dans une zone géographique ; - neuf entretiens avec des opérationnels qui participent aux projets d'exploration et production avec des partenaires.
De l'observation	Deux jours d'immersion dans une formation au sein de Total concernant notre objet de recherche, en l'occurrence les consortiums avec des partenaires externes dont les concurrents.
Livre publié et articles académiques	<p>Livre de l'association internationale des négociateurs de pétrole écrit par Walker en 2010,</p> <p>Livre « The Petroleum Handbook » publié en 1986 par Shell.</p>
Les rapports annuels	Rapports annuels de Total de 2002 à 2016.
Articles de presse et base de données de Total	<p>Pour approfondir nos connaissances sur les éléments issus des entretiens ou des données secondaires :</p> <ul style="list-style-type: none"> - Des articles de l'actualité de Total entre 2002 et 2016, - La base de données virtuelles de Total constituée à partir d'archives du Groupe Total (disponible sur internet).

Source : auteur

LA TECHNOLOGIE COMME NERF DE LA GUERRE

Dans les activités d'exploration et production de pétrole et de gaz, Total est une entreprise pétrolière en concurrence avec les autres entreprises pétrolières comme Exxon Mobil, Shell, Chevron, BP ou ConocoPhillip. Dans leur rivalité, la technologie est le nerf de la guerre. L'avantage concurrentiel généré par la possession d'une technologie de pointe est triple : (1) diminution du risque et des investissements nécessaires dans un projet d'exploration et production (E&P); (2) augmentation des chances de gagner un appel d'offres; (3) augmentation des opportunités de participer à des projets d'exploration et production sans avoir gagné l'appel d'offres (cf. figure 2).

Figure 2 – Les déterminants des rentes économiques de l'entreprise Total



Source : auteur

Par exemple, Total possède une technologie stratégique permettant de modéliser avec plus de précision les sous-sols pour identifier de potentiels réservoirs de pétrole. Pouvoir modéliser avec plus de précision les sous-sols permet de réduire le nombre de puits forés avant la découverte d'un réservoir. Cette technologie est donc stratégique car elle augmente les chances de Total de trouver un réservoir de pétrole rapidement et réduit le niveau d'investissement nécessaire. Cette capacité à augmenter les chances de succès et de réduire les coûts va attirer les Etats et donc augmenter les chances de l'entreprise de gagner les appels d'offres. De plus, même les concurrents peuvent être intéressés et vouloir utiliser la technologie de l'entreprise dans les projets où elle n'est pas présente. Ils proposeront donc à l'entreprise de devenir actionnaire dans le projet et d'apporter sa technologie. Ainsi, avoir une technologie stratégique augmente la probabilité de créer de la valeur dans un projet mais aussi de participer à des projets desquels ils auraient été exclus.

La technologie est bien le nerf de la guerre pour une entreprise comme Total. Développer de nouvelles technologies permet d'avoir un avantage concurrentiel et de générer des rentes dans les projets d'E&P.

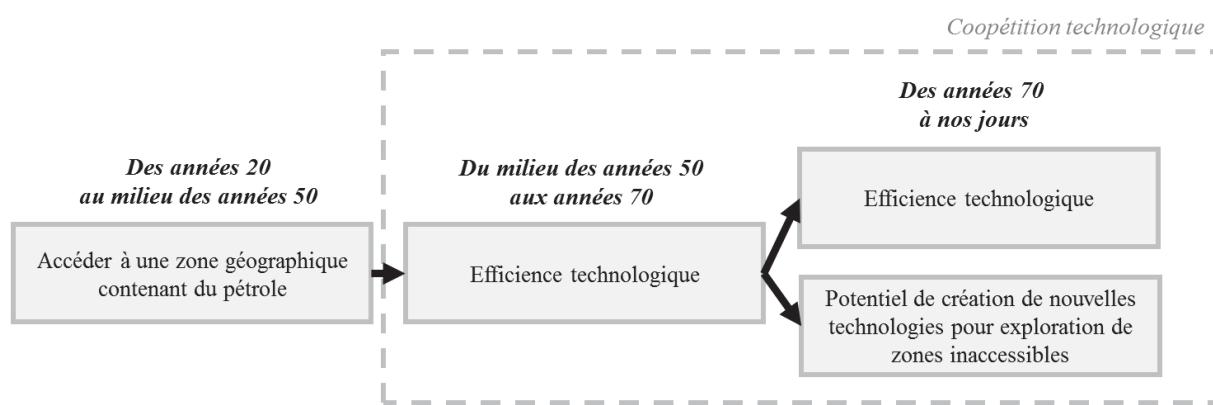
L'ÉVOLUTION DES STRATÉGIES DE COOPÉRATION DE TOTAL AVEC SES CONCURRENTS

Des années 20 au milieu des années 50, Total n'a pas de stratégie de coopération technologique. Mais cette période est clé car elle permet à Total de développer sa première

technologie stratégique. Ce n'est qu'à partir du milieu des années 50 que Total commence à effectuer des stratégies de coopération technologique : Total commence à combiner ses technologies avec celles de ses concurrents. Cette combinaison assure l'efficience technologique de leurs projets d'E&P. Puis dans les années 70, en parallèle à cette première coopération technologique, Total dépasse la combinaison de technologies pour mettre en place un processus de co-création de technologies avec ses concurrents. Dans les zones considérées comme inaccessibles, faute de technologie adéquate, Total coopère avec certains de ses concurrents pour co-créer une nouvelle technologie leur permettant ensemble d'explorer et de produire du pétrole dans les zones théoriquement inexploitables (*e.g.*, en haute mer).

Cette section résume de manière historique l'évolution des stratégies de coopération de Total et sera divisée en trois parties pour suivre les trois grandes périodes identifiées (cf. figure 3).

Figure 3 - Evolution des stratégies de coopération avec des concurrents de l'entreprise Total



Source : auteur

Les premières formes de coopération et la création d'une technologie stratégique (1920-1950)

Dès sa création en 1924, Total coopère avec ses concurrents. Cette coopération n'implique pas le développement de nouvelles technologies mais consiste uniquement à accéder au pétrole produit.

L'entreprise française Total, qui à l'époque s'appelle « la compagnie pétrolière française », se retrouve face à un dilemme : elle veut produire son propre pétrole mais elle ne peut pas accéder à des sols contenant du pétrole, ni en France, ni à l'étranger. En effet, le sol français

contient peu de pétrole⁵⁰ et les « majors » de l'époque⁵¹ détiennent déjà l'ensemble des territoires étrangers connus pour leurs réservoirs de pétrole. Lors d'un de nos entretiens, un haut dirigeant nous a expliqué : « *Il n'y avait plus d'espace à conquérir, le territoire était déjà en partie réparti [par les majors].* »

Après la première guerre mondiale, l'entreprise qui deviendra Total réussit à entrer dans un projet d'E&P. En effet, suite aux indemnités de guerre, la banque allemande donne ses parts dans l'entreprise l'« Iraq Petroleum Compagnie » (IPC)⁵². Cette participation est stratégique pour la future entreprise Total⁵³ car l'IPC détient le monopole sur l'exploration et la production en Mésopotamie. Cette entreprise sans but lucratif a pour objectif de produire du pétrole pour les entreprises actionnaires. Les entreprises actionnaires sont des entreprises qui s'affrontent farouchement sur le marché mondial du pétrole, mais qui au sein du projet, se partagent les droits de propriété et les décisions stratégiques (cf. figure 4). En 1928, lors de la découverte du premier gisement de pétrole, IPC est détenu à 23,75% par la « Near East Development Corp. » (NPC)⁵⁴, la Royal Dutch Shell et la future entreprise Total⁵⁵; et les 5% restant sont détenus par le fondateur. A cette époque, les premières coopérations de Total avec ses concurrents n'impliquent pas de développer une technologie en commun et Total reste uniquement un actionnaire (pas l'opérateur) (cf. figure 4, Total en tant qu'une des entreprises actionnaires est représentée par la couleur gris foncé).

Puis, l'entreprise qui deviendra Total veut s'émanciper de ses concurrents. Elle décide alors d'explorer seule de nouveaux territoires dont les potentialités en matière de pétrole sont encore inconnues. Son objectif est de pouvoir répondre à la totalité de la demande française et donc d'accroître sa production de pétrole. L'entreprise se tourne alors vers les seuls territoires accessibles pour Total : la France et ses colonies françaises. Sur le sol français, la persévérance paye car en 1941 Total découvre du pétrole dans la commune de Lacq à 600 mètres du sol. Le gisement de pétrole de Lacq est exploité de 1950 à 1955 et produit 1 460 000 tonnes ; il devient le premier gisement français. Mais, au milieu des années 50, le

⁵⁰ Les recherches de pétrole sur le sol français entre 1920 et 1935 révèlent que ce dernier est pauvre en pétrole à l'exception de quelques petites découvertes et d'un gisement de gaz naturel important mais très difficile techniquement.

⁵¹ ExxonMobil, Shell, Chevron, BP ou ConocoPhillip

⁵² A l'époque le nom de IPC était « Turkish Petroleum Company (TPC) ».

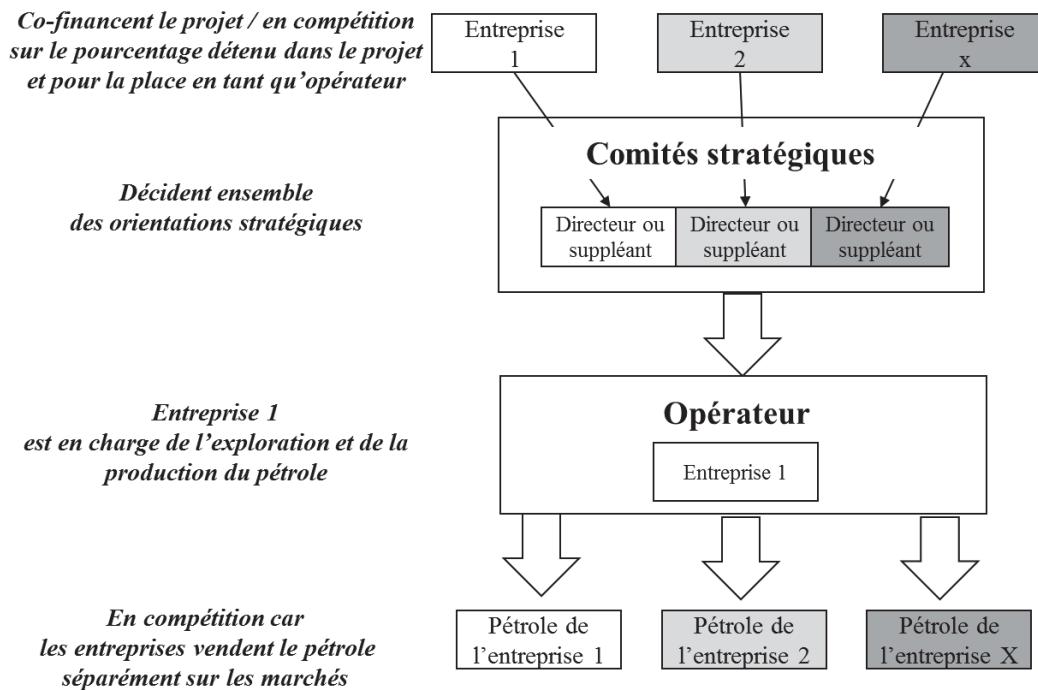
⁵³ Plus précisément, c'est suite à la réception de ces parts, que la « compagnie pétrolière française » est créée.

⁵⁴ Un consortium de cinq entreprises pétrolières américaines.

⁵⁵ A l'époque, la Compagnie française des pétroles (CFP).

puits fournit de moins en moins de pétrole. Suite à la découverte de ce puits de pétrole, des recherches sont conduites aux alentours et en 1951, du gaz à très forte pression est alors découvert à 3545 mètres. Cependant Total rencontre des problèmes techniques pour descendre à cette profondeur : le gaz dévore les parois des tubes d'acier.

Figure 4 - Les projets de coopération entre concurrents sans partage de technologie



Source : auteur

Au regard de la difficulté technologique et se sentant dépassée techniquement, le premier réflexe de l'entreprise Total a été de chercher à coopérer avec ses concurrents qui avaient plus d'expérience. Finalement, Total gère à 100% ce projet non par choix mais parce que les potentiels partenaires ont refusé de coopérer, jugeant la ressource impossible à exploiter. Total continue à faire des recherches seul et réussit à concevoir, grâce aux ingénieurs de Vallourec un acier capable de résister à la corrosion et imagine un outil de désulfuration du gaz. En 1957, l'entreprise réussit à dépasser la contrainte technique et à inaugurer la plus grande usine de gaz d'Europe.

Total combine ses technologies avec celles de ses concurrents (1950-1970)

Jusqu'aux années 1950, la répartition des zones géographiques contenant du pétrole était figée par des enjeux politiques et historiques liés aux contrats de concessions et l'existence de colonies. A la fin des années 1950, les entreprises internationales prennent conscience de la nécessité de diversifier leur offre de pétrole. En effet, la majorité des entreprises constate qu'augmenter les projets d'E&P permet de lutter contre la diminution de production dans leur pays d'origine et de réduire leur dépendance à l'OPEC.

L'indépendance des colonies arrive à point nommé, la compétition se libère en partie des biais politiques et historiques. L'accès aux territoires géographiques est donné aux entreprises les plus avantageuses pour le pays, c'est-à-dire aux entreprises capables de maximiser l'exploitation à moindre coût. Une compétition féroce commence pour l'obtention de ces zones géographiques. Dans le livre qui relate l'histoire de l'AIPN, nous apprenons que « *les fondateurs de AIPN se sont fait les dents en termes de négociation dans ces pays [les anciennes colonies]* » (Walker, 2010).

A cette époque, grâce au projet d'E&P dans la commune de Lacq, l'entreprise Total a démontré sa capacité à innover et possède désormais une technologie de pointe supérieure à celles des autres majors (*i.e.*, acier capable de résister à la corrosion). Ainsi, Total devient un adversaire de taille et concurrence les majors dans les nouveaux appels d'offres. A plusieurs reprises, Total gagne seul certains appels d'offres.

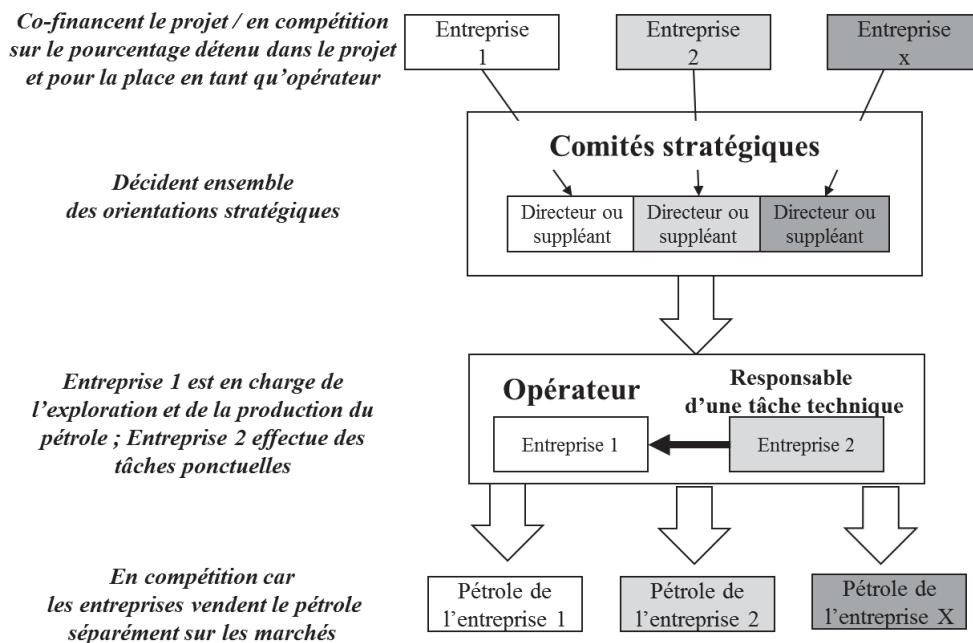
Cependant, plus la zone géographique contient potentiellement du pétrole facile d'accès, plus la compétition est intense. Or, la compétition au niveau technologique est tellement forte et évolue si vite qu'un investissement intense en R&D n'est pas suffisant pour maintenir une supériorité technologique. Pour gagner les appels d'offres, l'objectif devient alors de constituer l'offre la plus intéressante pour les Etats en s'associant avec les concurrents possédant des technologies complémentaires. L'offre commune est bien supérieure en technologie à l'offre que Total ou ses partenaires/concurrents auraient pu proposer seule. En cas de gain de l'appel d'offre, toutes les entreprises de l'offre gagnante financent le projet et bénéficient du pétrole. L'entreprise la plus avancée techniquement devient l'opérateur et prend en charge les opérations d'E&P. L'opérateur est conscient qu'il ne détient pas toutes les meilleures technologies et délègue certaines tâches à d'autres entreprises du projet en fonction de leurs compétences technologiques. Ces dernières effectuent la tâche dans leur entreprise et ensuite partage les résultats (cf. figure 5). Par exemple, l'entreprise Total possède un des

ordinateurs les plus puissants du monde. Lorsque l'entreprise Total n'est pas opérateur, l'opérateur lui confie souvent les calculs de modélisation. Total effectue les calculs de modélisation en interne et ne partage que les résultats.

Se voir confier une des tâches est source d'avantage concurrentiel. En effet, si une technologie a été choisie dans un projet, cela devient une preuve que les concurrents valident la supériorité de cette technologie ou de ce savoir-faire. Concrètement, quand Total réussit à être l'opérateur, ou à avoir ses technologies utilisées dans des projets d'E&P réussis, cela certifie de manière empirique leur bon fonctionnement, et cela affirme leur supériorité. Un des directeurs interviewés soutient : « *Dans ce métier être opérateur c'est mieux que de ne pas l'être. C'est une vitrine technologique [qui] permet de se développer, de valoriser nos compétences* ». Ainsi, la compétition pour les appels d'offres n'est que la partie émergée de la compétition entre les grands groupes pétroliers. Une compétition existe au sein des consortiums. Dans ces derniers, les entreprises sont en compétition soit pour être l'entreprise opératrice, soit pour le choix de la technologie/savoir-faire qui sera utilisée dans le projet. Au regard du risque et du coût financier d'un projet d'E&P, tous les partenaires ont intérêt à utiliser la meilleure technologie et à confier le projet au meilleur opérateur. Par exemple, en mars 2016, le projet d'exploration et de production commencé en 1990 au Kazakhstan ne produisait toujours pas de pétrole alors que les entreprises avaient investi plus de 50 milliards de dollars (montant cinq fois supérieur au devis initial)⁵⁶.

⁵⁶ Article de presse Capital (2016), Eric Wattez. (2016, Mars 7), « 50 milliards engloutis, zéro baril de pétrole, le désastre du gisement de Kashagan ».

Figure 5 - Coopération technologique entre concurrents
(additionnent la meilleure technologie de chacun des participants)



Source : auteur

Combiner les technologies avec un concurrent permet donc à Total d'augmenter son attractivité. Cela augmente aussi ses chances d'accéder à de futurs projets d'exploration et production. Si cet avantage est clé, ce n'est pas le seul. La combinaison des technologies a pour premier avantage d'assurer une efficience technologique. En outre, elle augmente la probabilité de succès et de profit du projet. Ainsi, même quand Total a été le seul à percevoir le réel potentiel d'un bloc encore méconnu, et qu'il a réussi à gagner l'appel d'offres seul, il peut proposer aux concurrents battus lors de l'appel d'offres de collaborer. La collaboration est presque considérée comme obligatoire pour optimiser l'exploration et l'exploitation de larges projets complexes. A ce propos, un manager interviewé soutient que : « *Mais on a quand même chez Total quelques politiques de champ où l'on est tout seul. Un autre cas de figure, on peut commencer à 100 % TOTAL. Le Comex [dit] OK on peut y aller. Et pendant l'exploration on a des informations et on se dit "oh, là là c'est gros" [et donc on cherche si un autre groupe international aimeraient participer].* » Inversement, même si Total a été battu lors de l'appel d'offres, le gagnant de l'appel d'offres peut proposer à Total d'intégrer le projet à condition qu'il accepte de combiner sa technologie avec celle du concurrent.

Ce comportement de coopération entre concurrents est accentué par le comportement des Etats. Au regard de l'augmentation de la demande pour les appels d'offres, les Etats prennent conscience de l'avantage qu'ils ont en détenant l'accès aux zones géographiques. Ils en

viennent même à modifier les contrats pour ne plus supporter le risque de l'échec des projets. A la suite de ce changement de contrat, les projets d'E&P deviennent instantanément plus risqués pour les entreprises puisque le risque d'échec n'est plus partagé avec l'Etat hôte. L'augmentation du niveau de risque favorise aussi le recours aux technologies des concurrents pour manager le risque.

La cocréation de nouvelles technologies avec un concurrent (1970 - a aujourd'hui)

A partir des années 1970, la stratégie poursuivie par Total et les quatre autres grands groupes pétroliers consistent à se spécialiser sur un nouveau marché : le marché de l'E&P de pétrole difficilement accessible (*e.g.*, l'exploration en haute mer). Cette stratégie est rendue nécessaire par l'ouverture et l'intensification de la compétition pour les zones géographiques contenant potentiellement du pétrole. Les entreprises nationales de pétrole commencent à maîtriser les technologies nécessaires à l'exploitation des gisements et évincent progressivement les majors des gisements les plus rentables. Total craint que ces entreprises nationales de pétrole s'intéressent de plus en plus à l'exploitation de gisement en dehors de leurs territoires, et viennent les concurrencer directement dans les appels d'offres. Entre 2004 et 2013, la production des cinq *majors*, Exxon Mobil, Shell, BP, Chevron et Total a diminué de 25% (Greggio & Mafféï, 2015).

Total et les grands groupes des gisements doivent donc réussir à se différencier de ces entreprises nationales qui les rattrapent au niveau technologique. Un des moyens est de continuer les stratégies de combinaison des technologies entre majors. En combinant leurs dernières technologies stratégiques, l'efficience technologique reste un avantage concurrentiel. Une autre stratégie mise en place par Total et les autres majors consiste à se spécialiser dans des zones difficiles d'accès, c'est-à-dire des zones qui n'ont jamais été explorées à cause de la complexité de l'exploration, et de l'absence de technologie permettant de dépasser cette complexité (exemple : l'exploration en mer très profonde). Ainsi, l'engagement dans ces zones difficiles d'accès les protègent des entreprises nationales qui n'ont ni la R&D, ni l'envie de gérer ces projets complexes. Mais l'enjeu est important et les coûts de ces projets sont colossaux et surtout marqués par l'incertitude de réussir à développer la technologie adéquate pour gérer ces contextes difficiles.

Cette stratégie est renforcée par une baisse généralisée de la production du pétrole. Pour faire face à cette baisse, les Etats vont chercher à exploiter de plus en plus de zones géographiques difficiles d'accès. Pour ces territoires, seuls les cinq majors ont les

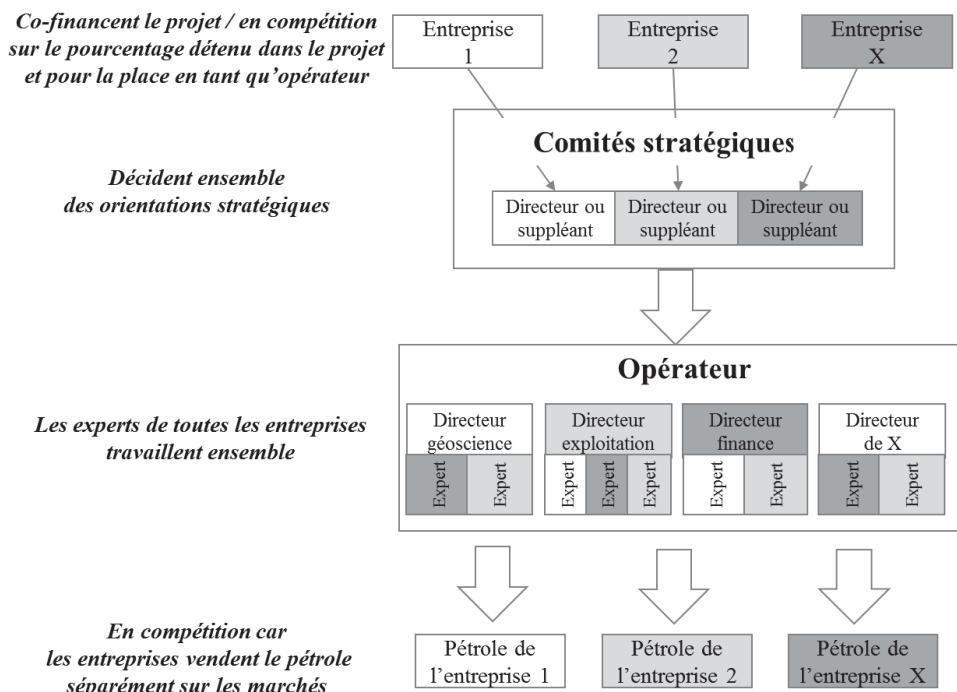
compétences et la capacité de développer une technologie spécifique permettant de surmonter l'accès difficile. Cependant, quelle que soit l'issue de l'appel d'offres, les majors ne s'y engagent pas seuls. Ces projets sont de facto plus complexes, plus coûteux, plus longs et plus intensifs en technologies nouvelles que les projets existants (e.g. 20 fois plus coûteux, non finançable sur fonds propres, avec une forte probabilité d'échec, d'une durée d'immobilisation de l'investissement d'une vingtaine 20 années). Un haut dirigeant de Total interviewé en 2014 met en avant le nécessité de coopérer, en particulier lorsqu'il s'agit de projets en mer profonde: « *C'est très lourd à supporter cette phase d'exploration donc on y va à plusieurs. Et ce qui est encore plus lourd c'est la partie d'appréciation et surtout de développement. Il s'agit de développer en mer profonde le gaz de pétrole. Là, la mise de fond est énorme : on ne peut pas le faire seul.* » Un autre haut dirigeant confirme que le recours à un concurrent permet de diversifier le risque : « *L'idée, c'est quand même de réduire les risques ou d'étaler nos participations dans des entreprises sur davantage d'entreprises, et puis de gérer un portefeuille de positions de façon plus équilibrée, pour que ce qui va mal se compense par ce qui va bien.* » Total ne peut donc pas entreprendre ces projets seule. Or, les banques refusent de faire des emprunts spécifiques pour ces projets caractérisés par deux tiers d'échecs⁵⁷. Total est donc contraint de travailler avec ses concurrents pour cofinancer les projets et partager les risques. Les concurrents sont les seuls partenaires qui souhaitent et veulent s'engager dans ces projets.

De plus, cette coopération est stratégique car elle permet d'optimiser toutes les décisions et surtout de développer une nouvelle technologie nécessaire à l'aboutissement du projet. L'idée est de créer une structure où l'entreprise qui opère l'exploration et la production est composée des meilleurs experts, quelle que soit leur entreprise d'origine (cf. figure 6). Cette structure fait en sorte de diversifier les idées en confrontant celles de leurs experts à celles d'autres experts dans le même domaine mais provenant d'une autre entreprise. Un des hauts dirigeants met ainsi en avant l'intérêt d'être challenger : « *quand on n'a que l'avis de ses experts à soi, on a qu'un seul son de cloche. Quand on est en JV[Joint-Venture], il y a une discussion, et souvent, ce qui a été dit par trois compagnies, à la fin des fins, c'est plus intelligent même si la discussion est animée et qu'on hurle et que l'on n'est pas content des partenaires. Le management n'est pas fâché des fois de se dire qu'il y a l'avis de CHEVRON, en plus de l'avis de TOTAL, et puis l'avis de CONOCO en plus de l'avis de CHEVRON, et que ça*

⁵⁷Rapport de l'opescst, Sénat, 9 avril 2014.

permet de relativiser des choses, on n'a pas tous les mêmes idées, on se fait critiquer [...], c'est quand même un truc qui est très civilisé où tout le monde est gagnant. La discussion doit amener les choses plus loin... ». Cette organisation a démontré qu'elle pouvait conduire à la création de nouvelles technologies permettant d'explorer et de produire dans des zones difficiles d'accès. Par exemple, Total avait une technologie efficace de conceptualisation et d'évaluation des potentiels de pétrole et de gaz, mais il ne pouvait pas utiliser cette technologie pour le gaz de schiste. En partageant sa technologie avec un concurrent maîtrisant les technologies actuelles d'évaluation des potentiels de gaz de schistes, ils ont pu ensemble cocréer une nouvelle technologie spécifique pour l'évaluation et la conceptualisation du gaz de schiste.

Figure 6 - Coopération technologique entre concurrents
(cocréent une nouvelle technologie)



Source : auteur

Synthèse du cas

Total est bien en compétition sur la technologie avec les autres grands groupes comme Exxon Mobil, Shell, Chevron, BP ou ConocoPhillip. Mais malgré cette forte compétition, ils coopèrent pour l'accès aux zones géographiques à explorer et pour le développement d'une technologie efficiente qui permettra d'optimiser l'exploration et la production. La coopération pour le développement d'une technologie efficiente prend deux formes différentes (cf. tableau 3) : soit ils combinent leurs technologies sans les partager (ils se répartissent les tâches en

fonction des technologies qu'ils possèdent et sur la base de cette répartition, chacun effectue ses tâches en interne), soit ils cocréent une nouvelle technologie qui n'existe pas avant en partageant leurs technologies (recherche ensemble à créer une nouvelle technologie). Ces choix de partager ou non la technologie reposent sur des déterminants internes et externes différents.

Tableau 3 – Gestion des technologies dans les projets d'E&P de Total

	Avant les années 70	Après les années 70
Pourquoi développer une technologie avec un concurrent direct ?	<p>1. Accéder aux zones géographiques avec un fort potentiel de pétrole (gagner l'appel d'offres)</p> <p>2. Accéder à la technologie du concurrent qui sur certaines tâches est meilleure (réduit le coût et le risque du projet)</p>	<p>1. Explorer et produire dans les zones géographiques difficiles d'accès</p> <p>2. Manager l'incertitude de pouvoir explorer et produire dans cette zone</p> <p>3. Développer un avantage concurrentiel qui les différencie des imitateurs (sociétés nationales de pétrole)</p>
Modalités de gestion des technologies	<p>Combinent leurs technologies sans les partager <i>(Ils se répartissent les tâches en fonction des technologies qu'ils possèdent et sur la base de cette répartition, chacun effectue ses tâches en interne)</i></p>	<p>Co-créent une nouvelle technologie qui n'existe pas avant en partageant leurs technologies <i>(Ils créent une Joint Venture et recherchent ensemble à créer une nouvelle technologie)</i></p>
Exemple de technologies	Un ordinateur très puissant ou un outil de désulfuration du gaz	Les techniques de modélisation de présence de pétrole
Eléments externes déclencheurs	<p>1. Intensification de la concurrence</p> <p>2. Coût de la R&D</p> <p>3. Niveau de risque des projets</p>	<p>1. Demande des Etats d'avoir plus de zones d'exploration et de production</p> <p>2. Absence de technologie sur le marché capable de répondre aux attentes de l'Etat</p>
Eléments internes déclencheurs	<p>1. Possède une technologie qui intéresse les concurrents</p> <p>2. Technologies internes insuffisantes pour gagner seul les appels d'offres</p>	<p>1. Vulnérabilité face aux nouveaux entrants</p> <p>2. Fonds propres insuffisants et incertitude sur l'aboutissement du projet</p> <p>3. Besoin de se faire challenger, et de combiner ses technologies avec celles des concurrents pour développer la technologie recherchée</p>

DISCUSSION ET CONCLUSION

Le management de la coopétition : partager ou ne pas partager ?

Premièrement, elle enrichit notre compréhension des pratiques de management de la coopétition, en confirmant l'existence de deux managements différents en matière de partage de technologie (*i.e.*, deux managements reposant sur deux structures de projets différentes : l'équipe projet séparée et l'équipe projet coopétitive). Nous confirmons que l'une n'est pas supérieure à l'autre mais que les deux sont utilisées en fonction du contexte et de l'objectif de la relation de coopétition. Il y a donc un réel intérêt à approfondir les recherches du management de la coopétition dans deux directions différentes.

Notre étude de cas le confirme. La première direction consiste à explorer les modalités pour atteindre l'objectif commun coopétitif sans partager la technologie (*e.g.*, Pellegrin-Boucher, Fenneteau, 2007 ; Ritala, Hurmelinna-Laukkanen, 2009 ; Yami, Nemeh, 2014). La deuxième direction cherche à comprendre comment partager et simultanément minimiser les effets négatifs de ce partage (Enberg, 2012 ; Fernandez, Chiambaretto, 2016 ; Le Roy, Fernandez, 2015). En effet, notre cas longitudinal de Total confirme empiriquement les deux pratiques de gestion de coopétition et, surtout, met en avant l'absence de supériorité d'une pratique sur l'autre. Nous confirmons leurs existences empiriques en retrouvant au sein de Total les deux structures de projets récemment identifiées par Fernandez et al. (2017) : l'équipe projet séparée et l'équipe projet coopétitive. Parfois Total et ses concurrents combinent les technologies sans les partager et parfois, ils partagent et recombinent leurs technologies. Plus que tout, notre cas corrobore la pertinence des deux pratiques et donc, des deux directions de la littérature sur le management de la coopétition, en mettant en avant l'absence de supériorité d'une pratique sur l'autre. En effet, Total a continué à garder des structures projet en « équipe projet séparée » alors qu'il avait expérimenté avec succès l'« équipe projet coopétitive ».

Les déterminants des pratiques de management de la coopétition

Si la première pratique, l'équipe projet séparée, est intuitive car elle permet de bénéficier des avantages de la coopétition sans supporter le risque de l'internalisation, la deuxième ne l'est pas moins. En effet, l'entreprise supportera un risque d'internalisation des technologies bien plus élevé. C'est pourquoi notre recherche a cherché à comprendre pourquoi Total a parfois eu besoin de passer d'une pratique relativement plus sûre à une pratique plus risquée

en matière de partage de connaissances. Notre recherche a identifié plusieurs déterminants multiniveaux (cf. figure 7).

Le premier niveau identifié est lié aux caractéristiques de l'environnement. L'entreprise évolue dans une industrie avec des menaces et des opportunités différentes. Notre étude de cas révèle que trois variables ont impacté le choix de Total de passer d'une combinaison de technologies entre concurrents sans partager, à un partage de ses technologies avec ses concurrents : (1) l'augmentation de l'intensité concurrentielle (*i.e.*, l'arrivée de nouveaux concurrents), (2) le niveau de risque et le coût des projets (*i.e.*, un projet d'exploration et production est déjà très coûteux et risqué, mais un projet similaire en mer profonde l'est d'autant plus), (3) la convergence technologique (*i.e.*, les nouveaux concurrents y arrivent relativement aussi bien que les leaders du secteur). L'intensification de ces variables menace la survie de Total et des autres majors (*e.g.*, perte sèche trop importante, différentiel technologique trop faible pour maintenir ses rentes). Ce contexte explique le choix pertinent de Total lorsqu'il partage ses technologies dans le but d'augmenter les chances de succès du projet.

Ainsi, lorsqu'une entreprise voit la valeur de sa technologie s'éroder avec le temps, et que de nouveaux entrants réduisent progressivement l'écart technologique, ce n'est qu'une histoire de temps avant que ces nouveaux entrants deviennent de véritables rivaux tout aussi armés technologiquement. Le partage de technologie devient alors une solution pour renouveler son avantage concurrentiel. Même si aucune généralisation de type statistique n'est possible à partir d'un cas unique, le partage de technologie dans les stratégies de coopétition technologique peut être un moyen de créer une capacité dynamique au sens de Teece (Teece, 2014). Inversement, la coopétition technologique sans partage de technologie serait une capacité ordinaire permettant l'efficience technologique mais pas un renouvellement de l'avantage concurrentiel. Nos analyses ouvrent donc tout un champ de recherches sur les capacités dynamiques offertes par la coopétition technologique. Elles identifient aussi de nouveaux outils pour les leaders des industries de plus en plus concurrencées par les géants du web (*e.g.*, Google, Amazon). En effet, dans l'industrie pharmaceutique, pour faire face à l'arrivée de Google, les leaders pourraient coopérer et partager leurs technologies afin de cocréer ensemble un nouvel avantage concurrentiel.

Le deuxième niveau concerne la relation et la capacité des autres entreprises partenaires à apporter de la valeur à la technologie partagée. En effet, si l'entreprise partenaire ne peut pas apporter de valeur, il est inutile de partager la technologie : cela constituerait une prise de

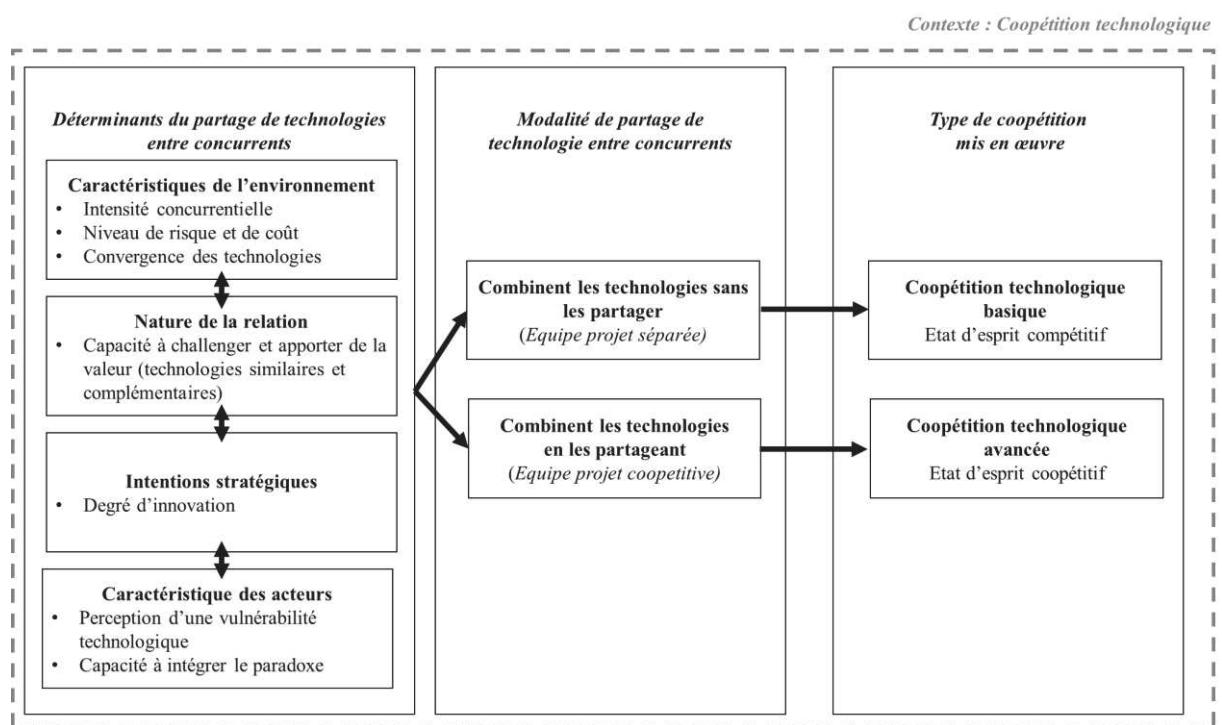
risque inutile. Dans ce contexte particulier, l'entreprise a intérêt à favoriser la combinaison de technologies sans partage. Par exemple, Total n'a pas eu intérêt à partager son ordinateur très puissant (*i.e.*, un des ordinateurs les plus puissants du monde). Il a pu faire les calculs en interne et ne partager que les résultats. Par contre, lorsque la technologie possédée doit être améliorée pour répondre à des contextes spécifiques, le concurrent peut s'avérer être un partenaire pertinent. Effectivement, plus les entreprises sont des concurrents directs, plus les technologies sont simultanément similaires et complémentaires, ce qui rend le partenaire apte à challenger les idées et les technologies partagées. Ainsi, en acceptant de partager sa technologie avec un concurrent spécialiste du gaz de schiste, Total a pu utiliser sa technologie de modélisation des sols pour l'identification de la présence des gaz de schiste. Cette idée, que tous les concurrents n'ont potentiellement pas le même effet de levier sur les ressources d'une entreprise, a été très peu étudiée dans la littérature sur la coopération. Dans celle-ci, les études ont tendance à majoritairement comparer les concurrents aux non concurrents, sans faire de distinction entre les différents concurrents (*e.g.*, Hamouti *et al.*, 2014; Le Roy *et al.*, 2016). L'étude de cas révèle un besoin de complexifier nos connaissances sur la coopération en distinguant les types de concurrents.

Le troisième niveau nous amène à l'intention stratégique. Lorsque l'objectif est uniquement de combiner les technologies pour améliorer l'efficience technologique du projet, le partage de technologies est inutile et risqué. Par contre, pour créer une technologie totalement nouvelle, les compétiteurs ont intérêt à s'engager dans une interaction intense et ouverte. Ce niveau confirme les travaux de Fernandez *et al.* (2017) soutenant la pertinence des structures de projet de type « équipe projet coopérative » pour l'innovation radicale, et les structures de projet de type « équipe projet séparée » pour les projets d'innovation incrémentale.

Le dernier niveau concerne les caractéristiques des acteurs. Nous avons identifié deux variables dans ce niveau : la perception d'une vulnérabilité technologique et la capacité d'intégration du paradoxe par les individus. La première est directement reliée au niveau « environnement ». L'environnement rend les technologies actuelles de l'entreprise plus ou moins vulnérables. L'entreprise n'acceptera de les partager pour les renouveler que si, et seulement si, elle ressent cette vulnérabilité et si elle considère qu'un sacrifice est l'unique moyen de la renouveler. Mais pour être capable de faire ce « sacrifice », il faut avoir intégré le paradoxe de la coopération. La littérature antérieure avait identifié que tous les individus ne sont peut-être pas capables d'intégrer le paradoxe et de dépasser la relation de marché

uniquement compétitive pour y intégrer de la coopération (Bengtsson & Kock, 2000a; Walley, 2007). Ce besoin de sacrifier la technologie pour la renouveler n'est peut-être pas perceptible par tous les individus. Il serait intéressant de retourner étudier Total afin d'identifier s'il y a eu des réticences au niveau des individus de passer d'une équipe projet séparée à une équipe projet coopétitive. En tout cas, nous pouvons faire le constat que les deux pratiques basées sur le partage ou le non partage de la technologie n'implique pas le même besoin d'intégration. Pour les projets coopétitifs sans partage, les individus n'ont pas besoin d'intégrer le paradoxe : cette stratégie de coopétition serait donc accessible à tous les individus. Par contre, pour les projets coopétitifs avec partage, les individus ont besoin d'intégrer le paradoxe : cette stratégie serait donc réservée à certains individus capables d'intégrer qu'ils ne sont pas uniquement dans une relation de compétition avec le concurrent mais bien une relation simultanément de compétition et de coopération.

Figure 7 – Modèle conceptuel des déterminants du partage ou de l'absence de partage de technologie dans une stratégie de coopétition technologique



Source : auteur

Vers une nouvelle typologie de la coopétition : coopétition basique *versus* avancée

Nous contribuons à la littérature sur la coopétition en mettant en avant la coexistence académique et empirique de deux pratiques de management de la coopétition technologique. Chaque pratique est basée sur un comportement différent de partage de technologie. Plus

précisément, nous complexifions notre compréhension de la coopétition en identifiant une nouvelle typologie basée sur le comportement de partage de technologies. En effet, le nombre croissant d'articles sur la coopétition a mis en avant que la coopétition pouvait être horizontale ou verticale (P Chiambaretto & Dumez, 2016), entre un acteur ou plusieurs (Dagnino & Padula, 2002; Gnyawali et al., 2008), et impliquer différentes activités comme la coopétition pour la R&D ou la coopétition pour la vente (Pellegrin-Boucher, Le Roy, à paraître). Notre cas questionne la pertinence de ces typologies pour expliquer le partage ou le non partage de technologies dans les stratégies de coopétition. En effet, le cas de Total montre qu'à l'inverse de Oxley et Sampson (2004), Total coopère avec ses concurrents de façon étendue : la coopération et le partage de technologie dépasse les activités de pure R&D et concerne aussi le projets d'E&P. De manière identique, le cas de Total montre la non pertinence d'utiliser la distinction coopétition verticale ou horizontale pour expliquer si une entreprise partage ou non ses technologies. Théoriquement, lorsque le partenaire est un concurrent direct, l'entreprise ne devrait pas partager ses technologies (Pellegrin-Boucher et al., 2013a). Notre cas Total montre une situation où une entreprise peut avoir un intérêt à partager avec son concurrent direct. Concernant la typologie sur le nombre d'acteurs, notre cas montre aussi qu'il est possible de coopérer et de partager sa technologie avec un nombre important de concurrents. Dans le projet d'E&P Kashagan, Total coopère et partage sa technologie avec l'américain Exxon Mobil, l'anglo-néerlandais Shell, l'italien ENI, le chinois CNPC et le japonais Impex.

Notre cas suggère l'existence d'une autre typologie directement basée sur le partage de technologies (cf. tableau 4). Il y aurait la coopétition basique qui consisterait à coopérer sans partager de technologies pour atteindre l'efficience technologique. Et, il existerait la coopétition avancée qui consisterait à coopérer en partageant ses technologies pour permettre la création d'une nouvelle technologie répondant à des besoins de renouvellement de l'avantage concurrentiel. Cette nouvelle typologie a un double intérêt empirique et académique. L'intérêt empirique de cette distinction est qu'elle met en avant, dans un premier temps, une coopétition facile d'accès dans laquelle les managers peuvent s'engager et garder leur esprit compétitif. Puis, dans un second temps, cette distinction souligne l'existence d'une coopétition avancée dans laquelle les managers sont obligés de partager de manière intensive leurs technologies et donc d'intégrer le paradoxe de la coopétition. Au niveau académique, notre recherche met en avant des opportunités et des enjeux radicalement différents entre les deux types de coopétition (*e.g.*, création d'une nouvelle technologie *versus* efficience

technologique ; risque de fuite de technologie *versus* pas de fuite possible ; besoin d'intégrer le paradoxe *versus* absence d'intégration du paradoxe).

Notre recherche met en avant un réel besoin de distinguer les recherches actuelles en fonction de ces deux types de coopétition. Cependant nos contributions sont limitées par l'industrie très spécifique dans laquelle a été menée notre étude de cas. Il est donc nécessaire d'approfondir nos connaissances en répliquant cette recherche dans d'autres entreprises et d'autres industries. L'objectif de ces futures recherches pourraient être d'affiner notre compréhension de ces deux types de coopétition, pour ensuite étudier leur co-existence. Dans le champ de la coopétition, nous sommes au début d'une recherche nécessitant de plus en plus de rigueur sur la description du partage ou non de technologies, et amenant ainsi à de plus en plus de complexité à la stratégie de coopétition.

Tableau 4 – Différence entre coopétitions basique et avancée

	Coopétition basique	Coopétition avancée
<i>But</i>	Efficience technologique (<i>combinent des technologies existantes</i>)	Cocréation d'une technologie (<i>créent une nouvelle technologie</i>)
<i>Risque que le concurrent internalise les connaissances</i>	Faible	Fort
<i>Besoin d'un principe d'intégration au niveau des individus</i>	Non	Oui
<i>Structure projet</i>	Equipe projet séparée	Equipe projet coopétitive
<i>Type de technologie partagée</i>	Technologie non spécifique (réutilisable telle quelle dans un autre projet)	Technologie spécifique (besoin de l'adapter en fonction des projets)

Source : auteur

Manuscript 3 ~ Managing coopetition: the fallacy of transparency becomes a reality

1. General information

The authors: Sea Matilda Bez, Frédéric Le Roy et Stéphanie Dameron

The involvement of the doctoral student Sea Matilda Bez :

- ✓ The full data collection
- ✓ The full data analysis
- ✓ Co-reflection on the ideas with the authors
- ✓ All the drafting of the article and all the changes to implement the improvements suggested by the co-authors

The current state of the manuscript:

- ✓ Awarded as the best article for its managerial implication at AIMS 2017 (French conference in Management Strategic)
- ✓ Going to be send before the dead line of the 15th December 2017 to the Long Range Planning special issue on “Coopetition strategies: antecedents, process, outcomes”⁵⁸

Ranking: FNEGE 2016: rank 2 - strategy; CNRS 2016: rank 2 - International strategy

Previous versions:

- ✓ June 2017: Conference AIMS
- ✓ March 2017: Open Innovation seminar at the Innovation center of Berkeley University
- ✓ January 2017: “Ateliers de Thésée” in Paris

Remark: This manuscript is going to be send to the Long Range Planning before the 15th December 2017. Before sending it, we are going to copy-editing the manuscript.

⁵⁸<https://www.journals.elsevier.com/long-range-planning/call-for-papers/coopetition-strategies-antecedents-process-outcomes>

2. Extended abstract

2.1. The content of the research

- ❖ The collective knowledge development in coopetition for radical innovation: an interesting and important phenomenon

In this manuscript, we investigate how firms unlock the radical opportunities of coopetition strategy. Our reflection starts with a simple idea: "there is no radical innovation without collective knowledge development". This idea, which might seem obvious, reveals to be difficult to execute when the partner is a competitor. Collective knowledge development relies on two conditions: the receptivity and the transparency of the partner. If competitors are *a priori* very respective to any strategic knowledge shared by its competitor, the transparency is counter-intuitive. Being knowledge transparent with a competitor is an invitation to opportunism and to a speedup of the erosion of its competitive advantage. Thus, a puzzling question is: how can firms be knowledge transparent with a competitor? Answering this question will increase our understanding of the managerial process to unlock the radical innovation opportunities of a coopetitive project. A strategy used more and more empirically. Some researchers even argue that coopetition is going to be the next dominant strategy in some industries like high-knowledge industries.

- ❖ The key role of the co-management principle in the collective knowledge development for coopetition: a question without an answer yet

There is one of the managerial practices which can be relevant to unlock this transparency between competitors: the co-management principle. Thus, this manuscript aims to generate insight into how the co-management principle can foster transparency.

This question is interesting because until now, the management of coopetition has mainly been used to foster a restricted and controlled transparency. The co-management principle was used to monitor the coopetitors' opportunism on the initial collaboration deal. It is used to make sure that each of the firms respects the initially decided knowledge transparency. Furthermore co-management gave some useful flexibility for the radical innovation success. It could sometimes allow for an additional knowledge transparency which overcomes the initial deal to ensure the success of the project. But this knowledge transparency is strictly controlled by the project managers. However, by building on Kale et al. (2010), it is possible to identify

different potential ways of using the co-management principle. The co-management principle can be used to reduce the fear of opportunism by generating a relational capital, and an integrative conflict management. If the co-management successfully implements both simultaneously, it fosters a greater and freer transparency. The consequences can be huge because increasing the transparency can allow a more accurate, comprehensive and timely knowledge sharing.

2.2. Our research inquiry

Our research inquiry is composed of two steps. In our first step, we looked through the literature to understand how the co-management could impact the knowledge transparency of the firm. It appears that by extending our thinking outside the pure literature of coopetition, there was not one unique answer. In our second step, we decided to more deeply explore this puzzling use of co-management principle by describing the co-management principle and understanding its impact on Sanofi's knowledge transparency.

2.3. Sample of the main contributions

N°	Insight from our theoretical background	The insight of our case	Insight from the confrontation of the literature and the case
1	The link between coopetition and radical innovation is ambiguous: sometimes positive and sometimes negative. One explanation of the negative link is because the fear of opportunism jeopardizes the needed knowledge sharing and transparency	Sanofi's generation of new layers of knowledge with BMS relies on a greater and freer transparency. And this intent occurred even if BMS behaved opportunistically	Confirms that coopetition and radical innovation can be positively linked. But in contradiction with past literature, the partner's opportunism can be overcome when there is a bigger knowledge creation purpose behind it. In that case, opportunism is treated as a "punctual conflict" or a potential indicator of value creation.

		Extends the reasons why a competitor is a good partner. A competitor is the only one who can duplicate extensively and qualitatively all the experts (i.e., from development to commercialization). Indeed, a competitor has experts with similar expertise which will be able to challenge and improve the decision of all their counterparts quickly.
2	A competitor is a relevant partner because of its similar and complementary resources	The 25 counterparts challenge and improve the proposition of actions of the other
3	The management of the transparency consists in some transparency. But this transparency is restricted and control by the project manager	<p>Sanofi and BMS duplicated more than 25 experts who worked with the intent of learning from each other and co-construct new synergic knowledge. These counterparts stayed located inside their parent firm to ensure the internal diffusion of the good practices learned</p> <p>We open our way of thinking about transparency in the coopetitive project. We highlight the need and possibility to foster greater and freer transparency and reciprocal internal sharing mechanism.</p>
4	<p>The co-management principle is used to monitor the transparency and allow some additional and restricted transparency.</p> <p>Moreover, the duplicated experts are co-located</p>	<p>The co-management consists in duplicating the experts but to let them in their parent firm. The co-management is used to create an extensive link and an intensive link between the two firms (if this is not enough, they create team building activities for the counterparts) but also to identify quickly any deviance that the top manager needs to deal with</p> <p>The co-management can be used to generate relational capital, implement an integrative conflict management and diffuse the practices learned internally.</p> <p>The conditions for this co-management to succeed : (1) have counterparts who work on a daily basis with its counterpart, (2) need to co-decide everything and speak with one single voice to the committee; (3) stay located in their parent firm. These three characteristics allow the co-management principle to foster greater and freer transparency,</p>

2.4. The insight for this doctoral research

- ✓ This article contains the building blocks to develop a proposition arguing that there are different ways to be transparent with a competitor, a transparency which is mandatory to unlock the radical innovation of coopetition. Despite, the restricted and controlled transparency identified in the past literature, it is possible to foster a much freer and extensive transparency. Our case study confirms that a freer and extensive transparency is not a fallacy. Our article also highlights the key role of co-management principle in fostering these different degrees of transparency.
- ✓ It opens our way of thinking about the opportunism of the partner. Our study confirms that being transparent is an invitation to opportunism. However, when the intent of the collaboration aims to create new knowledge that outperforms the existing one, it might be more relevant to treat opportunism as punctual conflicts to be overcome than deciding to end the relationship or reduce the transparency. Our case study confirms that these opportunisms can be treated as punctual conflicts and protect the project team from any consideration of this opportunism. The only exception is that the project team has a key role in reporting to the top managers if the counterpart jeopardizes the knowledge creation by not sharing or not being transparent enough.
- ✓ Finally, deepening our understanding of the key role of co-management to foster knowledge creation and transparency gives one additional explanation to why collaborating and sharing strategic knowledge with a competitor, relatively to a non-competitor could generate specific and superior leveraging effect. Indeed, only a competitor is able to duplicate each of the experts from development to the promotion of the drug. Moreover, only a strong competitor is able to duplicate and challenge the initial decision or routines of the expert.

3. The Manuscript 3

ABSTRACT

Being highly knowledge transparent with a competitor seems to be a fallacy. Indeed, it is an invitation to opportunism and to a deskill process by the competitor. The traditional intent of any firm is to reduce its knowledge transparency. However, we argue that being highly transparent is a condition for unlocking the radical innovation opportunities of a coopetition strategy (i.e., collaboration between competing firms). Our research goes beyond this inherent contradiction and reveals how firms could preserve their knowledge transparency in a coopetitive relationship. Answering this question is key to understanding how to unlock the radical innovation opportunities of coopetition strategy. Our case study of Sanofi, a pharmaceutical company which opened two of its radical innovation to its competitor, confirms and extends the key role of the co-management principle. Moreover, our research represents interesting guidelines for top managers by highlighting a specific project design to manage transparency in a coopetitive project.

Key words: coopetition, radical innovation, transparency, coopetition management

INTRODUCTION

Firms search pathways to create new layers of knowledge and radical innovation. In this quest, coopetition seems to be a relevant strategy (Belderbos, Carree, & Lokshin, 2004; Quintana-García & Benavides-Velasco, 2004; Srivastava & Gnyawali, 2011; Tether, 2002). Indeed, by engaging in a coopetitive strategy (i.e., a collaboration with a competitor), the focal firm leverages its knowledge creation process with its competitor's knowledge (Bouncken & Fredrich, 2012). However, the implementation of this strategy is challenging. It relies on counter-intuitive behavior such as being knowledge transparent with a competitor (Kale et al., 2000). Being knowledge transparent means reducing the learning barriers of its partner (Hamel, 1991). In other words, the firm takes a clear risk of proprietary knowledge leakage. In coopetition, letting the partner learn is counterintuitive. Indeed, in this strategy, the partner is a competitor. Thus, letting him learn causes the erosion of the value of its knowledge but also the reinforcement of its competitor. It weakens its own competitive advantage (Hamel, 1991; Park & Russo, 1996)

There is an ongoing research on the management of coopetition and the behavior to adopt regarding this knowledge transparency. More precisely, there is a whole sub-stream of the

research on coopetition which argues that some knowledge transparency is needed. It is the price to pay to reach the common goal and attract the partner (Hamel, 1991). A knowledge transparency is especially mandatory for radical innovation project, relative to incremental one (Fernandez et al., 2017). In the meantime, they also highlight proactive techniques to reduce this knowledge transparency to the strict minimum. Thus, they conclude that firms should minimize the transparency to what is deemed necessary and not more (i.e., the strict minimum).

This research offers a different conclusion. Indeed, based on the research on the collective knowledge development, we argue that any action that restricts the knowledge transparency locks away some knowledge creation opportunities. Thus, it generates opportunity cost. The managerial intent should be to maximize the transparency with a competitor. However, the fear of opportunism or the fear of enabling the competitor can undermine the knowledge transparency (Arranz & de Arroyabe, 2008; Fernandez et al., 2014; Nieto & Santamaría, 2007; S. H. Park & Russo, 1996). For instance, in the case study of Fernandez et al. (2014), the experts initially preferred to jeopardize the success of the project by not sharing their knowledge than taking the risk of a “deskill.” Our research aims to go deeper into this interesting debate and generates new insights into transparency as a mediator variable between coopetition strategy and radical innovation (i.e., the creation of the needed new layer of knowledge). We aim to answer the research question: why and how do firms need to be transparent with their coopetitor?

In conducting our research, we focus on a managerial practice that allows high transparency between competitors: “co-management principle” (e.g., Fernandez et al., 2017; Le Roy & Fernandez, 2015). It refers to the managerial practice of duplicating each of the managerial functions of the project. This duplication of the function is a way to monitor the partner and more precisely monitor that the partner is pooling its best resources. Moreover, it is also used to protect them from coopetitor’s opportunism (Fernandez et al., 2017, p. 13). It allows the detection of any deviance or signal of opportunism (e.g., Fernandez et al., 2017; Le Roy & Fernandez, 2015).

To assess the relevance of our framework, we conducted a qualitative case study of Sanofi, a pharmaceutical company which opened successfully two of its radical innovations to its competitor. This case confirmed and extended the key role of the co-management principle to unlock the radical innovation opportunities of coopetition.

This paper contributes to both literature on the use of coopeptition strategy for radical innovation and the literature on management of coopetition. First, it enriches our understanding of why and how transparency can occur between competing firms. The co-management principle appeared to be a relevant managerial principle. The extension of our understanding of this managerial principle is our second contribution (i.e., it can take different forms and uses). Finally, we argue that opportunism should not always be perceived as a barrier of transparency. Indeed, in case of a superior goal, it can be relevant to overcome the opportunism and treat it as a punctual conflict. Thus, the management of coopetition should try to minimize the willingness of the partner to behave opportunistically but not hinder its ability to do it.

THEORETICAL BACKGROUND

Coopetition for radical innovation

Competitors can be motivated and able to develop together the new knowledge needed for a successful radical innovation. Past research used qualitative and quantitative studies to prove it. Indeed, there are *case studies* of successful coopetitive projects for radical innovation (e.g., Gnyawali & Park, 2011; Le Roy & Fernandez, 2015). For instance, in the space industry, two competitors, EADS and Thales, managed to share their knowledge in the manufacturing of telecommunications satellite and get through one of the most important and worldwide space programs (i.e., manufacturing of a dual system of telecommunications satellite) (Le Roy & Fernandez, 2015). Or, in flat screen television, Samsung Electronics and Sony Corporation managed, through a common joint venture, to co-develop a radical innovation. The success of this radical innovation project relied on the combination of Samsung's strong capability in the LCD technology and Sony Corporation's TV making expertise (e.g., the flat-screen LCD) (Gnyawali & Park, 2011).

Moreover, many articles highlighted the empirical importance of coopetition for enhancing a firm's innovation capacity (Bouncken, forthcoming). For instance, based on a survey of 469 firms, Bouncken and Fredrich (2012) find that coopetition increases the radical innovation of firms more strongly than incremental innovation. They argue that cooperation among competitors potentially breaks lock-in situations and that groupthink within an organization stimulates creativity. Similarly, Quintana-Garcia and Benavides-Velasco (2004) highlight, based on a panel of 73 European biotechnology firms study, that coopetition is a relevant strategy for the development of new product lines.

By comparison, some research does not find a positive link between coopetition and radical innovation or at least finds that the positive link varies depending on the content of the collaboration. For instance, Mention (2011) highlighted that, for firms in Luxembourgish service, exploiting information from competitors does not stimulate innovation novelty, on the contrary, it stimulates imitation. Bouncken et al. (2017) have more nuanced results. By relying on a study of 1049 new product development alliances in German medical and machinery sectors, they highlight that the coopetition increases the radical innovations only during the product launch phase and not for the pre-launch phase. They justify their results by arguing that severe tensions jeopardize the success of a pre-launch phase for radical innovation. These tensions are due to uncertainties of the success of the phase and the difficulties of securing proprietary knowledge.

In response to these controversial results, there is a need for more research on the moderating, mediating variables between coopetition and performance (Czakon, Mucha-Kus, et al., 2014; Le Roy & Czakon, 2016). There are a huge number of possible directions for further research. It is possible to look deeper into multiple moderating and mediating variables such as the market uncertainty, network externalities and competitive intensity geographical distance (Le Roy et al., 2016; Ritala, 2012). Indeed, the research on the relationship between coopetition and innovation is still young and emerging (Bouncken, forthcoming).

To contribute to this literature, we are going to dig deeper into one potential mediator variable between coopetition and radical innovation: the management of knowledge transparency.

THE COUNTER-INTUITIVE ROLE OF TRANSPARENCY

Before getting into this section in which we explain one of the inherent paradoxes of coopetitive project for radical innovation, we need to define transparency. Our definition is directly based on Hamel (1991)⁵⁹. Transparency refers to any action in the knowledge sharing that allows the partner to access and internalize some critical information, capability, or skill from the focal. Thus, transparency determines the potential for the partner learning. A partner will not be able to learn if the focal firm is not transparent (and even if the partner intends to

⁵⁹ Hamel's 1991 definition is relevant in our context of inter-firm coopetition because Hamel presents transparency as one of the three dimensions of his inter-firm learning. Thus, this definition was developed for inter-firm relationships and it was developed based on the idea that this collaboration could be a locus of competition.

learn and is capable of learning). In other words, the transparency refers to the permeability of the firm border (i.e., the degree of flows of documents, people, skills, and capabilities).

Radical innovation is a risky process in which the exact path to success is unknown. The identification of the knowledge needed for radical innovation is made impossible by technological and environment uncertainties (Ritala et al., 2016). The whole point of the use of coopetition in a radical innovation project is to expand the portfolio of knowledge (Bouncken & Fredrich, 2012). It fosters the collective knowledge development (also called inter-organizational learning) (Larsson et al., 1998). In this paper, we focus on one key component which enables radical innovation: the collective knowledge development. Past research has already been focusing on the collective knowledge development (e.g., Larsson et al., 1998).

The collective knowledge development is defined as the learning synergy or interaction effect between the organizations that would not have occurred if there had not been any interaction (Larsson et al., 1998; Soekijad & Andriessen, 2003). To achieve this collective knowledge development, the existing knowledge from the two partners needs to be transferred to each other, and after, through interaction, they will be able to create completely new knowledge. Both transfer and creation of knowledge require simultaneous transparency and receptivity at some level among the organizations (Larsson et al., 1998). Larsson et al. (1998) illustrate this need by explaining: “If no organization is transparent, no existing knowledge is disclosed and thereby cannot be received by the others or used collectively to generate new knowledge—nor can transparency be utilized without the receptive ability and motivation to absorb the disclosed or generated knowledge” (p.291).

The specific challenge of any collective knowledge development between competitors is not the receptivity but the transparency. *A priori* both coopetitors will be highly receptive to each other’s knowledge. Indeed, the overlapping of the resources and market that characterized strong competitors enables them to easily identify and internalize any strategic knowledge shared by the other (Chen, 1995). The real challenge concerns the transparency. Being transparent with a competitor is counterintuitive and even potentially hurtful (S. H. Park & Russo, 1996; Santamaria & Surroca, 2011). Being transparent is an invitation to coopetitor opportunism. The coopetitor learning of the focal firm’s strategic knowledge can speed up the erosion of its knowledge. The coopetitor is likely to take this learning opportunity to increase its bargaining power inside the collaboration, and above all, to

reinforce its position on the market outside the collaboration (Hamel, 1991). The focal firm arms with its “own weapon,” the competitor (Fernandez et al., 2014).

Building on this hurtful effect, the dominant literature on the management of knowledge sharing in coopetition recommends reducing the transparency to the strict minimum. A focal firm should proactively create barriers to the partner learning (Baumard, 2010b; Fernandez & Chiambaretto, 2016; Ritala & Hurmelinna-Laukkanen, 2009)⁶⁰. If this management is an intuitive and relevant defense against the potential hurtful consequences of knowledge sharing, it is also working against collective knowledge development. Based on their approach, the management recommended by the coopetition literature is going to be hurtful because it will not allow the transparency needed for the creation of a new layer of knowledge.

Thus, the firms face a real stain in a coopetitive project for radical innovation: be knowledge transparent or reduce knowledge transparency. On the one hand, there is no radical innovation without collective knowledge development (i.e., without knowledge transparency). On the other hand, transparency is an invitation to opportunism, and the intuitive reaction of a firm should be to reduce the knowledge transparency. Based on this unsolved strain, the real question is: why and how can firms be knowledge transparent with a competitor? Indeed, answering this question will increase our understanding of the managerial process to unlock the radical innovation opportunities of a coopetitive project. This question is rooted in the idea that the radical innovation opportunities of a coopetitive project are possible under the condition of a knowledge transparency, which is an invitation to opportunism.

The solution: the principle of co-management?

The literature on coopetition recently highlighted from a unique case study a principle of co-management (Fernandez et al., 2017; Le Roy & Fernandez, 2015). The principle of co-management refers to a managerial process which organizes the coopetition project in a way that all decisions are made together by the two firms. In practice, the two coopetitors create a co-located team which duplicates each of the managerial positions of the project team, and the two managers are asked to work closely together on a daily basis with one another. The dual structure is replicated from the top manager levels to the lower levels of the project: two

⁶⁰ These barriers can take different forms such as segmentation and obfuscation techniques. The strength of these techniques is they can (1) be used for tacit knowledge, (2) be used in weak legal intellectual protection, (3) overcome the choice of sharing and protecting

project managers, two management controllers, two satellite managers, etc. (Fernandez et al., 2017; Le Roy & Fernandez, 2015).

When we dig deeper into the role of this co-management, it appears that it could be a relevant tool to manage this dilemma between transparency and opportunism. Indeed, Le Roy & Fernandez (2015) and later Fernandez et al. (2017) argue by an empirical observation that the duplication of the managers is, first of all, an essential tool to limit the risk of opportunism. It allows the detection of any deviance or signal of opportunism. Simultaneously, it can also be a means to encourage both coopetitors to pool their best resources essential to the success of the project. More concretely, their quest for radical innovation can lead the project managers to interact with each other and together agree to overcome some of the information sharing restrictions requested by the top managers. The project manager of each team has strict control of information flows between the two firms. He can prohibit an information transfer required by their top management, or allow and legitimate information transfers prohibited by their top management⁶¹. Thus, they can encourage a superior transparency on some information or competence judged necessary for the project success. This transparency is restricted and strictly controlled by the project manager (i.e., he is responsible for the knowledge flow). Moreover, the control on this additional transparency is reinforced by co-locating the two teams in a third location separated from the parent firm. This separation is an organizational solution to allow additional transparency in the project team, meanwhile limiting the risk of a direct reuse by the competing parent firm.

Based on Le Roy & Fernandez, (2015) and later Fernandez et al., (2017), we argue that the three main intents of co-management principle are to simultaneously: (1) monitor the opportunism of its coopetitor, (2) monitor the pooling of each partner's best knowledge and resources for the good execution of the project, (3) and sometimes encourage an additional restricted transparency for the project success. This third intent is legitimated and strictly controlled by the project manager of each team.

If this way of using the co-management principle as a first response which explains how to be knowledge transparent with a competitor, the co-management principle could be used differently. It could be used to foster a greater and freer knowledge transparency. Indeed, Kale

⁶¹ “Project managers had to manage these tensions with the strict control of information flow. They had the power to prohibit information transfers required by their top management and to allow information transfers prohibited by their top management.” (Le Roy & Fernandez, 2015, p. 682)

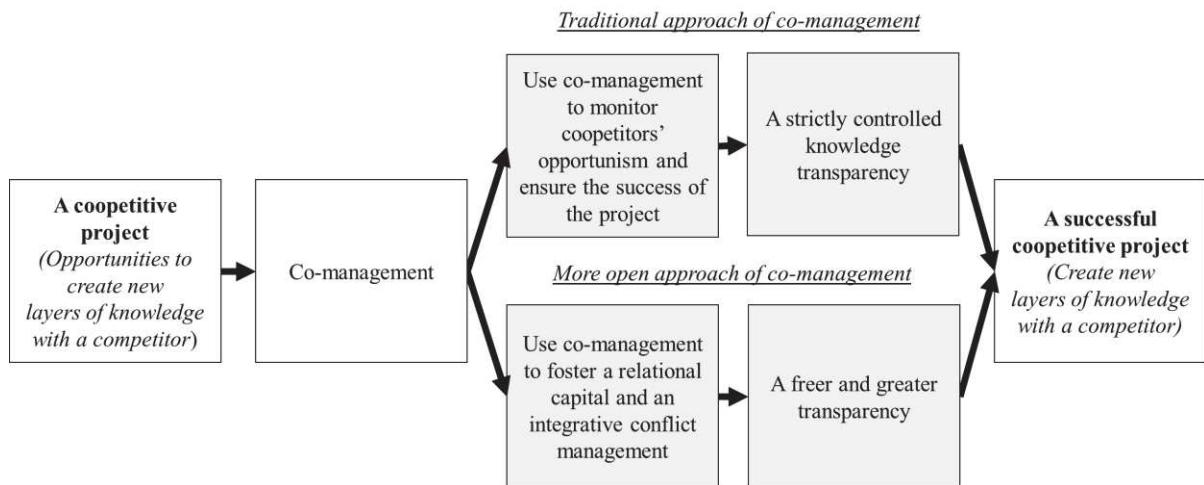
et al. (2000) argue that alliance implementing relational capital and integrative process of conflict management can generate a freer and greater exchange of information and know-how between committed exchange partners. Without a freer and greater exchange in an alliance, the information and know-how exchanged are low in accuracy, comprehensiveness, and timeliness.

Building upon Kale et al. (2000) argument, we assume that the intent of co-management is to allow a freer and greater exchange of information and know-how. The co-management is a relevant tool because the duplication of each manager can be used to foster the relational capital and an integrative conflict management (i.e., the two cornerstones of Kale et al. (2000) reflection). The two cornerstones directly reduce the fear of opportunistic behavior (Gulati, 1995; Zaheer et al., 1998). Indeed, the relational capital due to intense and close interactions between the individuals reduce the willingness to be opportunistic, and the integrative conflict management creates relevant context for a two-way communication that looks continuously for a win-win ending (Kale et al., 2000). In this context, transparency and protection against opportunism are not mutually exclusive.

In summary, there are two conceptual means for a focal firm to be transparent with a competitor through the co-management principle (cf. *Figure 1*).

1. The first one, traditionally emphasized by the literature of coopetition, consists of strictly controlling the knowledge transparency. Most importantly, the co-management principle is used to monitor the coopetitors' opportunism on the initial collaboration deal. It is used to make sure that each of the firms respect the knowledge transparency decided on initially. Moreover, the co-management offers flexibility. It can sometimes allow an additional knowledge transparency, which overcomes the initial deal to ensure the success of the project. This knowledge transparency is strictly controlled by the project managers.
2. The second one that we built upon Kale et al. (2000) is a more open means. It consists of using the co-management principle to foster greater transparency. Indeed, it can be used to generate a relational capital and an integrative conflict management, which, when combined, reduces the fear of opportunism and thus allow a freer sharing.

Figure 1 ~ Theoretical background



Source: The authors

We will explore deepening our understanding of the co-management principle on the management of the knowledge transparency between competitor through the study of an unusually successful coopetitive strategy. In this successful case, does the focal firm rely on a traditional or a more open approach of co-management? Which of the approaches unlock the radical innovation opportunities of a coopetition project?

METHODOLOGY: AN EXTREME CASE STUDY

The Case Study

Our objective is to describe and understand the poorly understood phenomenon of the role of the co-management principle on knowledge transparency between competitors. When the research intent is to understand a poorly understood phenomenon, case-based exploratory methods are appropriate (Eisenhardt, 1989). Indeed, co-management is still a puzzling principle that allows the counterintuitive transparency between competitors, but we do not know exactly how yet. Moreover, past research on coopetition such as Bengtsson and colleagues' (2010) and Gnywali and Park (2011) have recommended the use of in-depth and longitudinal case studies to investigate collaboration between competitors. The case studies are the best way to explore a multifaceted and paradoxical phenomenon, especially when collaboration between competitors is involved (Dowling et al., 1996; Luo et al., 2006; Tsai 2002; Tsai and Hsu, 2014). Thus, we looked for a revelatory longitudinal case study.

We chose the case of Sanofi, a European firm in the pharmaceutical industry, which opened two of its radical innovation processes to its American competitor Bristol Myers-

Squibb (BMS) from 1993 to 2012. This case is interesting for several reasons. First of all, Sanofi and BMS chose to manage their collaboration through the co-management principle. Second, because BMS was a very strong competitor to Sanofi, it was risky for Sanofi to share its discovery and knowledge about its discoveries and the European market with BMS. Indeed, BMS was intended to expand its market position in Europe, and one of Sanofi's discoveries could be easily internalized by BMS, as BMS was the leader of this market (cf. *Table 1 for more details on their competitive relationship*).⁶² Third, this case generated an unusual amount of success (cf. *vignette 1 for more details on the content and outcomes of the cooperative relationship*). All these make Sanofi's radical innovation project of the Plavix and the Aprovel a potentially highly revelatory case study (Yin, 2014). We studied this case for a period exceeding 20 years, more precisely from Sanofi's discovery of the two drugs at the early 90's to the end of the restructuration of the collaboration between Sanofi and BMS in 2012.

Table 1 ~ Empirical setting

Sanofi and BMS competitive relationship

In 1993, at the beginning of the collaboration, Sanofi and BMS were two pharmaceutical companies which aimed to develop blockbusters at the global world scale. Their market and resources overlapped more and more. For instance, in some European countries, they were already selling competing paracetamol, and BMS intended to expand its influence on Sanofi's European market. Conversely, Sanofi was also stepping into BMS market. Sanofi had recently acquired a Sterling Drug, a pharmaceutical subsidiary of Kodak, which gave Sanofi an access to the American market. And above all, Sanofi had discovered the Aprovel, a drug to cure hypertension, which was a new and more efficient mechanism. If successful, the Aprovel could have hurt the BMS sales rate as the current leader of the hypertension market. In their rivalry, the power was asymmetric. BMS was a top 5 strongest pharmaceutical company in regard to the stock market, and Sanofi was ranked twentieth.

⁶² For the record, BMS and Sanofi were already competitors. Their market and resources were more and more overlapping. Indeed, both intending to develop blockbusters at the global world scale. In some European countries, they were already selling competing paracetamol. In the US, Sanofi had recently done the acquisition of a Sterling Drug, one pharmaceutical subsidiary of Kodak which gave Sanofi an access to the American market. And lastly one of the radical innovation project concern the Aprovel. The Aprovel was a drug to cure the hypertension which in case of success could hurt BMS the current leader of the hypertension market.

Sanofi and BMS cooperative relationship

In 1993, Sanofi opened its innovation process to BMS. Sanofi had already discovered two potential blockbusters: the Plavix and the Aprovel. But the process to transform these discoveries into drugs and more precisely into commercially successful drug was still a long, costly and risky process. Moreover, Sanofi did not have the resources to unlock all the development and commercialization opportunities of the two blockbusters. Sanofi needed the three types of resources highlighted by Gnyawali and Madhavan (2001): asset, information, and status. Indeed, BMS brought into Sanofi's radical innovation projects *assets* such as financial help or its sales forces in the US, *information* like BMS's expertise in developing blockbusters or in obtaining a marketing authorization on the American market, and *status* like BMS's legitimacy on the American market and the hypertension market. The collaboration lasted from 1993 to 2012. The collaboration was restructured when they lost the exclusivity of the Plavix and the Aprovel in many major markets.

Outcomes of the collaboration

Thanks to BMS knowledge and resources, the two molecules initially discovered by Sanofi became two blockbusters (i.e., to radical and successful innovation). Together the two drugs generated more than € 100 billion sales. Moreover, both drugs had significant impact on their respective markets. The first drug, the Plavix, is considered a drug of historical importance. It is the first drug that dramatically reduced the risk of stroke and the mortality risk due to stroke on a large category of patients. Moreover, it was a superior treatment for stroke than the paracetamol a very cheap, well tolerated and well anchored into the doctors' habits. The second drug, the Aprovel, was also a success. It managed to change the mechanism of action to treat hypertension. In this case, the drug had not only an unusual setting but also unexpected consequences.

Data Collection

Before collecting any data, we decided to create a narrative case study based on secondary data and the observation of a presentation of the success story of the Plavix by the current alliance manager of Sanofi. Indeed, the collaboration between Sanofi and the Plavix was such a successful case that the amount of secondary data was huge. Moreover, as researchers fluent in both French and English, we could access the local press of both the American company BMS and the French company Sanofi. Then, our goal was to get more focused insight into (1) the co-management implemented in the Sanofi-BMS project and (2) Sanofi's actions

concerning its knowledge transparency in this highly risky coopetitive project (i.e., risky because of the competitive dimension of its relationship with BMS). Therefore, we conducted 18 semi-structured interviews with Sanofi employees who had been involved in these collaborations with BMS (*cf. Table 2*). We asked each of them to (1) describe or draw the project design, (2) identify the different contacts between employees from the two different firms, (4) relate Sanofi learning opportunities and then BMS learning opportunities, (5) explain the drivers of this knowledge sharing and whether or not they feared knowledge sharing.

These interviews were triangulated with a few interviews of BMS's employees involved in the project and a few employees of Sanofi involved in a similar project to the one with BMS. The total number of interviews was twenty-seven.

Table 2 ~ List of the interviews at the different level of the firm

	THE PROJET PROCESS		
	BEGINNING OF THE ALLIANCE	DEVELOPMENT AND PRODUCTION	LAUNCH OF THE PRODUCTS
TOP MANAGERS IN THE FIRM	X		N° 14 – Sanofi's R&D director N° 19 – Director of Montpellier area of R&D N° 26 – BMS's Director, Product and Portfolio Strategy
GLOBAL ALLIANCE MANAGERS	N° 9 – Sanofi's first Alliance manager and first Alliance manager on the project Sanofi-BMS		N° 4 – Sanofi's global alliance manager and also directly in charge of Sanofi-BMS alliance N° 2 - Sanofi's Alliance manager for commercial alliances
SANOFI/BMS PROJECT TEAM MANAGERS	N° 16 – One of Sanofi's project chief of the Plavix N° 10 – One of Sanofi's Project chief of the Aprovel		N° 15 - Sanofi's project chief of the Plavix
SANOFI/BMS PROJECT TEAM	N° 8 – Sanofi's Research expert in the project team which was part of the Plavix's discovery team	N° 7 - clinical & Exploratory Pharmacology Department. N° 3 - New Product Marketing (publication) N° 11 – Toxicologist Expert N° 23 - BMS's Development expert	N° 17 – Marketing expert N° 24 – BMS's Marketing expert global N° 26 – BMS's Marketing expert global N° 27 – BMS's Marketing expert
OPERATIONAL WHO WERE INVOLVED IN THE SANOFI/BMS PROJECT	N° 18 – The finder of the Plavix N° 22 - Sanofi's Research who was involved in the team which discovered the Plavix	N° 5 - Sanofi's Master Plan Project Coordinator (in charge of the construction of the production building) N° 20 - Sanofi's operational who oversaw the informatic issue of the alliance move from paper to computer data; now the collaborative innovation director in Montpellier N° 22 - Sanofi's operational in charge of the clinical trial	N° 4 - Sanofi's Marketing Director for the Plavix in Spain and France
OTHER	N° 11 – Director of Toxicology (hierarchical director of all the toxicologist expert involved in the project) N° 1 – senior expert who helped with specific toxicology issue N° 12 – senior expert who helped with specific toxicology issue		

Source: the authors

Data Analysis

The data analysis of the interviews went through two stages. First, we aimed to extend our narrative story. The draft of the narrative story was developed through 100 pages and a 20-page summary, which was published in a book section. This narrative story aimed to relate the story of the collaboration but also to characterize if Sanofi and BMS were or not engaged in a simultaneous competitive relationship, and the positive and negative outcomes of their collaboration. We wanted to ensure that the case was a case of coopetition and moreover that it was a successful case. Then, we did the second round of data analysis.

For the analysis, we did not only focus on the relationship but also on the focal firm and its actions in regard to knowledge transparency. The aim was to collect a specific view of the reality. It was to show and analyze the intentions, discourses and actions of actors from their point of view (Dumez, 2013). Thus, we wanted to identify their actions and intentions when they shared knowledge with their competitor, the impact of the organization design and how they perceived and reacted to potentially opportunistic behavior. For the record, we triangulated this opportunistic behavior and transparency with some interviews with BMS and secondary data (e.g., press articles). But we looked for Sanofi's point of view of the relationship because it is the firm which proactively chooses to open up its radical innovation project to a strong competitor.

THE RESULTS

We organize the results from the case study in the following manner: we describe the organizational design chosen by Sanofi and BMS to reach the unusual success of their two drugs (cf. subsection 3.1). More precisely, the organization design at the project level was renamed by one of the interviewees "the mirror organization." Based on the identification of this mirror organization which can be considered as existing co-management principle of the coopetition literature, we looked deeper into the effect on this organization. Our analysis highlighted two main effects. First, Sanofi leverages its knowledge by the creation of new knowledge or a learning process (cf. subsection 3.2), and then it also monitors the opportunistic behavior of the competitor (cf. subsection 3.3). But surprisingly, in this last section, we perceived that the mirror organization does not protect against opportunism, and these downsides are managed by the top management and not by the project team.

The Organizational Design

The co-development and co-promotion of the Plavix and the Aprovel followed a similar design (cf. *Figure 2*). Three committees supervised the whole project: a steering committee, an R&D committee, and a marketing committee. The commitment of the two firms in these projects was huge, as demonstrated by the level of top managers involved in these committees. Indeed, these committees were led by Sanofi's and BMS's CEO-1, global R&D director, and global marketing director. The goal of the committees was to approve the budget and decide the global strategic orientation.

To take its decision and then ensure the implementation of the strategy, the committee relied on a project team. This project team was composed of employees from Sanofi and BMS. Like a mirror, every employee from Sanofi's project team was doubled by a BMS counterpart (cf. *Figure 2*). Thus, each strategic domain for the development and promotion of a drug, from toxicology to marketing, had two employees: one from each company. That means that at least 25 people from each company were in contact with one employee of BMS at the project team level. Depending on the phase of the project, they were more or less requested on the Sanofi-BMS project. For example, the two project directors were always involved in the project, but the two toxicologists' counterparts were involved only at some specific phases. For example, the toxicologists were involved before any human trial to prove that the drug is safe and then later when the goal was to expand patient population or the duration of treatment.

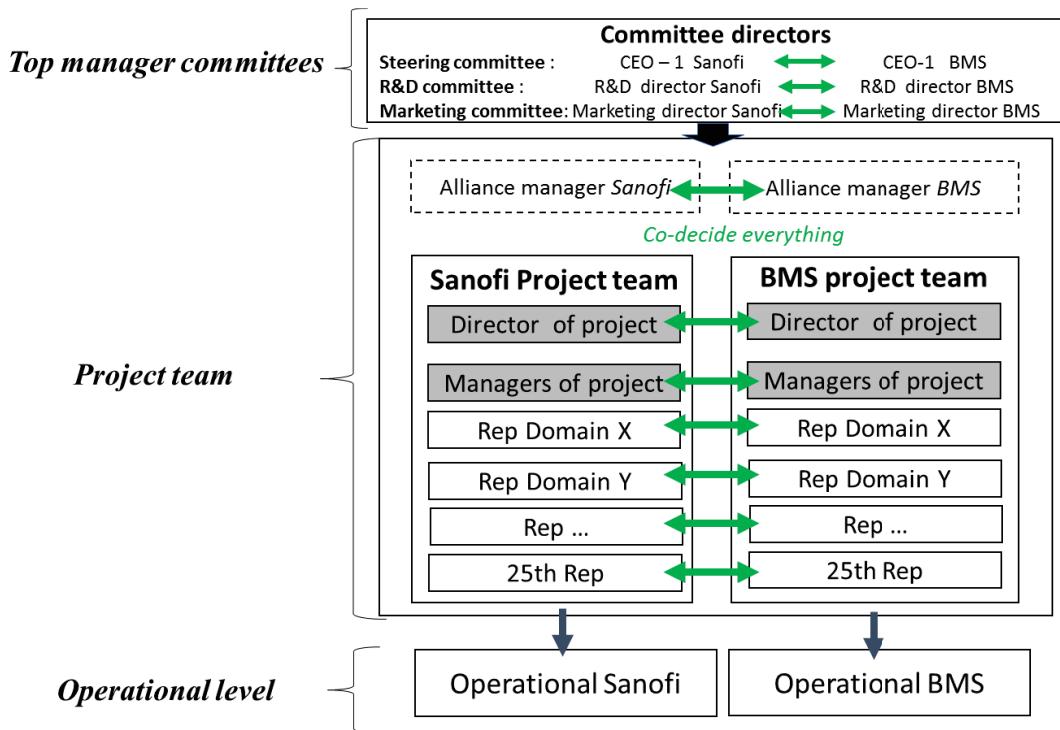
This mirror organization constrained the counterparts of Sanofi and BMS to interact. They had to agree on each decision and to speak with one voice to the committee. Officially, Sanofi had the lead on the development of the Plavix and the promotion of the drug in Europe, and BMS for the Aprovel and the American market. But in reality, one could not do something without the other's approval. Projects' progress was based on an extensive co-decision process at multiple and in multiple domains (*cf. all the green lines on Figure 2*).

One aspect of this mirror organization was that even if the counterparts from Sanofi and BMS were working together on a daily basis, each employee remained located in the parent company and they continued to work on other projects. The employees mainly worked and interacted via emails, phone calls, and video-conferences. However, from time to time, and especially when an unplanned issue emerged, they organized in-person meetings. For instance, Sanofi and BMS had to deal with an illegal generic drug commercialized by a

competitor in Canada before the end of the patent. In that case, they met at a neutral site, a hotel, and from there executed a co-constructed response.

Moreover, the project team did not just help the committee to make a decision; they were in charge of the implementation of the strategy. To do so, they split the tasks between Sanofi and BMS depending on the geographic area, their expertise or the quantity. Indeed, the operational level, especially for the development, consisted of very strictly following protocol, without any flexibility. The absence of flexibility was the only way to obtain marketing authorization. The benefit of it is that Sanofi and BMS could easily reverse their operational tasks.

Figure 2 ~ The Mirror organization



Source: The authors

The Leveraging Effect of the Mirror Organization

The mirror organization had two main leveraging effects on Sanofi. First it increased the efficiency of its traditional development and commercialization process in unexpected ways (i.e., created unexpected new layers of knowledge), and second, it allowed Sanofi to internalize some of BMS knowledge.

Indeed, the mirror organization was used not just to combine the knowledge but to create new knowledge. It aimed to create a real interaction which could lead to a co-construction of

decisions between Sanofi and BMS (cf. *Figure 3*). Both counterparts interacted on a daily basis. The leader, Sanofi's counterpart for the Plavix and BMS's counterpart for the Aprovel, always began by doing a proposition of action. This proposition was based on Sanofi's knowledge and past experiences. The BMS counterpart then compared the Sanofi leader's proposition against what he would have done. Most of the time, the BMS counterpart would counter with a different proposition, based on their experience and even routines. Then the two parties would discuss the pros and cons of each proposition. One interviewee illustrates the process for the reinforcement of a clinical plan:

[...]For example if they put together a clinical plan, and then one party says, ok we know much better about this area, and you should not design the clinical study this way, you have to design it that way. Or we know that it's difficult to get the approval if you do it that way, and you'll need these [additional] experiments, fire marks or whatever. So they contribute with inputs. They're trying to shape the clinical plans."

As a result, the proposition that emerged was an improved combination of the two partners' existing knowledge (cf. *Figure 3*). An interviewee highlighted that they were looking for synergies and not just added knowledge:

"Everyone in his domain of competencies needs to bring something. After there is a value added generated from the fact that we work together, again it is not just an addition of what we bring, we are looking for synergies."

More concretely, the counterpart received the instruction to share any knowledge or experiences that could bolster the success of the project (only data from another project, due to confidentiality reasons, could not be shared). One interviewee from Sanofi compared this situation as two persons working "hand-in-hand:"

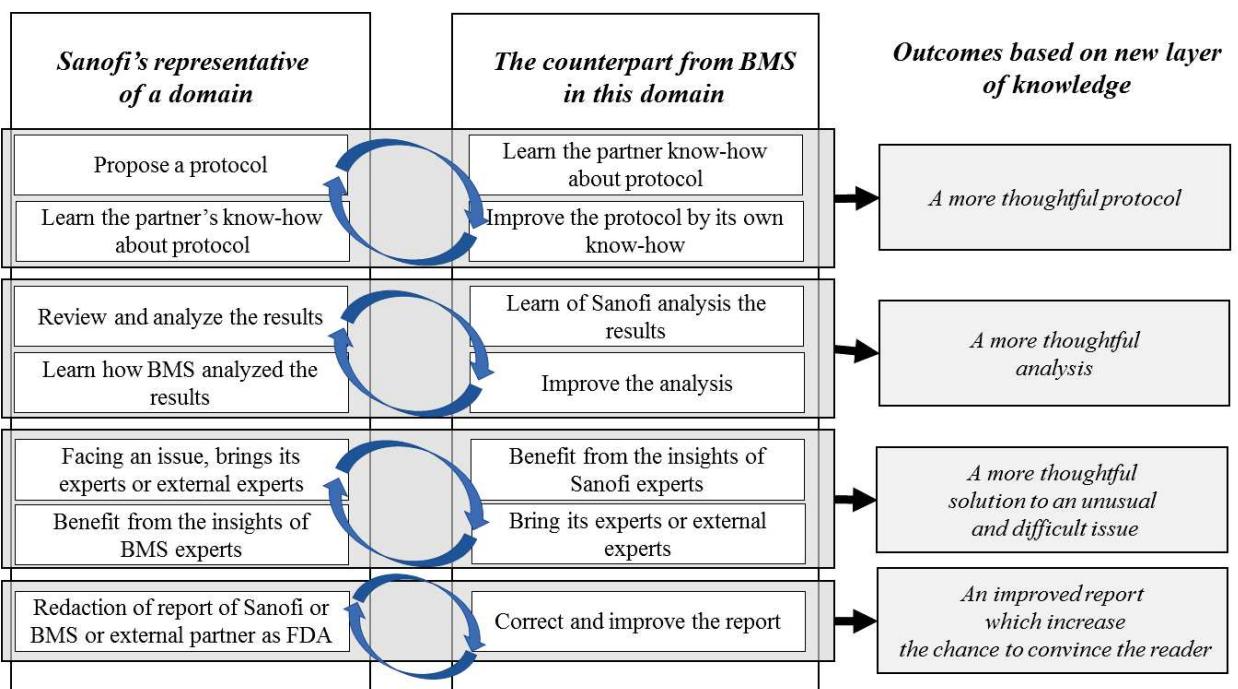
"They told me, from now on, you are going to work with a BMS colleague; you will have to work hand in hand with him."

The consequence of this reinforced decision process was that the committees gave more credibility and legitimacy to the proposition of the project team. While top management considered project member duplication to be costly in time, it guaranteed a thoughtful decision. (cf. *the outcome of Figure 3*). A more concrete example of this benefit is that by presenting its initial plan to BMS and receiving feedback and ideas, Sanofi managed to reduce

total duration of the development by over six months. Indeed, when Sanofi explained to BMS how they planned to organize the analysis of the results, BMS's brought its own insight based on experience and their personal contacts into the FDA. BMS wondered if it was possible to ask the FDA for authorization to begin analysis while the development team was still finishing the tests, so Sanofi and BMS co-constructed a special request to the FDA. When the FDA approved this request, the time to market for the Plavix was reduced by six months. One of the interviewees relates this story:

"BMS was in contact with the FDA, which is the U.S. Health Agency. Thus, we could make tactics, let's say - analyzing data even if it was not finished yet. It makes us win six months."

Figure 3 ~ The new layer of knowledge due to daily interaction between two counterparts



Source: authors

As a result of the duplication, more thoughtful and intentional processes are allowed to occur. For example, a counterpart can verify the quality of a report sent to medical authorities. When the managers are duplicated, the counterpart can verify the quality of the report. If a firm does not manage or have the approval of their drugs, it is a disaster. It means that all the investment has been wasted. Therefore, any action that can improve the application is key. An interviewee illustrates that having a counterpart improved the quality of the final report that they give to the FDA:

"and even for the study report, It is shared. Before finalizing it, both parties [Sanofi and BMS] read it. Because we always have a different perspective, it allows to take a step back from and ask questions. For the one writing, it, it seems logic but not for the one reading it. [...] by exchanging and the double reading we are sure that all is optimal. We are all engaged in the same boat, and we need to reach the same goal."

These close interactions at multiple levels and in each domain of the project team guarantees efficient decision-making, due to a larger portfolio of resources and experiences. It allows knowledge transfers and knowledge co-creation.

The *second effect* of the mirror organization is that it not only creates new knowledge but also reinforces the power of experts who are involved in the project. Indeed, this counterpart process works as a mentorship on explicit but also tacit knowledge. For example, Sanofi learned how to structure its question to the FDA (a United States federal agency in charge of the marketing authorization processes in the US). One interviewee refers to this specific nontangible learning:

"There are not tangible things, for example, if you are interacting with health agencies: how to approach how to ask questions. French we arrive like that with our big clogs... Yes, there are positive aspects of this approach but the Americans they have their own way. It's more a way of being; it's more subtle things. And that is not protected, by anything. You just learn! It's like, you're going to have an internship master that will teach you something. You learn from him; you will never have read it in a book: this is something that will perhaps lead you afterward to use these approaches, etc."

Another interviewee speaks well of his counterpart and highlights that he owes him a lot:

"I was working alone and all of a sudden we have to work with someone else. The person with whom I was in daily contact ... well, I can quote him because he is someone who I learned a lot from, [...] It was Mister X who was in clinical development, who was much senior to me."

One example of mentorship and nontangible learning was when BMS sent teams to teach Sanofi how to succeed in acquiring FDA approval. Sanofi needed to acquire FDA approval if BMS was to successfully commercialize the Plavix in the US. BMS had invested in this

possibility; the failure of the project would have been a disaster. Because of this, BMS had a real incentive to help Sanofi strengthen its ability to acquire FDA approval.

The Monitoring Effect of the Mirror Organization

The mirror organization is also a way to monitor BMS, and reciprocally for BMS to monitor Sanofi. As the two counterparts have a similar specific domain of competencies (e.g., toxicology, pharmacovigilance, marketing), they could evaluate the level of implication of their counterpart and its contribution to the success of the project in their domain. These close interactions were a way to monitor the counterpart. One interviewee refers to some of its counterparts who did not integrate this need of collaboration and transparency:

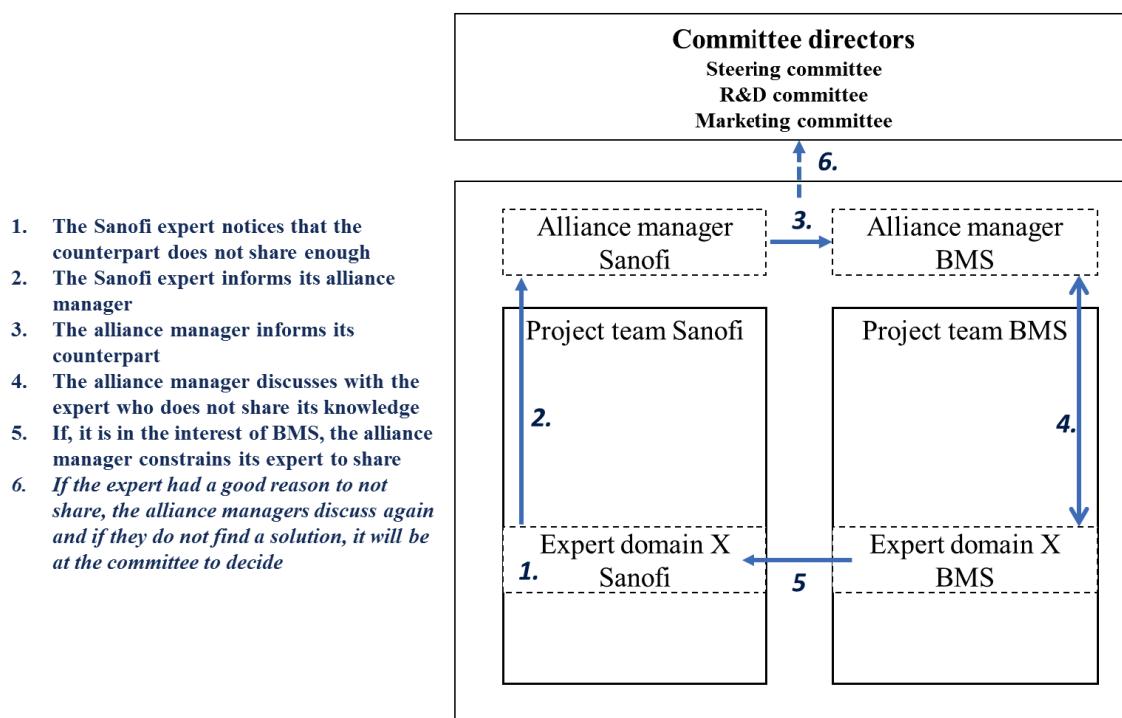
“There are really dumb people. I worked with people, they focus just on them. At one moment, we say « Stop ». We are not a trade unions with demands. It is a top management order to work together in collaboration. At one moment you just have to implement the means of interaction [they chose], whether you like it or not”

The interviewee quote also stresses that the expert had no choice but to collaborate and be transparent – it was an order from top management. If the partner failed to contribute enough or its involvement in the project decreased, they reported it to the alliance manager. The alliance manager would inform the other alliance manager and it would be managed internally by BMS. Thus, by a mirror organization, Sanofi could guarantee BMS contribution to the project, and reciprocally BMS could impact Sanofi contribution (*Figure 4*).

If the representative of BMS had good reason to not share specific knowledge, the alliance manager of BMS and Sanofi would negotiate to find a solution. If at this level they did not find a solution, the conflict would be reported to the decisional committee who had to address the issue and inform the representation on how to behave.

For instance, due to the competitive perception of each partner, the marketing representatives from Sanofi and BMS had issues sharing their best practices. As a result, the two alliance managers, supported by the decisional committee, decided to create common events such as team building activities, and decided to organize informal events, such as common dinners.

Figure 4 ~ The management of conflict due to a representative who did not share enough transparent



Source: the authors

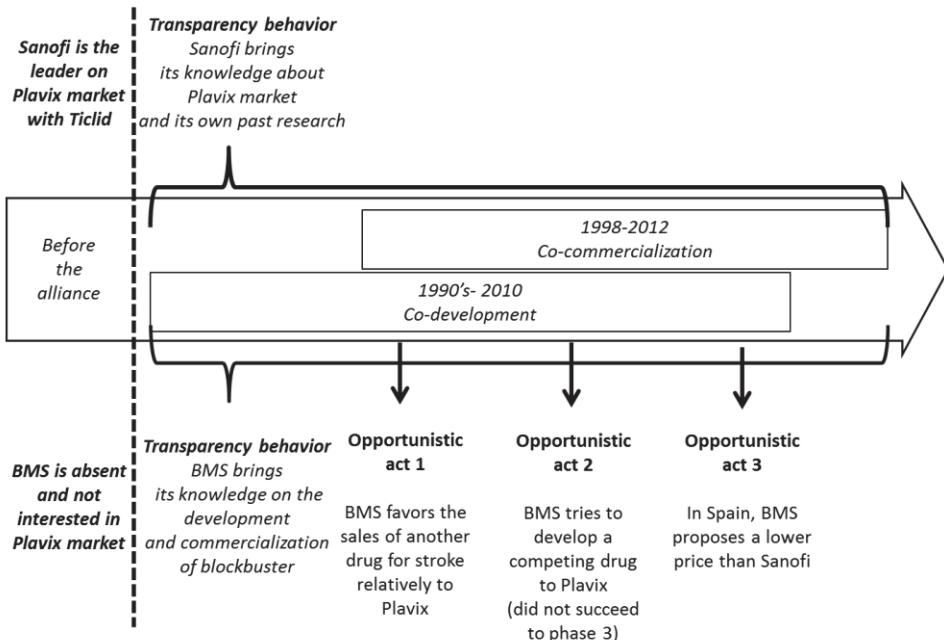
The Mirror-Organization an Invitation for Opportunism

By contrast, this mirror organization, which requires the partner firms to engage in close and intense interactions at multiple levels across the competitive interface, gave BMS opportunities to behave opportunistically (i.e., to learn about all the Plavix past research and about the opportunities of the Plavix market) (cf. *Figure 5*). All these interactions allowed BMS to perceive a strategic opportunity in the cardiovascular market. BMS decided to internally develop a competing drug to the Plavix. A patent was filed, but luckily for Sanofi, this drug failed in Phase 3, just prior to commercialization. If BMS had succeeded in the commercialization of this drug, Sanofi would have created its own competitor in the cardiovascular market.

Moreover, the mirror organization did not hinder opportunistic behavior in the value appropriation phase. First, on the US market, BMS gave priority to the sales of its own cardiovascular drug relative to the co-developed drug “Plavix.” Second, in some countries like Spain, due to legislation constraints, Sanofi and BMS had to sell the same product under two different brands. Thus, they were in direct competition in Spain. For example, in one of the largest hospitals in Madrid, each company had a full-time sales representative in charge of selling the drug. Because the product was the same, for the sales representative, it was not

possible to differentiate them based on product characteristics. Thus, to boost the competitiveness of their product, BMS decided to lower its price compared to Sanofi's product.

Figure 5 ~ BMS's opportunistic behavior



Source : the authors

One specificity of this mirror organization, which invites opportunism, is that the project team is protected from any conflict which could occur due to this opportunism. When a conflict arises, the alliance manager and the committees deal with it. At no moment is the project team informed. Thus, most of the interviewees were not even aware of BMS's opportunistic behavior during the collaboration (cf. *Figure 5*). Some employees even considered that this organization put them in a kind of bubble, separated from the rest of the company and even from the firms' issues. One representative of toxicology in the Plavix case argues:

“We were disconnected from... from the firm objectives. We do not think about money; we just think about finding the best solution to this scientific issue.”

Thus, they were in a sort of virtual separation between the top managers who dealt with BMS's opportunistic behavior and the project teams who needed to focus on the co-creation of knowledge.

DISCUSSION

Based on our theoretical background, we argue that transparency is a mandatory condition for unlocking radical innovation opportunities of a coopetition strategy. Moreover, one of the managerial tools to unlock this transparency is the co-management principle. This managerial principle can foster a restricted and controlled transparency. However, we extended our reflection by highlighting through Kale et al. (2010) that co-management could also be used to foster a greater and freer transparency. Any action that restricts transparency negatively impacts knowledge sharing accuracy, comprehensiveness, and timeliness.

The co-management principle

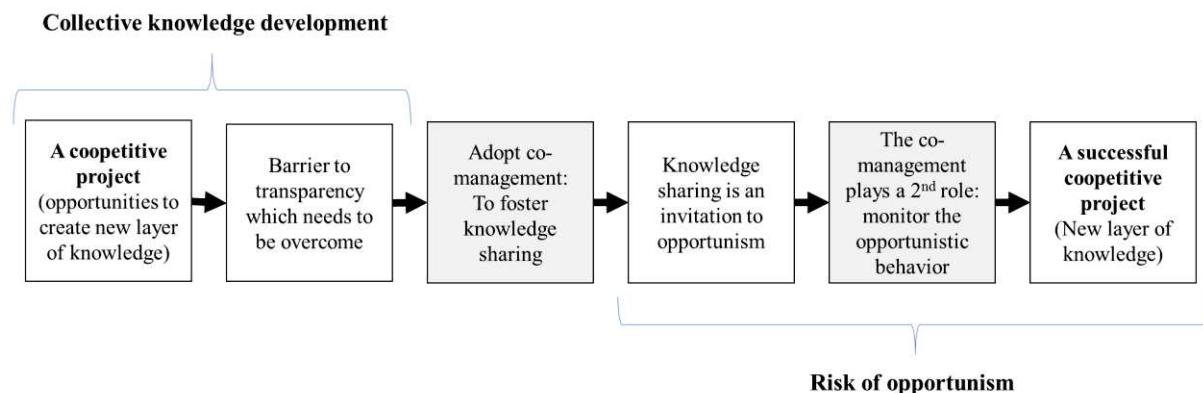
This research studied the means to unlock the radical innovation opportunities of a coopetition strategy by focusing on the co-management principle. Our case study confirms and extends our understanding of the co-management principle and its actions to unlock the radical innovation opportunities (Fernandez et al., 2017; Le Roy & Fernandez, 2015). We first confirm the key role of co-management to ensure the pooling of each other resources (Fernandez et al., 2017; Le Roy & Fernandez, 2015). Indeed, in our case study, the duplication of the team member is a way to empirically control the real contribution of each other. The counterpart will directly notice if one of them is sharing non valuable or only generic knowledge. By implementing a co-management principle, the involved experts are expected to learn and benchmark their practices with a strong expert belonging to a competing firm (i.e., with different experiences and routines). They will directly notice if the counterpart does not bring additional insight. Moreover, we did not just confirm the use of the co-management to monitor the coopetitor opportunism; we extended the possibilities of co-management use. Our case study highlights a way to use this principle which differs from fostering a restricted and controlled transparency principle (Fernandez et al., 2017; Le Roy & Fernandez, 2015). Our Sanofi case study shows that it can be used to foster freer and greater transparency. Indeed, it can create a kind of bubble with high relational interaction and feeling of fairness and justice in the decision process. We argue that co-management could foster greater transparency by enhancing the relational capital and the perception of integrative conflict resolution.

Moreover, in our case study, all the project teams are duplicated and work together on a daily basis. However, our case study differs from the one of Le Roy and Fernandez (2015) concerning the colocalization. In Le Roy and Fernandez (2015), the duplicated project team

are located together in a same third location. Moreover, to control the knowledge flow and simultaneously allow the project success, they cut off the link between the project team members and the other employees of their parent firms. In our case study, it is the opposite. Each counterpart is located in its parent firm. If intuitively we could think that it reduces the knowledge transparency because the counterpart is not colocalized, it increases the firms' capacity to learn and internally diffuse the knowledge created and learned during the project (Hamel, 1991). Estrada et al. (2016) have already highlighted that competitor collaboration positively impacts the firm product innovation performance when the focal firm implement a internal knwoledge sharing process (i.e., make sure that the knwoledge is duffuse inside the parent firm). One contribution of this article is to highlight that in order to increase the knowledge transparency, it may be more effective to allow the expert to be located in their parent firm instead of co-locating them.

Thus, this use and form of co-management highlighted by our case study is in contradiction with the dominant stream of literature on the management of coopetition. Indeed, this dominant stream argues that firms should reduce the ability of the partners' to internalize its knowledge (Baumard, 2010b; Fernandez & Chiambaretto, 2016). By contrast, our case study reveals that management of coopetition can consist in not hinder the partner internalization of the knowledge. The intent is to foster conditions for collective knowledge development. However, our case study agrees with the past literature highlighting the need to manage the opportunism. The only difference is that instead of acting on the partner's ability to behave opportunistically, the firm acts on the partner's willingness to behave opportunistically with the knowledge internalized. For this purpose, the co-management fill two roles : (1) fostering transparency, (2) reducing the partner's willingness to behaving opportunistically through relational capital and establishing the first step of an integrative conflict resolution. We schematized this reflection through a linear process (cf *figure 6*). In reality, the linear process is a simplification of the two roles of co-management happening simultaneously.

Figure 6 ~Synthesis



Source: the authors

Coopetition, transparency and radical innovation

Our research question emerged from the ambiguous results and position of researchers on the impact of coopetition and radical innovation. In the literature addressing coopetition strategy for radical innovation, coopetition is widely and successfully used to achieve innovations in various industries (Gnyawali & Park, 2011; (Bouncken & Fredrich, 2012) Pellegrin-Boucher, Le Roy, & Gurau, 2013; Yami & Nemeh, 2014). However, for some other researchers, cooperation with competitors remains a counterintuitive and risky strategy (Mention, 2011; Nieto & Santamaría, 2007). For those researchers, collaborating and especially knowledge transparency with competitors are invitations for opportunism (Mention, 2011). Thus, the transparency is just a fallacy or a transition state because one partner behaves opportunistically (Larsson et al., 1998; Loebecke et al., 1999).

We investigated an unusually successful case and highlighted that Sanofi and BMS, two competitors, implemented greater and freer transparency in comparison to what the literature on the management of coopetition predicted. Indeed, the co-management was organized in a way to foster knowledge creation (i.e., benefit from synergy) and not just to create a plug-in structure (i.e., benefit from the added knowledge). Thus, our study takes part into the controversial discussion on the link between coopetition and radical innovation by highlighting an additional case in which two competitors successfully created new layers of knowledge.

Our research is in the further course of Gnyawali and Park (2011), Bouncken and Fredrich (2012) and Le Roy and Fernandez (2015). It goes beyond existing research by giving one additional explanation that highlights why only a competitor could create these synergic and

leveraging effects. Indeed, the knowledge creation of our case study relies on the duplication of each of the team members and more precisely on their interactions and benchmarking processes. A non-competitor could not duplicate so extensively and intensively all the team members of the project. Moreover, a non-competitor could not, so quickly and easily, challenge and positively influence the partner's decision.

In some ways, our case study did also partially confirm the argument of the opponent to the coopetition for radical innovation. Indeed, these opponents argue that coopetition is not a relevant strategy because it is an invitation to opportunism (Mention, 2011). Our case study partially confirmed their arguments. BMS used Sanofi knowledge to try to imitate the Plavix. However, contrary to the past research prediction, this opportunism did not stop Sanofi's collaboration or transparency with BMS. Sanofi continues to collaborate transparently with BMS despite the opportunistic behavior. Thus, the counterintuitive contribution of our research is that sometimes is can be worthwhile to put up with opportunism when it arises. Indeed, when opportunism arises, the focal firm needs to revisit the broader purpose of the collaboration.

Sometimes the broader purpose of the transparency can justify overcoming the opportunism and treating it as a punctual conflict. In these very specific cases, opportunism is not a barrier to transparency but a conflict that need to be managed. These conflicts are resolved by the top managers. The team level is not involved in these competing considerations. If we extrapolate a bit, we could even argue from this case study that erasing the risk of opportunism is not entirely beneficial for radical innovation. The risk of opportunism might be the proof that the coopetition is creating value and new knowledge. BMS began to imitate the Plavix internally only because the Plavix was such a success.

MANAGERIAL IMPLICATIONS

Our findings might serve as interesting guidelines for top managers and project managers. First, they confirm that coopetition strategies are relevant to addressing the challenges of radical innovation. These strategies allow the creation of new layers of knowledge and improve the radical innovation process success. Moreover, only a competitor can challenge every strategic decision in every domain of the innovation process. Thus, we encourage top managers to consider collaborating with even their strongest competitor. Both partners will benefit from the exploitation of their complementarities under the proper circumstances. Second, our findings provide some directions for an adequate organizational design: the co-management principle with a localization of the counterpart in their own parent firm (i.e.,

mirror organization). Third, opportunism should not be perceived as a barrier of transparency but as an indicator of value creation which needs to be dealt with as a punctual conflict. One way to deal with this conflict is to escalate it from the project team to higher management. This escalation of the conflict protects the project team against the pervasive and intuitive reaction of reducing transparency when a conflict arise.

CONCLUSION

Coopetition is a widely adopted strategy. However, its impacts on radical innovation are still ambiguous. Our article explains this ambiguous result by the degree of transparency and its management. We argue that firms need to look for greater and freer transparency to unlock the radical innovation opportunities of coopetition. Any action that reduces its transparency can lead to “shooting itself in the foot.” Indeed, by reducing transparency, a firm is likely to destroy the possibility of developing new knowledge (i.e., a key process for creating radical innovations).

This reflection is particularly counter-intuitive because the partner is a competitor. *A priori*, being highly transparent with a competitor is an invitation to opportunism. Our study empirically confirms this *a priori*. However, our study also highlighted that sometimes firms need to fight against the intuitive reaction of reducing transparency when the partner behaves opportunistically. The focal firm needs to analyze the purpose of the collaboration and why this opportunism has happened. It might be relevant to overcome the opportunism and to treat it as a “punctual conflict” when there is behind a bigger knowledge creation intent.

Finally, we highlight the key role of the organizational design and the one of co-management principle for fostering greater and freer transparency. More precisely, our study extends our understanding of the co-management principle because we revealed that there are different forms and intent behind the implementation of co-management principle. When the intent is that the co-management fosters greater and freer transparency, the co-management should aim: (1) to generate relational capital, (2) to implement an integrative conflict management, (3) to allow the counterparts to remain located in their internal organization and thus diffuse internally the knowledge learned.

The results and contributions of this study suffer from some limitations that also offer opportunities for future research. First, our case study focused on only one extreme case within an industry, and therefore the findings should be interpreted with caution and need to be tested through other cases (e.g., non-knowledge intensive industry, nonhighly regulated

industry). Second, we highlighted from this extreme case study a new mediator variable between coopetition and radical innovation: the management of knowledge transparency. Currently, quantitative research is needed to confirm and further explore this mediator variable. Third, while we investigated the opportunities of transparency and highlighted some opportunistic behaviors, the management of opportunistic behavior without reducing the transparency needs to be investigated in future research.

Part 3 ~ Knowledge claimed

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Introduction Part 3

This doctoral research aims for a more comprehensive understanding of the ways of strategizing and managing coopetition. The research's intent is to highlight and theoretically explain an empirical fact which is in contradiction with the dominant view of the coopetition literature: the high knowledge transparency in coopetition⁶³.

This Part 3 is divided into two chapters. We begin by synthesizing the main results of this doctoral research, and we put them in perspective with the existing literature. More concretely, our synthesis of the results identifies three main ways of strategizing and managing coopetition. Each way relies on a different degree of transparency. If the two first ways are confirming practices already identified in past research (Fernandez et al., 2017), the third one is a puzzle. It is a contradiction to the theoretical roots of the first two, roots which are dominant in the coopetition literature. We conclude this first chapter by building an integrated framework. This integrated framework consists in identifying five transversal variables which can be used in different ways of strategizing and managing coopetition. However, each research project is characterized by its contributions and its boundaries' conditions⁶⁴. Thus, in the second chapter, after stressing out the theoretical, managerial and methodological contributions, we are specifying the boundaries' conditions of the knowledge claimed. Being aware of these limitation gives more accuracy and explicit value to the knowledge claimed by the research, and above all gives future research opportunities.

⁶³ Rephrased: why does the focal firm enable the coopetitor when the literature on coopetition predict that the focal firm is going to obstruct the appropriation of the knowledge shared?

⁶⁴ Boundary conditions are initially used to place limitations on the propositions generated from a theoretical model (Busse, Kach, & Wagner, 2016). As our research is not a pure theoretical model, we use boundary conditions as a general limitation.

Chapter 1 ~ Synthesis of the main results

This chapter aims by looking at the firms' knowledge sharing to answer the research question: *How do firms strategize and manage coopetition?* To do so, we crossed the results of the three manuscripts of this doctoral research and the existing literature on coopetition. The process leads us to argue that:

"A firm involved in a coopetitive relationship has a continuum of choices for strategizing and managing coopetition. Concerning the knowledge sharing to implement, the focal firm has three main choices: a low transparency, a restricted and controlled transparency, or a high transparency."

For the interests of clarity and simplicity, we first decided to present only three degrees of transparency on a continuum of choices: the two polar ends of the degree of transparency (i.e., low and high transparency) and one in-between (i.e., a restricted and controlled transparency). Moreover, we decided to present them in an ascending order regarding the degree of transparency instead of following our chronological research inquiry.

Section 1 ~ The low transparency

Our doctoral research, by confronting the empiric results and the literature, highlighted a first way of strategizing and managing coopetition: a low transparency. The firms might reduce their degree of transparency to its lowest level to unlock the value creation opportunities of coopetition. Indeed, the practice of low transparency allows the focal firm to overcome its fear of coopetition (cf. subsection 1) and even creates an incentive to contribute to the project with its best knowledge and technology (cf. subsection 2).

1. A low transparency to overcome the fear of coopetition

One first way to use transparency in coopetition is to reduce the degree of transparency to its lowest level. This low degree of transparency unlocks the value creation of coopetition by overcoming the fear of sharing strategic knowledge with a competitor. Indeed, our manuscript

2 highlighted that since the year 1950, Total has been involved in successful coopetitive projects in which it can contribute to the exploration and production project success with its best technology and without fear of proprietary technology leakage. There is no fear because the project is designed in a way that the strategic technology is never exposed to the coopetitor. Concretely, the operator oversees all the tasks, unless the project could gain in efficiency by using one of the coopetitor technology. In this case, the operator delegates one specific and very narrow task to its coopetitor. The coopetitor accepts because first, it is an external signal of the superiority of its technology and because the firm does not fear technology leakage. The task is internally performed, and the focal firm will share only the outcomes. Thus, in this coopetitive project, Total is contributing, without fear, to the success of the project with its best technology as its very powerful computer or its steel pipe able to toxic gas.

This managerial solution of partitioning the task of a project to unlock the sharing of strategic knowledge between competitors had already been highlighted in past coopetition literature (e.g. Faems, Janssens, & Van Looy, 2010; Fernandez, Le Roy, & Chiambaretto, 2017; Oxley & Sampson, 2004). This partition takes different names “plug-in structure” (Hamel, 1991) or “separate project team” (Fernandez et al., 2017). More concretely, it consisted in (1) partitioning the project activities depending on the strength and weakness of each partner, (2) letting each partner perform the task independently, (3) and combining only the outcomes (Faems et al., 2010). It is considered as a relevant means to collaborate with a competitor and to reduce the risk of unintended knowledge spillover. Partitioning the activities by task domains, knowledge domains, commercial domains allows firms to simultaneously benefit from the use of the current best technology and limit the exposure of their strategic knowledge (Faems et al., 2010). Thus, our first contribution is to provide an empirical proof that separate project teams support successful coopetition cases. It allows for overcoming the fear of sharing strategic knowledge by reducing to lowest level the focal firm transparency (i.e. limit the exposure of the technology).

This contribution has three implications, first we increase the external validity of this project design as Total is a company who is supposed to have developed relevant managerial solutions (i.e., Total executes 90% of its exploration and production in coopetition, and has more than 70 years of experience of coopetitive relationship). Second, we can take a stand against past research which argues that coopetition is a fallacy because the fear of opportunism hinders the sharing (Mention, 2011; Nieto & Santamaría, 2007; Santamaria &

Surroca, 2011). Our doctoral research provides the empirical proof that the managerial practice of “low transparency” (i.e., separate project teams) overcomes the fear of sharing due to the competition dimension. Thus, the third implication is that we also confirm the sub-stream of coopetition which argues that the management is the “missing link” between coopetition and the performance (Le Roy & Czakon, 2016; Le Roy & Fernandez, 2015).

2. A low transparency to stimulate the use of the best existing technology

The manuscript 2 identified that the low transparency fosters an internal technology competition between the coopetitors. Indeed, in the oil and gas industry, the exploration and production projects are also showcases of the current best technology. Thus, having the operator delegating one specific task to a focal firm increases the focal firm’s competitive advantage on the market. Indeed, it sends a signal to the market that even the competitors recognize that for this task, relatively to them, the focal firm has a superior technology.

This empirical observation extends the use of separate project teams in coopetition literature. The separate project team does not only allow firm’s to overcome the fear of sharing (Faems et al., 2010; Fernandez et al., 2017), it creates incentives to provide the best knowledge to the project. This is in contradiction with the past research that argues that the positive effect of coopetition will be low because the coopetitors will offer the only secondary technology. We develop a proof that focal firms have two main incentives to support the coopetitive project with its best technology: (1) increase the success of the project, and thus the potential rent capture, (2) increase its technological competitive advantage on the market. This contribution is a follow-up to the “self-restraining strategies” (Depeyre & Dumez, 2007). Indeed, the separate project team stimulates the use of the best technology in the coopetition project only if the operator is implementing a “self-restraining strategies.” The operator must be known for using the competitor technology if its technology is superior.

For the record, we also confirmed that this willingness of providing the best technology depends on the resource investment in the project (Gnyawali & Charleton, 2017). The more the focal firm invests in the project, the less it endures a failure, and the more strategic resources will be shared (cf. manuscript 1).

Sum up on Strategizing and Managing coopetition through low transparency

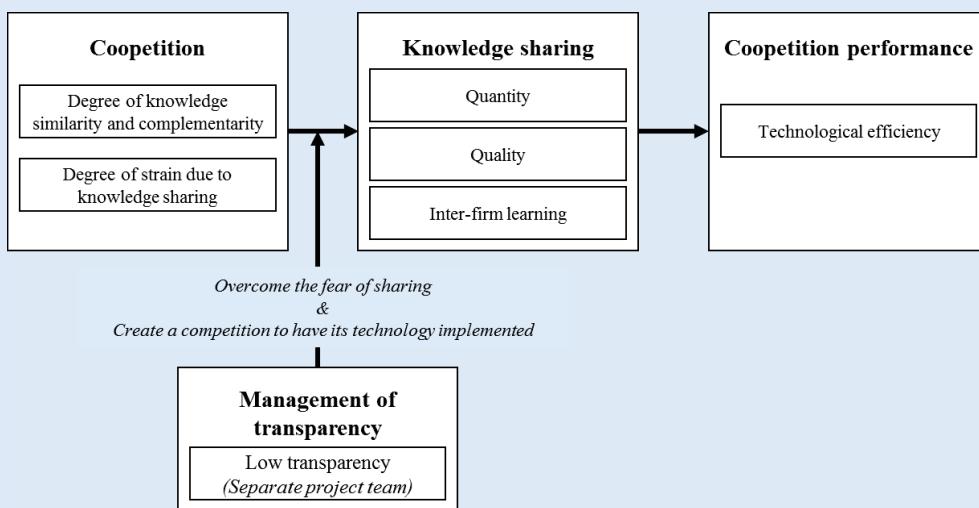
Contributions:

- Provide empirical proof of a firm using successfully for more than 50 years this low transparency in most of its coopetitive projects, and that this low transparency is implemented through a separate project team.
- Confirm that low transparency through a separate project unlocks the coopetition opportunities by overcoming the fear of sharing knowledge with a competitor (i.e., reduce the exposure to the risk of proprietary knowledge leakage).
- Extend our current knowledge about separate project team by identifying that it does not only allow a firm to overcome the fear of sharing; it creates incentives to provide the best knowledge to the project.
- Contradict, with an empirical case, the past research which argues that coopetition is a fallacy because of the fear of knowledge sharing.
- Contradict, with an empirical case, the past research which argues that coopetition leads to sharing only secondary or obsolete technology.
- Confirm the key role of management in coopetition.

Proposition:

“Reduce the degree of transparency to a very low level by partitioning the activities is a managerial tool which enables the focal firms to (1) overcome the fear of combining its strategic knowledge with its competitor’s (i.e. by not exposing the knowledge), (2) stimulate its willingness to provide its best and most recent strategic knowledge. Thus, low transparency unlocks the coopetition opportunities. It is a first way to strategize and manage the coopetition.”

Synthesis of our reflection:



Section 2 ~ The restricted and controlled transparency

Low transparency is what supports the coopetitive project's success by limiting the exposure of the firm's strategic knowledge to its competitors. Each technology is used internally without risk of the coopetitor internalizing it. However, our empiric results highlight that some firms like Sanofi and Total sometimes choose to implement project designs which allow close interactions between the experts of the two competing firms and above all the sharing of knowledge to co-create a radical innovation.

More concretely, our doctoral research, by confronting the empiric results and the literature, highlighted the existence of a second way of strategizing and managing coopetition: a restricted and controlled transparency. Indeed, to unlock the value creation of coopetition, the focal firm might look for fostering interactions between its experts and the competing firm's expert (cf. subsection 1). But the focal firm is not naïve and controls the transparency very strictly (cf. subsection 2) and even relies on the experts to use techniques which allow the sharing but restrict the coopetitors potential for learning (cf. subsection 3). This is why we named this transparency: "the restricted and controlled transparency. "

1. Some transparency is needed to foster interaction

In our two cases studies, Total and Sanofi felt the need to implement a project design which allows the interactions between the experts of the two firms. Indeed, if accessing the partner's existing best knowledge allows gaining technological efficiency, it does not allow to create new, unexpected layers of knowledge. In manuscript 2, Total shifted from the separate project team to projects which allowed the interaction between the competitors when the project goal was to move beyond the current technological constraint and co-created a technology able to explore and produce the oil and gas of geographical areas considered until then as inaccessible. Similarly, in manuscript 1 the development of the projects of Plavix and Aprovel were so risky and complex that Sanofi did not just want BMS's resources, it wanted its current processes to be leveraged by BMS. Sanofi was looking for a partner able to challenge and improve its current development and commercialization processes on the Aprovel, a drug that Sanofi did not know a lot about, but also on Plavix a market in which Sanofi was already the current leader. For instance, Sanofi's initial development plan for Plavix was reduced by six months by interacting with BMS. This technique to speed up the

development was not an existing technique used by BMS. It was a solution co-created during the interaction. Thus, for Sanofi and Total allowing the interactions between the experts were key and almost mandatory to unlock their intent of co-creation of knowledge.

These empiric results confirm Fernandez et al. (2017). Indeed, they had highlighted that if separate project teams are relevant for incremental innovation, there is no relevance for radical innovation. Indeed, for radical innovation, the generation of new knowledge and capabilities requires them to access their partners' resources and competencies ideally on a daily interaction (Fernandez et al., 2017; Gnyawali & Park, 2011). Our two-fine grained case studies extended Fernandez et al. (2017) by identifying that the daily interactions are key, not only because the focal firm will have a greater and deeper access to the partner resources, but because the interaction is going to leverage the decision process that the focal firm would have decided alone. By implementing close and regular interactions between the experts of the two competing firms, firms leverage the benefit of accessing and combining the resources between competitors. It is this emulation process which is the core intent behind close interaction. This makes one wonder if the Ritala et al. (2014) business model of coopetition might be enhanced by fostering interaction. Nonetheless, we have empirical proof that it is possible to implement knowledge interaction successfully between competitors.

Moreover, our manuscript 2 extends the literature by identifying multiple drivers at multiple levels which are likely to impact positivity the need to shift from a separate project team to a project that fosters interactions (e.g., the technological convergence, the perception of its technology as vulnerable, the capacity of the partner to create emulation). We could even predict a trend which is that in our highly technological and competitive global environment more and more projects are going to shift from the separate project team to a more transparent team (cf. manuscript 2). Thus, if in the past section, we had identified the low transparency practice and provided empirical proof of its relevance, there is also a second possibility of transparency practice. This second transparency practice is *a priori* more transparent than in separate project team because it allows and fosters regular and close interactions between the experts.

This second way of strategizing and managing coopetition was confirmed recently because the literature of coopetition has identified a project structure to manage coopetition innovation projects which allows the competitors to interact. This project structure, called the “coopetitive project team,” consists of a team separated from the parent firms and in which both firms pool their technological, financial and human resources. Its specificity is that the

team members from the competing firm are pooled and work together on a daily basis to develop innovation capabilities (Fernandez et al., 2017; Le Roy & Fernandez, 2015).

2. A controlled transparency to monitor the success of the project and the flow of knowledge

In manuscript 3, we are digging deeper into the implementation of this additional transparency which looks for the benefit of interactions. We find that Sanofi created a project design in which each member of the project team was duplicated by a counterpart belonging to the other firm⁶⁵. To make sure that the two counterparts were interacting, each decision had to be approved by the two counterparts, and they had to speak with a single voice in front of the committee. Moreover, the duplication of the expert was a means to control if the competing firm was providing strategic knowledge. Indeed, only an expert with similar knowledge can be able to judge the quantity and quality of the knowledge brought into the project. If one expert considers that the other counterpart was not collaborating enough, there was a process to solve the conflict at the level of the project manager. Thus, if the knowledge not shared by the expert was critical for the project's success, the project manager could compel the expert to share it.

These empirical results highlight that even if they promote more transparency by implementing interaction between the experts of the two firms, the transparency can also be a way to monitor the competitor and its involvement in the project. Past research had already identified the key role of duplicated the experts and their monitoring role (Le Roy & Fernandez, 2015). They called it the “dual management.” Thus, our doctoral research confirms the key role of “dual management” to foster and control the reciprocal transparency. It is interesting to notice a difference in the modality to create an incentive to share a lot and to share the strategic knowledge. In the first transparency called low transparency, the incentive relies on the external signaling of the superiority of the technology, when in this second transparency, the incentive relies on a direct control by duplicating the expert.

When in a coopetition project based on interaction, both firms use transparency to monitor each other. The transparency is strictly controlled. Even if we have no data on it, past

⁶⁵ Even if we did not develop it in the three manuscripts of this doctoral design, we found a similar duplication of the team member in the Total case. We put this design in annex and our goal is to develop it in a future paper.

literature has highlighted the key role of the project manager in coopetitive project team (Le Roy & Fernandez, 2015). They strictly control the project's success and the knowledge flow. They have two powers: to prohibit transfers required by their top management and to allow information transfers prohibited by their top management (Le Roy & Fernandez, 2015).

3. A restricted transparency to obstruct the coopetitor's knowledge internalization

In manuscript 3, Sanofi and BMS told some marketing experts that even if it was an order for the top management to work hand in hand with its counterpart from the other company, they would refuse to collaborate and share their good practices. To solve this issue the top managers decided to implement team building training. For the record, one of the alliance managers explains that he did not know why, but interacting and collaborating with competitors was much easier for the research expert than for the marketing expert. Thus, if all the experts were invited into the team building, it was conceived in priority for the marketing one.

This empiric result highlights the complexity of increasing the degree of transparency. The more the transparency increases, the more the individual need to integrate the paradox of sharing strategic knowledge with a competitor. Indeed, in low transparency, there is no sharing paradox. The project design limits a priori the sharing. The past literature on the management of coopetition is rooted in the theoretical debate of the individual capacity to integrate the paradox or not (Bengtsson & Kock, 2000; Chen, 2008; Seran, Pellegrin-Boucher, & Gurau, 2016). Our manuscript 3 takes a stand into this debate of the individual capacity to integrate the paradox by highlighting that all the individuals are not a priori able to integrate the paradox, but it seems that through specific training this barrier to coopetition can be overcome. Moreover, our empiric results seem to highlight that the main difficulty of integrating the paradox is more a lack of knowledge sharing than an overflow of knowledge sharing. Lots of interviews referred to their employment contract that forbid the revealing a firm's secret. These results confirm the past research that argued that, at the project level, the individuals which are interacting with their counterpart have to integrate the paradox (Fernandez, Le Roy, & Gnyawali, 2014; Gnyawali, Madhavan, He, & Bengtsson, 2016).

Integrating the paradox regarding knowledge sharing means being able to balance between sharing, protecting and doing both simultaneously (Fernandez & Chiambaretto, 2016). This

integration is particularly difficult when the knowledge is critical for the project success and appropriable (i.e., when it is a sensitive knowledge). In that case, the knowledge should be simultaneously protected and shared. The experts who integrated the paradox use techniques to share the knowledge without allowing the partner to appropriate it. These techniques can consist of obfuscation (Baumard, 2010), aggregation of data to make them non-appropriable (Fernandez & Chiambaretto, 2016), or segmentation techniques (Majchrzak, Jarvenpaa, & Bagherzadeh, 2015). Building on this research, we can argue that the firm's challenge is to share without allowing the partner to internalize the knowledge, in other words, to foster simultaneously the sharing and the safeguard against the partner's appropriation. If we extrapolate a little bit to be provocative, we could wonder if the transparency in coopetitive project team is a fake transparency. Of course, there is inherently more transparency than in the separate project team because the experts are working closely together and interact. However, these interactions are implemented in a way that minimizes the internalization opportunities. By being less provocative, we can call this transparency a restricted and controlled transparency

Sum up on Control and Restricted transparency

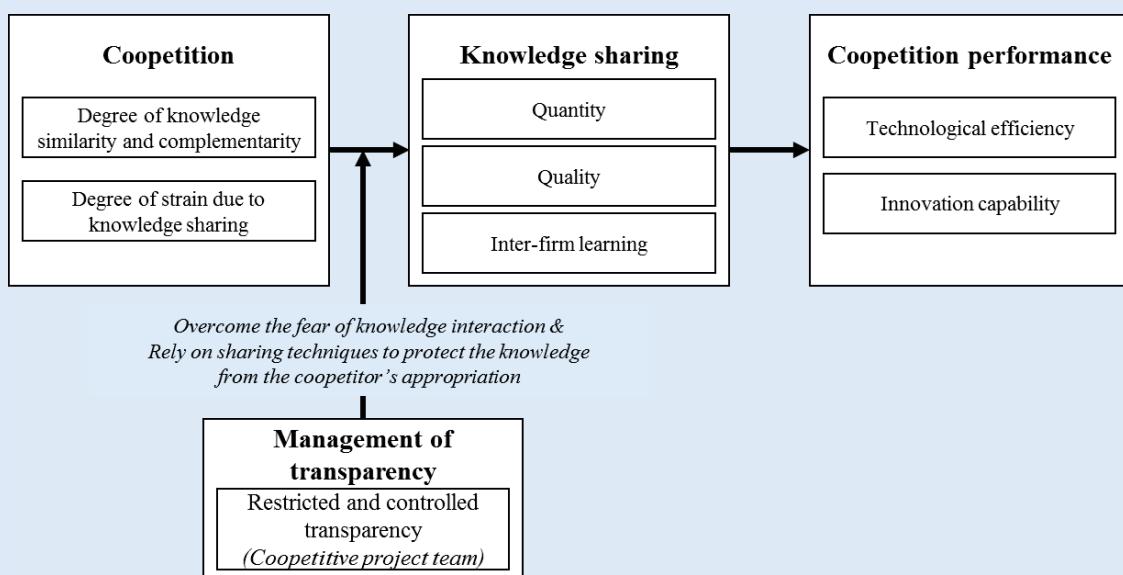
Contributions:

- Provide empirical proof of a firm using a transparency with its competitor that fosters interaction and which generated 100 billion dollars sales. The coopetitive project team materializes this second transparency.
- Confirm and extend our understanding of why there is a need for transparency that fosters interaction. Confirm the argument that it unlocks more intense access to the coopetitor resources which enhance its innovation capacity (Fernandez et al., 2017; Gnyawali & Park, 2011); Extend it by identifying another reason: interaction allows emulation and thus enhances its decision process.
- Question the business model of coopetition (e.g., Ritala et al., 2014) that could not be enhanced by implementing more transparency.
- Confirm that the transparency that allows interaction can also be a tool to monitor the partner knowledge involvement.
- Confirm the need to integrate the paradox when the project's design fosters interaction. But emphasize that the integration is unnatural for some individuals, but they can be trained.

We argue:

“Having a restricted and controlled transparency is a way to unlock and pursue coopetition opportunities by simultaneously allowing knowledge interaction between competitors and overcomes the focal firm’s fear of engaging in knowledge interaction with a competitor (i.e., by limiting the appropriation of the knowledge). Thus, restricting and controlling transparency is a second way to strategize and manage coopetition.”

Synthesis of our reflection:



Section 3 ~ The high transparency

The main contribution of this doctoral research is to question the relevance of the restricted and controlled transparency presented above. Firms can strategize and manage the value creation of coopetition by following up on low transparency practice because they both consider the coopetitor's knowledge internalization process as a downside or at least as the price to pay which needs to be at its minimum (Hamel, 1991). However, our empiric results provide counterfactuals with the proof being that Sanofi in its coopetitive project which generated 100 billion dollars behaved differently than was expected from the coopetition literature. For instance, instead of hindering the coopetitor internalization of the knowledge, they enabled each other.

More concretely, by confronting the empiric results and the literature our doctoral research highlighted a third way of managing and strategizing coopetition: a high transparency. Indeed, to unlock the value creation of coopetition, the focal firm might look to enable the partner (cf. subsection 1) and for a spiral of knowledge development (cf. subsection 2).

1. A high transparency to enable the coopetitor

Our manuscript 1 highlights that Sanofi and BMS are enabling each other. Indeed, the value captured of the common project is interdependent to the coopetitor performing well. The greater the coopetitor performs, the greater the focal firm captures value. Reciprocally, if the partner fails, the project fails, and the huge investment of Sanofi shifts into a waste. In this context, both Sanofi and BMS need the other to succeed. Thus they do not hesitate to be transparent in a way that can even consist of teaching the other how to perform better. For instance, BMS taught Sanofi how to succeed with an FDA approval and how to deal with the marketing authorization in Europe. Or, another example, in order to convince BMS to invest time, money, and experts on a market in which they had no initial interest in, Sanofi did share all openly of the market opportunities of this drug, the Plavix.

This teaching behavior is in contradiction with the dominant view of the management of coopetition in which the main challenge is to “share without sharing” (Baumard, 2010). It means to contribute to the success of the project without enabling the competitor with its own knowledge (Fernandez & Chiambaretto, 2016; Jarvenpaa & Majchrzak, 2016).

Thus, to explain Sanofi's teaching behavior, we had to look outside the literature of coopetition. Deutsch's theory of cooperation and competition is one theory which explains Sanofi actions. Indeed, the theory of cooperation and competition argues that any relationship between actors is a continuous intermeshing of cooperation and competition which depends on the flow of positive and negative interdependence (*cf. our programmatic literature review – chapter 1 – subsection 3 on Deutsch*). This theory goes even further and predicts the effects of the positive and negative interdependence. A high degree of goal interdependency implies accepting substitutability and inducibility and having a positive attitude toward the other actors. More concretely, it leads to open communication and mutual assistance. Moreover, this theory was extending to dynamic conflict resolution, and it revealed that cooperative action as the mutual assistance fosters a fulfilling creation process, when on the contrary a competitive action as the obstruction of the partner learning creates a fulfilling destructive process. (*cf. our programmatic literature review – chapter 2 - section 2 – subsection 1 on constructive conflict resolution*).

Building on this theory that we applied for the business relationships between competitors, we can give two different reasons why a focal firm decides to implement a transparency that enables a competition. First, be transparent and teach the competitor is a rational reaction when the business relationship with the competitor is highly positively interdependent. Past research had already highlighted the high positive interdependence of competitors. This interdependence can be *a priori* positive or proactively reinforced. It is *a priori* when a competitor has some asset, information, or status that is crucial for the focal firm's success (Gnyawali & Madhavan, 2001; Gnyawali & Park, 2011). It is proactively reinforced when both firms involve strategically important resources (Gnyawali & Charleton, 2017) or that the project is built on a huge and full risk sharing with a no-fault basis (Fernandez et al., 2017). Our manuscript 3 confirmed this *a priori* and proactive interdependence. Sanofi was *a priori* dependent on BMS's asset, information, and status (i.e., confirm Gnyawali & Park, 2011). Moreover, Sanofi's actions proactively increased the interdependence by engaging huge research in a risky project. We evaluated the total investment for each company as follows: 1) approximately 20 billion euros of direct money invested in research, development, marketing, 2) a full project team of 25 people (one project team in each company) and 3) the time of the top manager in the project committee (steering committee, R&D committee, and commercialization committee). These investments were so huge and the project so risky that their relationship was based on risk sharing with a no-fault basis (i.e., confirm Gnyawali &

Park, 201 and Fernandez et al., 2017). Moreover, our manuscript 1 extended the list of drivers that can reinforce the positive interdependence by identifying the key role of the value capture system. A cross-licensing system directly involves the competitor to the focal firm's success (i.e., the more the focal firm sells products, the more royalties the partner will receive). These proactive actions to reinforce the positive inter-dependency have a huge implication that contradicts past research on coopetition. The firms accept to increase the level of cooperation and do not try to narrow the collaboration as predicted in past research (Faems et al., 2010; Oxley & Sampson, 2004).

The second reason that the theory of cooperation and competition adapted to conflict solution highlights that engaging in cooperative actions as a high transparency or teaching is strategic for unlocking value creation. Indeed, any cooperation action creates a fulfilling positive dynamic process with the competitor. The more I teach the other, the more the partner is likely to promote transparency in return. Indeed, it is human nature to react positively to what is initially beneficial. On the contrary, reducing the transparency can be perceived as an obstruction to the partner's success and it will trigger hostility and obstruction. In return, the partner will reduce its transparency and a destructive value spiral will begin.

Thus, by building the theory of cooperation and competition, we take a stand against the dominant view of managing coopetition. We argue that high transparency is a strategic tool in coopetitive relationships. Firms can decide to implement a transparency which enhances a higher level of cooperation. Competitors which aim to bring mutual assistance and thus enable each partner will generate a positive value creation process. On the contray, limiting the partner's appropriation of knowledge shared for the project's success might not generate any positive dynamic and might even create a destructive process (response by the same or more drastic reduction of transparency or even engagement in illegal means to learn the knowledge wanted).

2. A high transparency to trigger spiral of knowledge

Our manuscript 3 provides the evidence of a project design in which the counterpart of the two organizations stays located in their parent firm. Moreover, the expert involved in these projects have high expectations regarding learning from their counterparts. The expectations are so high that an expert must report to its top manager if its counterpart is not collaborating

enough (i.e., is not bringing strategic knowledge). One other proof was that the transparency was so high that BMS could reuse Sanofi's knowledge against Sanofi.

By being so highly transparent this is in contradiction with the coopetitive project team (Fernandez et al., 2017; Le Roy & Fernandez, 2015). Indeed, in a coopetitive project team, the transparency is possible because it is restricted and controlled. Thus, even for the project's success, the project manager has to share transparency some additional knowledge, the whole managerial point is to be sure that this knowledge shared will be used only inside the project and not reused by the parent firm. Concretely, they co-locate the two teams in a building exclusively dedicated to coopetitive program and which is separated from the rest of the company by wire netting.

To justify theoretically the rationality behind the managerial practice of high transparency, we build on Nonaka's spiral of knowledge (1994) in the Knowledge Creation Theory. Indeed, the spiral of knowledge creation argues that organizations can proactively amplify the current tacit knowledge of its employees by triggering knowledge conversion (i.e., socialization, externalization, combination, internalization). To do so, the individuals need to interact with other individuals. By interacting, they observe and receive information which can confirm or break down some of their current routines, habits and cognitive framework. It is this confirmation and breakdown which create the first spiral of knowledge creation. The spiral of knowledge creation can be generated through triggering interactions inside the boundaries of the firm or beyond the boundaries of the firm. If the firm wants to create a continuous process with no ultimate end, the firm needs to go beyond the boundary of the firm (Nonaka, 1994).

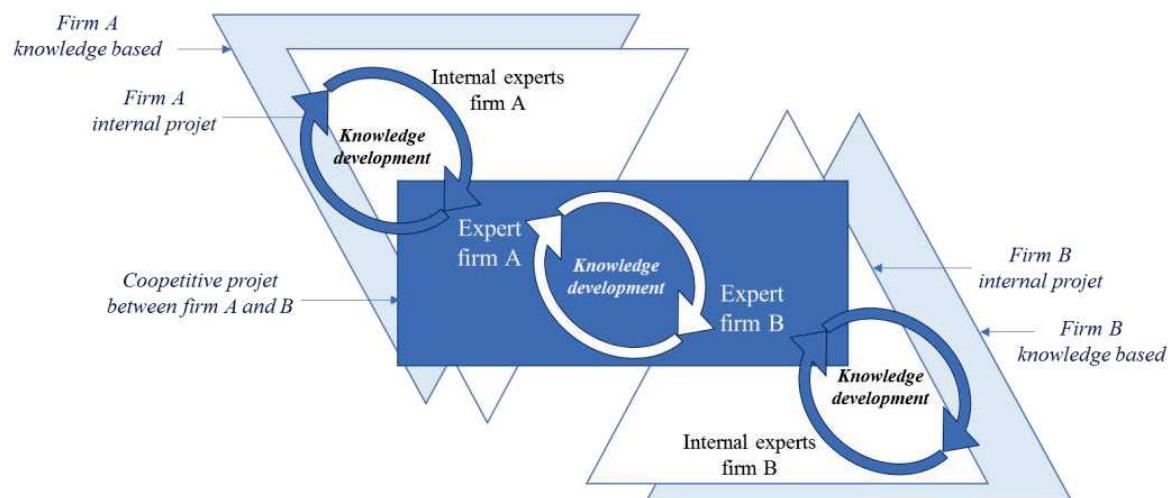
Building on this main idea of interactions and spiraling of knowledge, the first contribution of our theoretical reflection is to highlight that the dominant way of managing coopetition, which intends to obstruct the competitor's internalization, is hurtful by nature as it also obstructs the knowledge development. Indeed, by creating a project team in which all the experts are duplicated and interacting daily, the two firms create a first spiral of knowledge development (cf. the spiral in white at the centrum of Figure 37). The experts for the two firms will access each other's explicit knowledge, but also tacit knowledge. The access to the tacit knowledge consists in being able to observe and confront each other's know-how, crafts, skills, past experience and perception of the environment and the future. These confrontations generate unique new layers of knowledge for the success of the coopetitive project and also for the personal development of the experts involved. This first spiral of knowledge relies on the four knowledge conversions. If a firm intends to reduce its transparency inside the project

by obstructing the coopetitor knowledge learning/internalization, it obstructs this first spiral of knowledge. Thus, it is key to be aware that the reduction of the transparency has a cost regarding knowledge creation potential. Firms that favor high transparency to restricted and controlled transparency are firms which have a bigger intent that the project succeeds, they look for coopetitive relationships for fostering a renewal of their current knowledge. This idea was confirmed in the manuscript 3.

Moreover, building on the theoretical insight of interactions and spiral of knowledge, we are able to develop one explanation to the unexpected behavior of Sanofi of not separating the project team from the parent team (i.e., and thus take a bigger risk of leakage of proprietary knowledge). If by allowing the interaction between experts of two competing firms, it creates the first layer of knowledge (cf. the white spiral of *Figure 37*). It is possible to amplify the potential of this spiral by allowing the expert of the project team to interact with their parent firm (cf. the two other spirals of *Figure 37*). Indeed, the project knowledge creation can benefit from a much wider knowledge-base composed of the knowledge of the current expert involved in the project but also to the knowledge of the other expert which is only internal to the project.

For the record, this theoretical insight seems relevant in light of Estrada et al. (2016). Indeed, through a quantitative study, they identified that one condition to have a coopetition project which impacts the firm innovation performance positively is that the firm implements an internal knowledge sharing mechanism. Thus, there is a need for a knowledge loop back to the parent firm. This past research strengthens our reflection, and we extend it by providing it a concrete practice that allows the internal knowledge sharing mechanism: let the experts located inside the parent firm.

Figure 37 ~ The spirals of knowledge due to not collocating the experts



Source: See Matilda Bez's doctoral research, 2017 (inspired by Nonaka et al., 1994)

Sum up on High Transparency

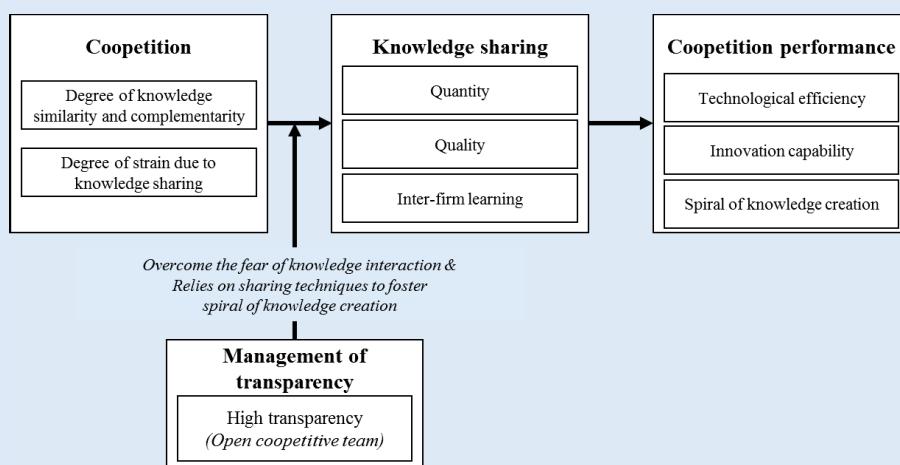
Contributions:

- Provide an empirical proof that competitors can enable each other (be involved in a teaching process) and proactively engage in a higher level of transparency (e.g., deliberately creates an incentive to be transparent and even teach the coopetitor).
- Contradict empirically the dominant management of coopetition which aims to enhance the success of the project without enabling the competitor with its own knowledge.
- Provide two new theoretical explanations for these counterintuitive enabling actions: (1) the coopetitors are highly positively interdependent thus to succeed or not fail, the focal firm needs to enable the competitor; (2) to unlock a value creation fulfilling process, a focal firm needs to implement cooperative actions (i.e., reducing or restricting its transparency can be perceived as a competitive action and fulfill a competitive destructive process).
- Provide an additional theoretical explanation for the counterintuitive high transparency (1) trigger a spiral of knowledge inside the coopetitive project, (2) provide a theoretical explanation for the counterintuitive localization of the expert in their parent firm: amplify the spiral of knowledge inside the coopetitive project with a much wider knowledge base.
- Confirm that there is a need for internal knowledge sharing mechanism to unlock the value creation of coopetition and bring a practice: let the experts located inside their parent firm.

We argue:

“Having a high transparency is a way to unlock the coopetition value creation by triggering three self-sustaining spirals of knowledge creation: one at the project level between the experts of the two competing firms, and one in each parent firm between the expert involved in the coopetitive team and the others internal experts. The pursuit of this high transparency implies a high interaction between the coopetitive expert inside the project team and the parent firm. High transparency is a third strategy to manage coopetition.”

Synthesis of our reflection:



Chapter 2 ~ Contributions, limits and research opportunities

In this chapter, we begin by discussing the global implications of the main findings presented in chapter 1. The intent is to identify the mains contributions (cf. section 1), but also the boundaries conditions (section 2). The contributions and the boundary conditions are complementary to specify the knowledge claimed.

Section 1 ~ Integrated framework: rethink the transparency in coopetition

This doctoral research opened our way of thinking about strategizing and managing coopetition. Indeed, until now the management of coopetition was mainly rooted in Hamel (1989,1991)'s competitive collaboration view of the collaborative relationship. From this view, strategic alliances with competitors are simultaneously opportunities to enhance a firm competitively and a means to risk the 'out-learning' (Hamel, 1991, p.84). In response, a focal firm should implement: high learning, limit its own transparency, and enhance its receptivity (Hamel, 1991; Hamel, Doz, & Prahalad, 1989). Since then several articles are trying to find out how to implement this competitive collaboration management. More precisely, as the first article of the industrial marketing journal special issue on the management of coopetition argues the "art of coopetition would be to appropriate more than coopetitors. Coopetitors are engaged in a learning race, and try to obtain asymmetric leaning at their advantage" (Le Roy & Czakon, 2016, p.3). Thus, the management of coopetition should consider the intent to reduce the coopetitor's capacity to internalize the strategic knowledge shared by the focal firm. In other words, in the coopetitive project, the firm should try to limit its transparency to the strict minimum.

Figure 38 ~Integrated framework

	PROTECT (learning race)	SHARE & PROTECT (learning race)	SHARE & ENABLE (constructive capture)
<u>Degree of transparency</u>	Low knowledge transparency	Restricted and controlled knowledge transparency	High knowledge transparency
<u>Strategic Intent in the coopetitive project</u>	A technological efficiency	An enhanced innovation capability	an amplified spiral of knowledge
<u>Attitude toward knowledge sharing</u>	Protection	Sharing and Protection	Greater and freer Sharing
<u>Project design</u>	Separate project team	Coopetitive project team	Open coopetitive team
<u>Attitude toward opportunism</u>	Limit opportunism	Manage opportunism to minimize it	Manage opportunism only if it creates a conflict
<u>Analytical capacity</u>	Perceive a positive Interdependence and considers not be transparent as a protection	Perceive a high positive interdependence and considers not be transparent as a protection	Perceive a high positive interdependence and considers not be transparent as a destructive process

Source: See Matilda Bez's doctoral research, 2017

If our empiric observation confirmed that firms adopt this learning race view for managing their coopetitive relationship, our empiric observation did also identify one different way of managing coopetition. The main results of this doctoral research consisted in identify three different practices of managing transparency. The first two fit to Hamel's approach of the management of the collaboration between competitors, but not the last one.

To gain in analytical generalization, we look for a comprehensive framework which could integrate the three practices of transparency identified. In this question, we identified five transversal variables to the three practices of transparency: a strategic intent, an attitude toward knowledge sharing, the project design, the attitude toward opportunism, and the analytical capability.

The strategic intent concerns what the focal firm expects for the coopetitive project. We identified three different expectations: a *technological efficiency* (i.e., using the best existing knowledge, whatever its origin is; thus, using the competitor's technology if it is superior), an

enhanced innovation capacity (i.e., co-create an innovation by recombining the knowledge of the competitors), an *amplified spiral of knowledge* (i.e., the focal firm's intent is to renew its knowledge through coopetition). It is interesting to notice that a firm is involved in high knowledge transparency when the purpose of the coopetitive project is higher than the success of the project. Indeed, in high knowledge transparency, the strategic intent concerns not only the project level but also the focal firm's knowledge level.

The attitude towards knowledge sharing depends on the strategic intent. Indeed, when the strategic intent is technologically efficient, the focal firm looks only into the *protection* of the knowledge. As the existing knowledge is enough, there is no need to put itself at a risk of out-learning. In this context, the firms *limit the opportunism*. The relevant project's design to limit the opportunism is the *separate project team*. Indeed, in a separate project team, the strategic knowledge is not exposed.

When the strategic intent is to *enhance the innovation capability* of the firm, the interaction between the experts is key. However, if the knowledge needs to be shared for the project's success, the knowledge does not need to be appropriate. In that case, the focal firm's attitude towards sharing is to simultaneously *enhance sharing and protecting*. The execution of this attitude relies on a *coopetitive project team* in which the individuals use obfuscation techniques, data aggregation, or segmentation.

When the strategic intent is to amplify the focal firm's *spiral of knowledge*, the firm implements a greater and freer sharing of the knowledge they want to renew. Indeed, it is through interaction and knowledge conversion between simultaneously internal experts and external experts that the tacit knowledge of one expert can be amplified and renewed. To do so, the focal firm implements a project design in which each expert of the project team is duplicated and needs to work "hand in hand" with its counterpart. But to be sure that both firms will be able to amplify with its own wider knowledge layer, the counterparts stay located inside their own company. We named the project design: "*open coopetitive team*." We used the term open because in this design the internalization of the knowledge by the competitor is accepted, it is the price to pay to benefit from the spiral of knowledge. Thus, in this high knowledge transparency, the competitor's knowledge internalization is *not an opportunistic behavior*. For the record, it is not because a priori is it not an opportunistic behavior that in fact, it does not generate conflict (e.g., the knowledge internalization can be asymmetric, the internalization cannot respect the fair rules implemented). The focal firm

implements specific managerial processes to manage the opportunism if it generates a conflict.

The last dimension concerns the analytical capacity of the focal firm. Depending on the degree of transparency, the understanding of the relationship is different. When a focal firm identifies a positive interdependence with its competitor, the firm engages in a coopetitive relationship through low knowledge transparency. However, when the analysis of the relationship highlights that the interdependence is high because a co-creation process is needed (i.e., combine existing knowledge is not enough), the firms implement a restricted and controlled transparency. For the two first degrees of transparency, the analytical capacity is based on the potential hurtful outcomes due to cooperative action. Not reducing the transparency is a relevant managerial solution to protect the firm against a hurtful competitive future. On the contrary, in the high degree of transparency, the reduction of the transparency is dangerous because it can trigger a self-fulfilling value destruction process. Cooperative actions as behind transparent decisions trigger a self-fulfilling value creation process.

Building on this framework, composed of five transversal dimensions; we claim that:

“The choice of the degree of transparency is a strategic and managerial tool in coopetitive projects. Indeed, the degree of transparency chosen:

- *Is a response to firm’s strategic intent concerning the coopetitive relationship (i.e., a technological efficiency, an enhanced innovation capability, an amplified spiral of knowledge)*
- *Implies specific operational choices (i.e., specific project designs, specific knowledge sharing and specific reaction to opportunism)*
- *Is driven by the firm’s analysis of the business relationship (i.e., the degree of positive interdependence and the perception or not of a destructive value creation of acting competitively)*

At no point do we argue that one degree of transparency is better than any other. The three can be used, and we have empirical examples of the three. Depending on the strategic intent and the analysis of the relationship the firm will act on the degree of transparency to reach its goal and for that, the firm will act on the project designs, the type of knowledge sharing and the way of coping with opportunism. More concretely, the main contribution of this doctoral research is to highlight a third way to strategize and manage coopetition. This third way which goes one step further in the knowledge sharing: the focal firm does share knowledge but also intent to enable the competitor to increase the rate of success of the radical innovation and above all to amplify its knowledge capture.

Thus, more broadly, the greater and freer transparency is not a naïve, altruist or only cooperative action. It is done with an explicit intent to capture knowledge. The only difference is that the knowledge value capture is fostered when the resolution of the knowledge sharing conflict with the competitor is constructive. Be constructive means that both coopetitors need to be enable simultaneously (i.e., both end stronger after collaborating than before the collaboration). We can add a third adage to the dominant ones of “knowledge protecting” and “sharing protecting” in coopetition project : “knowledge sharing and enabling for constructive capturing.”

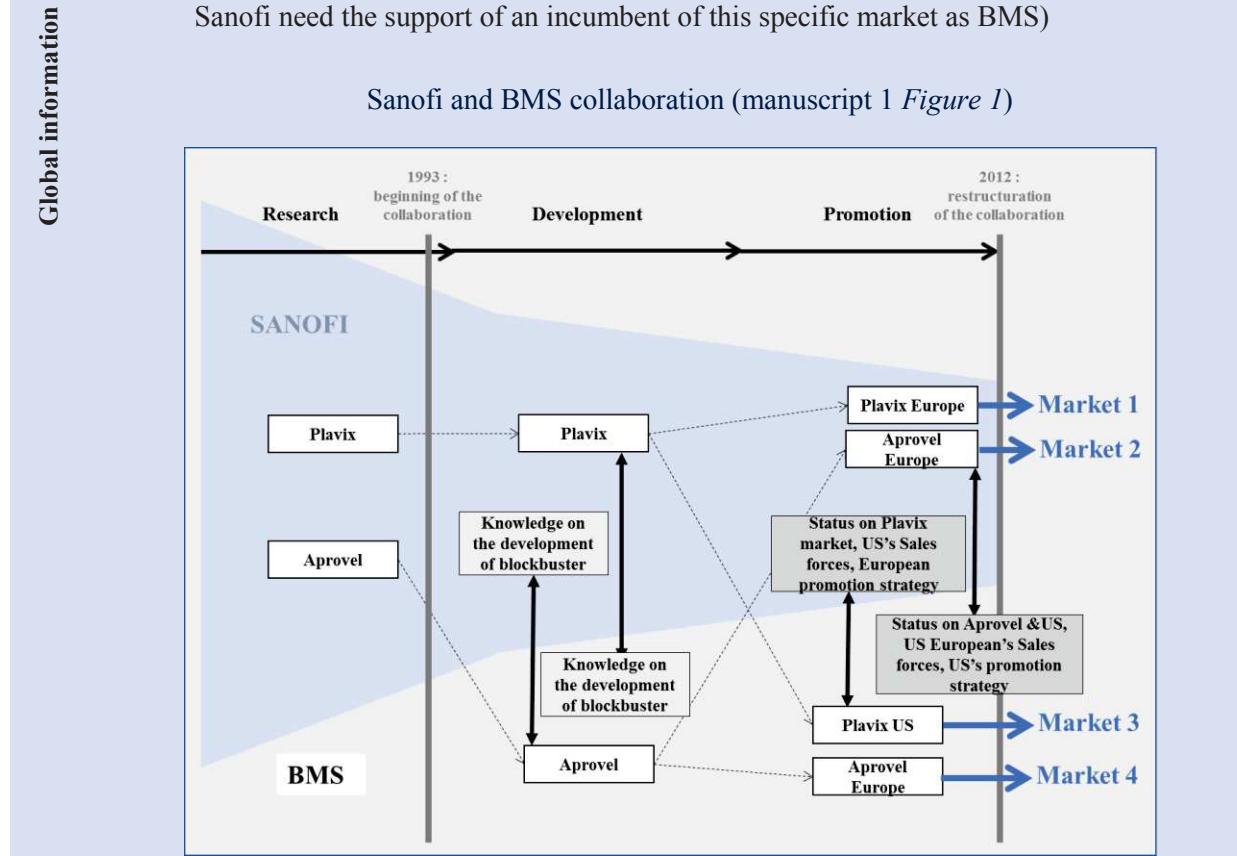
In the following table, we sum up the content of the main results of the manuscripts which allowed us to create the integrated framework. Thus, after presenting very quickly general information on the two case studies, we give details on each of the transversal variables of our integrated framework.

Manuscript 1 and 3: SANOFI's Case Study

The collaboration between Sanofi and BMS began in 1993 at the early phase 3 of the trial and continued until the end of the patent in 2012. During this period of 19 years, Sanofi and BMS collaborated on each activity of both products discover by Sanofi. Even if they partitioned the lead, each decision was co-decided. This collaboration allowed Sanofi to generate rents from four products/markets

- Market 1: although Sanofi was the current leader of Plavix and had a relatively superior status in Europe than BMS, Sanofi improved its strategy by learning some marketing strategy tips from BMS)
- Market 3 of the figure below, although Sanofi was the current leader of Plavix, Sanofi had a relative low superior status in the US. Thus Sanofi put BMS in charge of the commercialization in the US and continued to contribute marginally
- Market 2 and 4, Sanofi had been totally absent from the Aprovel market. Thus Sanofi need the support of an incumbent of this specific market as BMS)

Sanofi and BMS collaboration (manuscript 1 *Figure 1*)

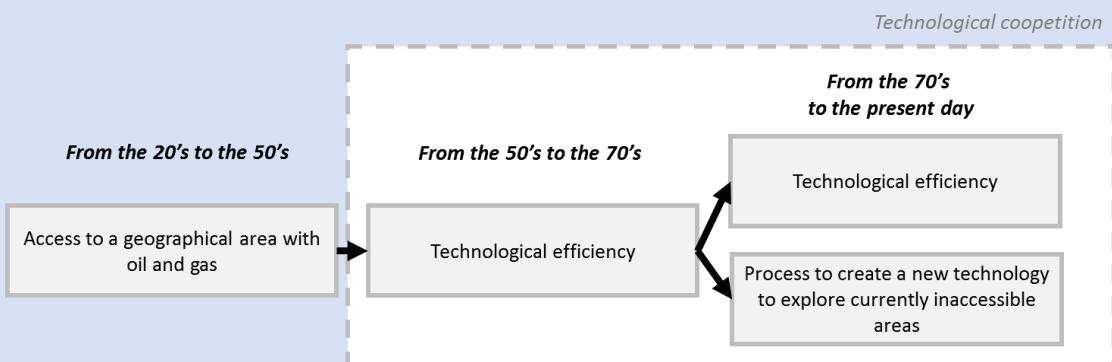


Manuscript 2: TOTAL's Case study

Total from its creation to the present day had known three different uses of knowledge transparency (cf. figure 3):

- From the 20's to the 50's, its coopetitive project consisted in having a percentage of ownership in the exploration and production of a specific area. Thus, there was no knowledge transparency because Total did not have any attractive technology.
- In the 50's, Total developed a specific technology which was very attractive for its competitors. Thus, from the 50's to the 70's, Total shifted from being in only a shareholder role to an active role in the success of the project (i.e., brought its technology). But in these projects, he oversaw task and executed the internal technology safely from the risk of the coopetitor's learning. In the manuscript, is called "basic coopetition."
- Since the 70's, simultaneously to the basic coopetition, Total implemented an advanced coopetition. Total and its competitor accepted to combine their expertise to create a new technology which can create a real competitive advantage against the new competitors (i.e., explore, geographical areas which are currently considered as inaccessible).

Evolution of Total's cooperation strategy with a competitor (manuscript 1- Figure 3)



	Manuscript 1 and 3: SANOFI's Case Study																								
Transparency and attitude toward sharing	<p>Sanofi implemented a high and extended knowledge transparency which concerned: two drugs and the whole innovation process (from development to promotion) (cf. figure 1).</p> <p style="text-align: center;">High and extended transparency (manuscript 1- Figure 2)</p> <p>The diagram shows a timeline from 1993 beginning of the collaboration to Co-promotion. It maps resources and knowledge between Sanofi and BMS across three phases: Co-development, Co-promotion, and Leverage effects.</p> <ul style="list-style-type: none"> Co-development: Shows overlapping resources and knowledge. Sanofi has knowledge about Plavix and Aprovel markets, while BMS has expertise in marketing authorization and sales forces. A dashed box labeled "MISSING" indicates areas where one party lacks the other's knowledge. Co-promotion: Shows overlapping resources and knowledge. Both parties have expertise in marketing authorization and sales forces. Leveraging effects: Three arrows point down from the timeline to outcomes: <ul style="list-style-type: none"> Reducing the risk-taking of the development Reducing the time to market Optimizing the revenue 																								
Strategic Intent	<p>Development and commercialization efficiency, Knowledge creation, Internal learning</p> <p style="text-align: center;">New layer of knowledge due to daily interaction (manuscript 3: Figure 3)</p> <p>The diagram shows a 4x2 grid of interactions between Sanofi's representative and their counterpart from BMS, leading to outcomes based on the new layer of knowledge.</p> <table border="1"> <thead> <tr> <th>Sanofi's representative of a domain</th> <th>The counterpart from BMS in this domain</th> <th>Outcomes based on new layer of knowledge</th> </tr> </thead> <tbody> <tr> <td>Propose a protocol</td> <td>Learn the partner know-how about protocol</td> <td>A more thoughtful protocol</td> </tr> <tr> <td>Learn the partner's know-how about protocol</td> <td>Improve the protocol by its own know-how</td> <td></td> </tr> <tr> <td>Review and analyze the results</td> <td>Learn of Sanofi analysis the results</td> <td>A more thoughtful analysis</td> </tr> <tr> <td>Learn how BMS analyzed the results</td> <td>Improve the analysis</td> <td></td> </tr> <tr> <td>Facing an issue, brings its experts or external experts</td> <td>Benefit from the insights of Sanofi experts</td> <td>A more thoughtful solution to an unusual and difficult issue</td> </tr> <tr> <td>Benefit from the insights of BMS experts</td> <td>Bring its experts or external experts</td> <td></td> </tr> <tr> <td>Redaction of report of Sanofi or BMS or external partner as FDA</td> <td>Correct and improve the report</td> <td>An improved report which increase the chance to convince the reader</td> </tr> </tbody> </table>	Sanofi's representative of a domain	The counterpart from BMS in this domain	Outcomes based on new layer of knowledge	Propose a protocol	Learn the partner know-how about protocol	A more thoughtful protocol	Learn the partner's know-how about protocol	Improve the protocol by its own know-how		Review and analyze the results	Learn of Sanofi analysis the results	A more thoughtful analysis	Learn how BMS analyzed the results	Improve the analysis		Facing an issue, brings its experts or external experts	Benefit from the insights of Sanofi experts	A more thoughtful solution to an unusual and difficult issue	Benefit from the insights of BMS experts	Bring its experts or external experts		Redaction of report of Sanofi or BMS or external partner as FDA	Correct and improve the report	An improved report which increase the chance to convince the reader
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Redaction of report of Sanofi or BMS or external partner as FDA	Correct and improve the report	An improved report which increase the chance to convince the reader																							

	Manuscript 2: TOTAL's Case study	
Transparency and attitude toward sharing	<p>For Basic coopetition: Zero transparency. And the technology is used internally</p>	<p>For advanced coopetition: Accept to be transparent and sacrifice some technology <i>(We do not have enough information on the content of the daily technological sharing to know how the sacrifice technology is done in a restricted and controlled way or in a greater and freer transparency. We need to do another study focusing on a specific project)</i></p>
Strategic Intent	<p>The drivers of the two types of transparency (manuscript 2- Figure 7)</p> <pre> graph TD subgraph Context [Context : Technological coopetition] direction TB subgraph Drivers [Drivers of the sharing of technology between competitors] direction TB Env["Environment characteristics • Intensity of the competition • Level of cost and risk • Technological convergence"] Rel["Nature of the relationship • Capacity to challenge and bring additional value (similar and complementary technologies)"] Strat["Strategic intention • Degree of innovation"] Actors["Actors characteristics • Perception of a vulnerability • Capacity to integrate a paradox"] Env --> Rel Rel --> Strat Strat --> Actors end subgraph Modalities [Modalities for technology sharing between competitors] direction TB SH["Combine the technology without sharing (Separate project team)"] SHS["Combine the technology by sharing them (Cooperative project team)"] SH --> SHS end subgraph Type [Type of the coopetition implemented] direction TB BT["Basic technological coopetition Competitive mindset"] AT["Advanced technological coopetition Cooperative mindset"] SHS --> BT SHS --> AT end end </pre>	<p>Technological efficiency => reuse the best existing knowledge</p> <p>Knowledge creation; have its technology recognized as superior</p>

	Manuscript 1 and 3: SANOFI's Case Study
Design project	<p>Sanofi implemented a mirror organization: they duplicated all the experts of the project team. For the record, each counterpart stayed located in its parent firm.</p> <p>The mirror organization: the duplication of all the experts (manuscript 3-Figure 2)</p> <pre> graph TD subgraph TopManagerCommittees [Top manager committees] SC[Steering committee : CEO - 1 Sanofi ↔ CEO-1 BMS] RC[R&D committee : R&D director Sanofi ↔ R&D director BMS] MC[Marketing committee: Marketing director Sanofi ↔ Marketing director BMS] end subgraph ProjectTeam [Project team] subgraph SanofiPT [Sanofi Project team] direction TB SDP1[Director of project] <--> BDP1[Director of project] SMP1[Managers of project] <--> BMP1[Managers of project] SR1[Rep Domain X] <--> BR1[Rep Domain X] SR2[Rep Domain Y] <--> BR2[Rep Domain Y] SRE[Rep ...] <--> BRE[Rep ...] SRE2[25th Rep] <--> BRE2[25th Rep] end subgraph BMSPT [BMS project team] direction TB BDP1[Director of project] <--> SDP1[Director of project] BMP1[Managers of project] <--> SMP1[Managers of project] BR1[Rep Domain X] <--> SR1[Rep Domain X] BR2[Rep Domain Y] <--> SR2[Rep Domain Y] BRE[Rep ...] <--> SRE[Rep ...] BRE2[25th Rep] <--> SRE2[25th Rep] end end subgraph OperationalLevel [Operational level] OS[Operational Sanofi] OB[Operational BMS] end SC --> MC SC --> RC MC --> RC SDP1 <--> BDP1 SMP1 <--> BMSPT SR1 <--> BR1 SR2 <--> BR2 SRE <--> BRE SRE2 <--> BRE2 OS --- OB </pre>
Reaction to opportunism	<p>Opportunism is a punctual conflict arising after the knowledge sharing.</p> <p>The project team is protected from any competitive or opportunistic behaviors. Indeed, it is the top managers who deal with these issues</p> <p>Dealing with opportunism after fostering transparency (manuscript 3 Figure 6)</p> <pre> graph LR A[A competitive project (opportunities to create new layer of knowledge)] --> B[Barrier to transparency which need to be overcome] B --> C[Adopt a co-management: To foster knowledge sharing] C --> D[Knowledge sharing is an invitation to opportunism] D --> E[The co-management plays a 2nd role: monitor the opportunistic behavior] E --> F[A successful competitive project (New layer of knowledge)] </pre> <p style="text-align: center;">Collective knowledge development</p> <p style="text-align: center;">Risk of opportunism</p>
Analytical capability	<p>The success of the Sanofi and BMS collaboration relied on the acceptance of (1) sharing strategic knowledge and (2) enabling the competitor.</p> <p>For some of the individuals, the dimension of competition was a barrier to the sharing of their best practice (e.g., the marketing representatives from Sanofi and BMS). The issues were due to the competitive perception of the partner. Thus, the two alliance managers supported by the decisional committee decided to create common events as team building activities or they try to always organize informal events as a common dinner.</p>

	Manuscript 2: TOTAL's Case study		
Design project	<p>For the basic coopetition</p> <p>Separate project teams use the technology internally and share only the result</p> <p>Task separation (manuscript 2 – Figure 5)</p> <pre> graph TD F1[Firm 1] --> SC[Strategic committee] F2[Firm 2] --> SC Fx[Firm x] --> SC SC --> D1[Director] SC --> D2[Director] SC --> D3[Director] D1 --> O[Operator] D2 --> O D3 --> O O --> F1_1[Oil for firm 1] O --> F2_1[Oil for firm 2] O --> Fx_1[Oil for firm 3] F2_1 --> T[In charge of a specific task] T --> F2_2[Oil for firm 2] </pre> <p>The diagram illustrates a basic coopetition structure. Three firms (Firm 1, Firm 2, Firm x) contribute to a central Strategic committee. The committee oversees three Directors. These Directors manage an Operator, which is responsible for producing oil for all three firms. Firm 2 also has its own internal task force (Director Geoscience, Director exploitation, and two Experts) that oversees oil production for Firm 2.</p>	<p>For advanced coopetition:</p> <p>The separate project team was not enough and needed more transparency. In some projects, they are collocated</p> <p>Co-creation of technology (manuscript 2 - Fig. 6)</p> <pre> graph TD F1[Firm 1] --> SC[Strategic committee] F2[Firm 2] --> SC Fx[Firm x] --> SC SC --> D1[Director] SC --> D2[Director] SC --> D3[Director] D1 --> O[Operator] D2 --> O D3 --> O O --> F1_1[Oil for firm 1] O --> F2_1[Oil for firm 2] O --> Fx_1[Oil for firm 3] F2_1 --> D2_1[Director Geoscience] F2_1 --> D2_2[Director exploitation] F2_1 --> E1[Expert] F2_1 --> E2[Expert] D2_1 --> F2_2[Oil for firm 2] D2_2 --> F2_2 E1 --> F2_2 E2 --> F2_2 </pre> <p>This diagram shows an advanced coopetition structure. The setup is similar to the basic one, but Firm 2 is fully integrated into the Operator. It has its own internal structure (Director Geoscience, Director exploitation, and two Experts) that oversees oil production for Firm 2, while still being part of the overall operator managed by the Strategic committee.</p>	
Reaction to opportunism	<p>Protected by the organizational barriers to transparency</p> <p>Example: Total will never share its internal computer</p>		No information
Design project	<p>Attribute the task to the firm which has the best technology. Know that they are interdependent on the resources of the others</p>		Need each other's resources

Section 2 ~ Doctoral research contributions & Limits

1. The contributions

This chapter aims to highlight the main contributions of this doctoral research at the three levels theoretical, managerial and methodological.

1.1. Theoretical contributions

The theoretical contributions have already been highlighted in detail in the above chapter. More broadly, we have three main theoretical contributions that we recall quickly. The first one concerns the literature of the management of coopetition. We extend the current theoretical roots to external theories able to explain the puzzling empirical facts observed. We also identify a different project design to manage coopetition which opens a discussion on the localization of the project teams in coopetitive project (i.e., co-localization or letting them into their parent firm). The second contribution concerns the literature on the strategy of coopetition. We highlight that a focal firm can unlock and pursue current and future advantage for themselves through a freer and greater transparency. Indeed, it can allow the renewal of its internal knowledge. We also identify when this higher degree of transparency can be relevant. Finally, we contribute to a better understanding of the key role of transparency in coopetition by building an integrative framework which can simultaneously explain the low transparency (i.e., knowledge protecting), the restricted and controlled transparency (i.e., knowledge sharing and protecting) and the high transparency (i.e., knowledge sharing and enabling for constructive capturing). This integrated framework allows us to call for more integrated frameworks which take into account different cooperative and competitive orientation.

❖ Contributions to the management of coopetition

This doctoral research generates several insights into the literature on the management of coopetition. Firstly, it simultaneously confirms and questions the relevance of rooting our theoretical reflection on the management of coopetition only on Hamel's approach of the collaboration between competitors (Hamel, 1991; Hamel et al., 1989). Hamel conceptualized the collaboration between competitors as a learning race in which the managerial challenge is out learned or at least not be out learned. In response, they considered that one strategic and

organizational response is to reduce the degree of transparency to its minimum level. Following up this conceptualization of the managerial intent, past research finds multiple techniques like the obfuscation (Baumard, 2010a), the segmentation (Jarvenpaa & Majchrzak, 2016), or the transformation of the information shared into non-appropriable information (Fernandez & Chiambaretto, 2016). This doctoral research begins by confirming this approach by characterizing two ways of managing coopetition by reducing the appropriability of the knowledge shared: the low transparency and the restricted & controlled transparency. More precisely, we highlighted that the low transparency based on a separate project team could be used to unlock the coopetition advantage of technological efficiency, and the coopetitive project team can be used to unlock the coopetition advantage of fostering its innovation capabilities. Thus, we confirmed Fernandez et al. (2017) who argue that firms use coopetitive project teams for radical innovation and separate project teams for incremental innovation.

However, our empirical results also highlighted that there were not just these two ways of managing coopetition and its knowledge sharing. Thus, if Hamel's is a relevant theoretical root to explain some choice of knowledge sharing in coopetition, there is a real need to complete it with other approaches which could explain the focal firm's choice regarding the higher degree of transparency. We identified two theories which could perform this role: Deutsch's theory of resolution of the conflict and Nonaka's theory of dynamic theory of organizational knowledge creation., They justify theoretically why a high degree of transparency can be a strategic choice.

In accordance, another of our insights into this literature on the management of coopetition is that we identify a project design that we called “the open coopetitive team.” It has two specific characteristics: the duplication of all the experts and the localization of the expert in their parent firm. This second characteristic has a huge implication on the management of coopetition literature because it opens a discussion about the localization of the team members of the project team. Indeed, in a coopetitive project team, the goal is to separate them from their parent team to simultaneously foster sharing the critical knowledge for the project's success and protect against the harmful consequences of sharing (Le Roy & Fernandez, 2015). However, separating them from the parent firms deprive them from their positive interdependent knowledge creation spirals. Thus, more research is needed to take a stand in this discussion.

❖ Contribution to the literature of strategizing coopetition

To deepen our understanding of the knowledge sharing and the degree of transparency leads to rethink the strategizing of coopetition. The current way of strategizing coopetition is based on Hamel's learning race. Le Roy and Czakon (2016) even argue that the art of coopetition would be to appropriate more knowledge than coopetitors, to win the learning race. Adopting this approach has implications; it means that the focal firm chooses to deal with the conflict of being simultaneously in cooperation and competition by adopting competitive actions. However, Deutsch (2011) has clearly emphasized that response by competitive actions to inter-relational conflicts due to the simultaneity of cooperation and competition as a destructive self-fulfilling process. It will end by violence, frustration, crying, and above all both actors will obstruct the action of the other and thus each other's value creation. Thus, we argue that the managerial intent in coopetition of engaging in a learning race is a destructive value process. It is why coopetition needs to be reconceptualized to be a value creation process.

We argue that to reconceptualize the strategy of coopetition in a value creation process when the focal firm considers that its spiral of knowledge creation is positively related to its competitor's spiral of knowledge. We developed this argument based on our empirical results and Nonaka's organizational knowledge creation theory, the more the experts simultaneously interact with the counterparts from the competing firm and the internal experts, the more the focal firm amplifies its spiral of knowledge creation (i.e., the focal firm's initial spiral of knowledge creation will be amplified by two other spirals: the project's and the coopetitor's). Thus, we confirm Estrada et al. (2016) who argue that the internal knowledge sharing is a key explanation of the coopetition performance. In addition, by sharing some strategic knowledge with a competitor it can create what Nonaka called the "creative chaos." By sharing some strategic knowledge with a competitor the experts cannot rely anymore on their current knowledge and have to innovate. Knowing that creates tensions which trigger the knowledge creation.

Thus, our first contribution to the literature on the strategizing coopetition is to argue that the creation and pursuit of current and future advantage for a focal firm which wants to renew its knowledge based through coopetitive project can consist of implementing a strategy based on greater and freer transparency. The focal firm implements it when (1) they are considering that obstruct transparency is a self-fulfilling destructive process, (2) their strategic intent is to renew their internal knowledge base, (3) they perceive that their spiral of knowledge creation

is positively related to its competitors spiral of knowledge. Their goal is not to maximize the sharing to maximize the value captured from the coopetitive project.

Moreover, by building on Deutsch (2011)'s "constructive competition," we argue that the art of coopetition should be to implement a constructive competition which consists of searching for an internal competition in which one coopetitor wins more than the other, but both end stronger after the collaboration than before. The competition becomes a game with benefit from the emulation of being in competition without the high emotional dramas of dominance and submission, life and death, victory and defeat. For the record, the three degrees of transparency highlighted in this doctoral research are three constructive competitions. The three of them implement competition in which whomever the winner is, both end by being strengthened. The only difference is on the level of competition implemented:

- In the low transparency, the competition is on the best existing technology, and both win because the best technology is used and thus the value created is increased.
- In the safe and restricted transparency, the competition is on the value capture of the cooperation, and both win because the value capture would not have occurred without cooperation.
- In the high transparency, the competition is on the renewal of the internal knowledge, and both win because they benefit from the amplification of the spiral of knowledge.

Thus, our second contribution is to emphasise that it is not enough to identify two direct competitors are collaborating to characterize a coopetitive relationship. To consider a business relationship as coopetitive, we need to identify a constructive competition (i.e., a constructive value capture process). If the intent is a learning race, for us, it is not coopetition because there is no real intent of benefiting from cooperation.

❖ An integrated framework for the use of transparency in coopetition

Our last contribution is our integrated framework that overcomes the two approaches: Hamel's approach of safe and restricted knowledge sharing, and our doctoral approach based on a freer and greater knowledge sharing. We conceptualized the transparency as a managerial tool, and we explain the choice of the degree of transparency based on three dimensions: on the strategic intent, the operational choices, and the analytical capability. The strength of these dimensions is that they are transversal to the two approaches and thus offer a

hypothetical story about why and how firms implement a certain degree of transparency without being limited by one of the approaches.

1.2. Managerial contributions

Our doctoral research had two managerial intents; we wanted to help top managers increase their understanding on (1) What are the different values they can pursue by engaging in a coopetitive relationship? (2) How through operational choice can they unlock this value?

Concerning the first question, we identified three different strategic intents behind coopetition: a technological efficiency, an enhanced innovation capability, an amplified spiral of knowledge. It is key for top managers to have a clear understanding of which value they are looking after through coopetition. Depending on the strategy chosen, the execution of the coopetition strategy needs to be different.

Concerning the second question on the operational choice to unlock the value, our main managerial contribution is to highlight to the top managers that transparency is real managerial tool that can unlock different value creations. It is not only the downside of implementing a coopetitive strategy. Our integrated framework could almost be reused by top managers to obtain a clear understanding of different execution choices based on their strategic intent and understanding of the relationship. The choices concern the project design to implement, the attitude towards knowledge sharing, and also the attitude toward opportunism. For example, it is not possible to enhance innovation capability by only protecting the knowledge and limiting opportunism. Alternatively, that sharing transparently the knowledge when the goal is to use existing technology efficiently might be an unnecessary and costly decision.

1.3. Methodological contributions

This doctoral research does not have real methodological contributions. We relied on traditional techniques. The only marginal originality of our choice to emphasize the abductive process of this doctoral research by doing an article-based doctoral research in which each manuscript presents one step of the abductive process.

2. Limits & Opportunities for future research

Any rigorous research has boundary conditions (Gnyawali & Song, 2016). These boundary conditions impact the cause, nature, and implications of results. Each boundary can simultaneously be perceived as a limit for the global generalization of our results and opportunities for future research. In this section, we present some of the main limits and perspectives of our research: first the limits due to the research inquiry (cf. section 2.1) and then the limits due to the case studies (cf. section 2.2).

2.1. Limits link to our research inquiry

Our research inquiry is built on a specific unit of analysis and level of analysis. If having a clear unit of analysis and level of analysis is a means of preventing the risk of the abstract actor (cf. *the section on the “risk of the abstract actors” in our Research Design*), it also narrows the implication of the results. Thus, in this two first subsections, we present the limits due to our unit of analysis and level of analysis, and its consequential research opportunities. Then, in the third sub-section, we present one major limitation of using an abductive process.

❖ Limits of the unit of analysis: shift from a focal firm to the interdependence

The focal firm is the unit of analysis of this doctoral research. This choice was relevant because we aim to dig deeper into the puzzling actions of focal firms. Indeed, we explore the firms' strategic knowledge sharing between competitors. These actions were puzzling because they put the firm in a risky situation of allowing the competitor to internalize its own core resources. Our results and then our theoretical background, which was improved after the finding of the results, highlight that these focal firms make these puzzling decisions because the business relationships between competitors have shifted. We are in an environment in which competitors are no longer in a negative interdependent relationship; their relationships are both negatively and positively interdependent. Sometimes to succeed or survive, the focal firm needs its competitor to succeed too. Thus, instead of focusing on the focal firm, it could be interesting to focus on the interdependence and thus engage in a deeper research that links the reciprocal degree of transparency between the coopeitors. Changing the unit of analysis could be a way to increase our understanding of the business relationship.

❖ Limits of the level of analysis: shifting from dyadic coopetition to more open coopetition

The theoretical reflection of this doctoral research is based on the dyadic relationship (i.e., between two competitors). This choice was relevant to understand the challenges and practices of knowledge transparency between competitors. However, Ritala et al. (2017) highlight that it is not the only dialectical tension linked to the decisions of how to search, share, and integrate knowledge. Firms are also confronted with a choice of inclusiveness (inclusive vs. selective). Inclusiveness relates to the decisions of either sharing knowledge to all network actors, or by carefully selecting the actors with whom they share knowledge. Our case study of Total opens this black box. Indeed, Total was collaborating with multiple competitors in most of the exploration and production projects. For example, Total is partnered with five other competing firms on a huge project called Kashagan. Thus, the dyadic context in which built up our reflection restricts our reflection on knowledge transparency. More nuances must be brought into the reflection by including a reflection on the inclusiveness. These recent facts confirm this need for additional research. For instance, Apple, Amazon, Facebook, Google, IBM, and Micros are joining forces on the very core subject of artificial intelligence.

❖ Limits of our abductive research

Our research is based on an abductive research. We build our reflection on some continuous and rectifying loops between theories and facts. These loops ended by extending the coopetition theoretical framework with external theories as Deutsch (2011) and Nonaka (1994). As our manuscripts were developed before the end of the doctoral research, they do not use these relevant theoretical insights. It can be considered as a weakness or as an opportunity. It is a weakness because the manuscripts could have been improved with this new lens; it is an opportunity because we might be able to then write a theoretical paper by digging further into this theoretical reflection (post Ph.D.).

Table 26 ~Sum up of the limits and research opportunities of our research inquiry

Research inquiry choice	The relevance of the choice	Why are there limits of this choice?	What are the research opportunities?
The focal firm as a unit of analysis	Fit to the research aims: dig deeper into the puzzling actions of focal firms (i.e., <i>share their strategic knowledge transparently</i>)	The firm's success is not based only on the focal firm actions, but it is interdependent to the partner actions (i.e., <i>goal interdependence</i>)	Change unit of analysis to one which allows for looking deeper into the effect of the interdependence
The mainly dyadic level of analysis	Fit to the research aims: restricted the firm interaction to more easily observe its puzzling actions (i.e., dyadic interaction instead of networks)	Our reflection on knowledge transparency is inherently restricted by the dyadic context in which build up our refection (i.e., confronted with a choice of inclusiveness)	Include a reflection on the inclusiveness
Abductive process	Fit to the research aims: dig deeper into the puzzling phenomenon	We were able to extend the coopetition theoretical framework with external theories only at the end of the doctoral research (i.e., the manuscripts do not refer to them)	An opportunity for a theoretical paper post-doctoral research.

Source: See Matilda Bez's doctoral research

2.2. Limits due to the boundary conditions of our case studies

Our case studies have some limitations that also offer opportunities for future research. First, our two case studies focused on the only coopetitive relationship with (1) strong competitors, (2) radical innovation projects, and (3) within a very specific industry. Therefore, the findings should be interpreted with caution and need to be tested through large-scale empirical studies. Moreover, by detailing each of these limits, we also highlight the need for further qualitative research before engaging in a large quantitative study.

❖ Shifts from strong competitors to relationships with less competition

Our results and contributions are adapted only to coopetitive projects between direct strong competitors. We cannot generalize them to coopetitive projects with suppliers, clients, or weaker competitors. Indeed, we have no clue about what would be the degree of transparency chosen in these types of coopetition. On the one hand, we might find a high degree of transparency. Indeed, when the partner is not a strong competitor, there are fewer barriers to be transparent with a competitor. On the other hand, when the partner is not a strong competitor, there is less incentive to be so highly transparent. For instance, a supplier will not be able to duplicate and challenge the focal firm on all the activities. Whatever, the interesting contribution of this doctoral research is that even if we cannot predict the degree of transparency, it highlights that the transparency is a strategic choice. Thus, there is more research to do to identify the relevant degree of transparency in all the different coopetitive relationships. In a vertical coopetition, does the focal firm choose to be knowledge transparent?

❖ Shifts from radical innovation projects to incremental

Our results and contributions are adapted to only radical innovation projects. A greater transparency might be relevant only if the degree of innovation and knowledge creation is high. The overall goal needs to overcome the addition of existing knowledge or the learning of existing knowledge. For instance, the case study of the oil and gas company Total stressed that when the knowledge cannot benefit from synergic effects, Total is not knowledge transparent. Fernandez et al. (2017) seem to have found similar results in their case study in the satellite industry. Thus, it seems that for incremental innovation, the degree of transparency will be low. However, there might be underexplored leveraging effects of being transparent for incremental innovation. Maybe this transparency takes a different form. Indeed, our reflection about incremental innovation is only intuitions, and our case study did not look at incremental innovation. For future research, it could be interesting to look deeper into the role of transparency in the incremental project.

❖ Limits of one boundary condition: within very specific industries and firms

Our case study focused on only two cases within very specific industries and firms. Indeed, the industry and firms are specific for at least three reasons. Firstly, we studied the two biggest firms regarding market capitalization. This choice was relevant because based on their market capitalization; the two firms are likely to manage the sharing of their strategic

knowledge efficiently. Second, they are both in industries in which coopetitive relationships are standards. For instance, Total had more than 70 years of coopetition experience, or Sanofi created an internal school for alliance managers in which some of the good practice learned are inspired by the Sanofi/BMS relationships. Thus, based on the industry context and firms' behaviors, the two firms are likely to have developed good practices in knowledge sharing with competitors. Thirdly, we study only critical activities for Sanofi and Total. For years Sanofi research has relied on the cash flow of the coopetitive project studied, and for Total, the exploration and production activities are the most profitable activities. Thus, the firms are involved and concerned with the success of the project. Not sharing a strategic knowledge which could be helpful for the project is a real concern.

Table 27 ~Sum up of the limits and research opportunities of our case studies

Boundary conditions	The relevance of the choice	Why are there limits of this choice?	What are the research opportunities?
WHO? Only strong competitors	The paradox due to knowledge sharing was easier to observe	No interpretation of competitive relationship with a weaker competitor, a supplier or a client	Replicate the research on the knowledge transparency in different coopetitive relationships
WHEN? Only with huge radical innovations	The knowledge sharing was mandatory (constraint to successes: a failure would be very damaging for both coopetitors)	No interpretation for incremental innovation or a non-innovation project	Replicate the research on the knowledge transparency for radical innovation or non-innovation project
WHEN? Only innovation produced by “patent”	We could access through the accounting document to the flows of money and this measure the monetary value capture	The sharing is intrinsequely less risky	Replicate the research based on a parent/licensing discussion
WHERE? Only specific firms and industries	The two biggest French firms in sales; industries in which the coopetitive relationship is standard; looked only at successful cases, etc.	The findings should be interpreted with caution because they are only cases within very specific industries	Test the results through large-scale empirical studies and in different industries, size of firm and projects

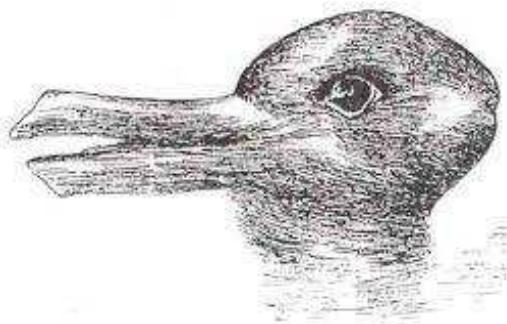
Source: Sea Matilda Bez's doctoral research.

For all these reasons, we conducted our case study on Sanofi and Total. These reasons are also the weaknesses of our research. Indeed, these are cases within the very specific industry. For instance, the access to the exploration area of Total depends only on call for tenders; or for Sanofi, the drug is partially protected by a patent for 20 years, etc. Therefore, the findings should be interpreted with caution and need to be tested through large-scale empirical studies.

Conclusion of this doctoral research

Let's begin this conclusion by thinking about the rabbit-duck optical illusion of Wittgenstein (cf. Figure 39). When you look at the drawing, you can spontaneously see either a duck or a rabbit. Most of the time, one of your colleagues will see the opposite animal to you. For a short lapse of time, you will even argue and confront your perception of the drawing. At the end of the argument, both will realize that both were right. It is possible to see a duck or a rabbit. In addition, what is interesting with this optical illusion is that you can see a duck or a rabbit, but you cannot see them at the same time (Dumez, 2013)

Figure 39 - rabbit-duck optical illusion of Wittgenstein



Source: Wittgenstein (1892), « Which animals resemble each other most? », *Fliegende Blätter*, 23 October 1892

By building on Wittgenstein (1892), this doctoral research aims to highlight that there are two main ways of strategizing and managing coopetition. Both are relevant, and they cannot occur simultaneously. Until now, the literature of coopetition has focused on the fear of knowledge sharing because the partner who is also a competitor might internalize the shared strategic knowledge. Building on this idea, they argue that to unlock the leveraging effects of coopetition, it is key to reduce the fear of knowledge sharing. More concretely, they consider that firms should look for the lowest transparency possible and accept additional transparency only under conditions that this transparency is deemed necessary for project success and that this additional transparency is controlled by a project manager. The ideal transparency would be to reveal it in a way which could not be harmful for the focal firm. The managerial challenge is to protect and when the sharing is critical for the project success to simultaneously share and protect. For us, this dominant view is depicting a real managerial solution implemented by lots of firms. However, it also represents only the “rabbit” perception of Wittgenstein’s drawing.

This whole doctoral research is constructed as an advocacy to rethink how to strategizing and managing coopetition. If we reuse Wittgenstein's drawing, this whole doctoral research aims to highlight that there might not be only a "rabbit" but also a "duck." Indeed, the research inquiry concludes that firms can favor of a greater and freer knowledge transparency to increase the value capture. The managerial intent can be "sharing and capturing." This second way of acting happens when the intent is to renew its knowledge base (i.e., to create a radical innovation). Moreover, it happens only under specific conditions: (1) they perceive that their spiral of knowledge creation is positively related to its competitors' spiral of knowledge, (2) that they are considering that obstruct transparency is a self-fulling destructive process.

This doctoral research. intends to highlight the co-existence of one different way to unlocking coopetition opportunities compared to that claimed in the coopetition literature. Our research inquiry was not constructed to demonstrate the superiority of one over the other. This is the next challenge for the future research.

French Version of the doctoral research

Introduction

Imaginez deux découvertes qui ont généré 100 milliards de dollars. Ce n'est pas une fiction. Il s'agit du fruit récolté par l'entreprise pharmaceutique Sanofi suite à la découverte de deux molécules. Ce chiffre d'affaires n'aurait pas pu être atteint seul. Sanofi a dû s'associer avec son concurrent américain Bristol Myers-Squibb (BMS). Ce montant financier élevé n'est que la partie émergée des gains de la coopération. Simultanément, les deux concurrents ont profité de la coopération pour se renforcer mutuellement en partageant leurs connaissances. Sanofi a appris les rouages pour obtenir une mise sur le marché américain. Réciproquement BMS a renforcé ses connaissances pour une mise sur le marché européen réussie. Ce comportement est contre-intuitif et contredit les relations entre concurrents traditionnellement considérées comme des relations gagnant/perdant avec un concurrent (Brandenburger & Nalebuff, 1996).

L'objet de la recherche

Depuis la fin des années 90, le terme « coopétition » a été utilisé pour faire référence à des relations de marchés qui combinent, de manière simultanée, des relations de coopération et de compétition (Brandenburger & Nalebuff, 1996 ; Dowling, Roering, Carlin et Wisnieski, 1996). Si le néologisme semble très simple à comprendre à première vue, la réalité est beaucoup plus complexe. De nombreux courants l'utilisent différemment. La coopétition peut faire référence à des relations de coopération et de compétition au niveau d'un réseau d'entreprises ou dans une relation dyadique entre deux concurrents (i.e., débat entre l'école de pensée de la coopétition centrée sur les acteurs versus celle centrée sur les activités). Elle peut aussi être définie comme des relations horizontales entre concurrents directs ou des relations verticales entre une entreprise et son fournisseur. Dans cette thèse, nous entendons par le terme coopétition, l'engagement simultané d'une firme dans des activités coopératives et compétitives avec son concurrent direct.

Cette définition avec le terme d'«engagement» met en évidence le rôle clé et proactif de l'entreprise dans une relation de coopétition. Si son engagement dans des actions compétitives est intuitif de par leur relation de compétition, l'engagement dans des actions coopératives est à l'inverse plus difficile et parfois même contre-intuitive. Pourtant, Gnyawali et Charleton (2017) ont souligné que l'engagement dans des activités coopératives comme le partage de ressources stratégiques influence le niveau de performance de la stratégie de coopétition. Ils considèrent que cet engagement est tellement important qu'il peut être considéré comme une

condition obligatoire pour caractériser une relation de coopétition. Toutefois, ce partage de ressources stratégiques ne génère pas toujours que des effets positifs. Il peut conduire à menacer l'avantage concurrentiel actuel ou futur de l'entreprise (Ghobadi & D'Ambra, 2011; Lavie, 2006; Loebecke, van Fenema, & Powell, 1999). En effet, la raison d'être d'une entreprise est liée à ses ressources idiosyncratiques. Or, lorsqu'une entreprise partage ses ressources avec son concurrent dans un projet de coopétition, elle prend le risque que ce dernier les internalise et les réutilisent contre elle (Bouncken, Fredrich, Ritala, & Kraus, 2017 ; Fernandez & Chiambaretto, 2016). Elle peut exploiter les ressources internalisées pour augmenter son pouvoir de négociation dans la relation dyadique ou directement contre elle dans des affrontements sur d'autres projets (Hamel, 1991).

La valeur ajoutée de la notion de coopétition n'est pas liée au fait qu'elle mette l'accent sur la possibilité que des concurrents coopèrent. Des exemples de coopérations entre concurrents datant de l'antiquité romaine ont été identifiés (Mira & Le Roy, 2014) et les raisons de s'engager dans ces collaborations spécifiques sont bien connues et multiples (Carlin et coll., 1994). La coopétition a pour valeur ajoutée de repenser les relations entre concurrents. Elle met en avant le besoin de conceptualiser les relations de coopétition comme simultanément coopératives et compétitives et pas uniquement compétitives. Le succès ou la survie d'une entreprise peut paradoxalement dépendre de son concurrent (Gnyawali & Park, 2011). Et inversement, la survie d'une entreprise peut dépendre de sa capacité à avoir conscience des risques spécifiques liés au fait de coopérer avec un concurrent. L'exécution d'une relation de coopétition repose sur la capacité des entreprises à avoir une compréhension claire et précise des contradictions, des dualités de la coopétition (Gnyawali et al., 2016). Les recherches antérieures ont déjà identifié dans leur ensemble ces contradictions et ces dualités (Chiambaretto & Dumez, 2016 ; Fernandez, Le Roy, & Gnyawali, 2014 ; Tidström, 2014). Ainsi, Fernandez & Chiambaretto (2016) incitent à investiguer plus en profondeur une tension au lieu d'adopter cette approche globale des tensions. Il y a donc un intérêt académique et pratique à approfondir nos connaissances sur une tension unique liée à la coopétition, et sur les implications qui en découlent en matière de management et de stratégie de la coopétition.

Question de recherche

Afin de répondre à ce besoin, nous avons décidé d'examiner plus profondément : « **Comment les entreprises gèrent la coopétition par le prisme du partage de connaissances ? et à quelles intentions stratégiques répondent ces choix managériaux ?** »

Partie 1 ~ Revue de littérature

La première partie présente la recherche programmatique derrière notre recherche étroite sur le partage des connaissances dans la coopétition. Nous commençons par un premier chapitre qui présente les enjeux théoriques sous le terme de coopétition et qui justifie davantage de recherches sur ce phénomène. Nous mettons en évidence que le terme de coopétition est la conséquence d'un changement dans notre façon de conceptualiser les relations entre concurrents. Ce changement est réel et profond. Nous apportons des preuves issues de trois approches théoriques différentes : la théorie des jeux, l'approche par les ressources et compétences, et la théorie de la coopération et la concurrence. Nous terminons ce chapitre en faisant un état de l'art de la coopétition. Il nous conduit à justifier l'existence et la nécessité de creuser plus profondément dans la boîte noire du partage des connaissances dans un projet coopétitif.

Puis, dans un deuxième chapitre, un état de l'art, plus précis, est mené sur le partage de connaissances dans la coopétition. Nous commençons par présenter l'approche dominante au regard du partage des connaissances dans les stratégies de coopétition. Cette approche s'est construite sur l'idée de la course à l'apprentissage d'Hamel (1989;1991). L'intention stratégique est de contribuer à la réussite du projet tout en se protégeant contre l'internalisation des connaissances par le concurrent en réduisant son degré de transparence. Cette approche dominante n'expliquant pas le comportement contre-intuitif exposé au début de cette introduction (i.e., partager ses connaissances avec un concurrent d'une manière qui lui permette de se renforcer), nous sommes allés chercher deux théories à l'extérieur de la littérature sur la coopétition. A l'aide de la théorie de résolution de conflits constructive de Deutsch (2011) et de la théorie de la création de connaissances organisationnelles de Nonaka (1994), nous montrons qu'il peut être opportun de partager de manière extensive et intensive ses connaissances avec un concurrent. Il pourrait être stratégique de chercher à maximiser le partage et donc sa transparence avec son concurrent.

Partie 2 ~ Méthodologie et manuscrits

Cette recherche doctorale vise à appréhender, à l'aide d'une approche compréhensive et abductive, les différents choix quant à la transparence de la connaissance dans une stratégie de coopétition. Ainsi, dans la partie 2, nous commençons par présenter notre recherche abductive. L'ensemble du processus peut être résumé en trois principales boucles :

La première boucle a consisté à confronter les prédictions de la littérature sur la coopétition à une recherche exploratoire et une première étude de cas dans l'industrie pharmaceutique. Cette confrontation a permis d'identifier un fait surprenant. Alors que la littérature prédit une

protection des connaissances partagées pour empêcher le coopétiteur de l'internaliser (Baumard, 2010 a ; Faems, Janssens, & Van Looy, 2010 ; Fernandez & Chiambaretto, 2016), Sanofi partageait de manière intensive et extensive ses connaissances avec son concurrent Bristol Myers-Squibb. Le partage était si intense qu'ils n'hésitaient pas à se renforcer l'un l'autre.

La deuxième boucle a cherché à confirmer et à approfondir notre compréhension de ce fait étonnant. Pour ce faire, nous avons mené une deuxième étude de cas. Nous avons étudié Total, une entreprise intéressante car forte de plus de 90 ans d'expérience en matière de coopération. En outre, dans les années 1970 elle a décidé pour certains projets spécifiques de passer d'un partage de connaissances restreint et sécurisé à un partage des connaissances plus extensif et intensif. Cette deuxième boucle a confirmé l'existence d'un problème scientifique (c'est-à-dire, une tension entre connaissances scientifiques et ignorance).

La troisième boucle a tenté de résoudre le problème scientifique. Nous sommes donc retournés à l'étude de cas sur Sanofi pour comprendre comment cette transparence contre-intuitive était mise en place. De plus, nous avons recherché des théories en dehors de la littérature de la coopération pour expliquer pourquoi il pourrait y avoir une autre façon de gérer les relations de coopération.

Ainsi, l'ensemble du processus abductif a abouti à deux études de cas dont les résultats sont présentés sous la forme de trois manuscrits.

Manuscrit 1

Les recherches antérieures, s'intéressant à l'impact de la coopération sur l'innovation radicale, aboutissent à des résultats contradictoires. Certaines recherches montrent que les risques liés à la coopération sont trop élevés pour qu'elle ait un impact positif sur l'innovation radicale. D'autres recherches montrent, *a contrario*, que coopérer avec un concurrent peut avoir un impact positif sur l'innovation radicale. La question de l'impact de la coopération sur l'innovation radicale reste donc posée. Afin d'y apporter des éléments de réponse, nous analysons, de façon longitudinale, deux projets d'innovation menés par Sanofi et son concurrent Bristol-Myers Squibb (BMS). Cette étude de cas montre qu'un partage intensif et extensif de ressources avec un concurrent permet le succès des projets d'innovation radicale.

Manuscrit 2

Partager sa technologie dans un projet impliquant un concurrent est contre-intuitif. En effet, le concurrent va pouvoir internaliser la technologie et la réutiliser contre l'entreprise qui l'a initialement partagée. Alors qu'il existe des structures projets réputées plus sûres car elles permettent de réduire drastiquement le risque d'internalisation des technologies, certaines entreprises préfèrent avoir recours à des structures projets plus risquées qui favorisent l'internalisation. Notre étude explore ce comportement intriguant à l'aide d'une étude de cas approfondie et longitudinale d'une entreprise qui a fait le choix de passer d'une simple structure projet, réputée plus « sûre », à des structures parfois « plus risquées ». Nos résultats montrent non seulement que ce choix est stratégique, mais qu'il existe de nombreuses variables encourageant cette structure plus risquée. Ce changement de structure de projet révèle un changement de représentation des relations de marché entre les concurrents.

Manuscrit 3

Partager ses connaissances de manière transparente avec un concurrent semble être un mythe. Ce partage peut être considéré comme une invitation à l'opportunisme ou à l'imitation. La réaction intuitive est de réduire son niveau de transparence. Cependant, nous soutenons qu'être fortement transparent est une condition pour libérer les opportunités d'innovation radicale liées aux stratégies de coopétition (i.e., coopération entre concurrents). Notre recherche dépasse cette inhérente contradiction et révèle comment les entreprises peuvent être transparentes dans une relation de coopétition. Répondre à cette question est crucial pour comprendre comment générer des opportunités d'innovation radicale par les stratégies de coopétition. Notre étude de cas sur Sanofi, une entreprise pharmaceutique qui a partagé deux de ses molécules avec un concurrent, confirme qu'il est possible d'être transparent et met en avant le rôle clé du principe de co-management. De plus, nos résultats permettent d'identifier une structure de projet qui permet d'être transparent dans un projet coopétitif.

Partie 3 ~ Synthèse des résultats et contributions

Notre principal résultat consiste en l'identification de trois stratégies de coopétition, chacune reposant sur un management particulier du partage de connaissances. Les deux premières s'inscrivent dans la continuité des travaux existants sur la coopétition. Elles adoptent une approche Hamelienne de course à l'apprentissage, dans laquelle la gestion du partage consiste à trouver des techniques pour partager la connaissance critique pour le succès

du projet commun, sans permettre au partenaire d'internaliser la connaissance. Ces techniques consistent à « protéger » ou « partager & protéger ».

En revanche, la troisième stratégie identifiée, à l'inverse des prédictions de la littérature sur la coopétition, encourage un partage plus ouvert et intensive qui peut même aller jusqu'à renforcer le coopéteur avec sa connaissance. Mais si l'entreprise s'engage dans cette stratégie ce n'est pas par altruisme ou par volonté d'aider l'autre, mais parce qu'elle perçoit une opportunité pour capturer de nouvelles connaissances. Ainsi, les entreprises ont conscience de la dynamique positive de création de connaissances qui va être générée en partageant de manière transparente au lieu de réduire la transparence (i.e., processus de capture de valeur constructif). Cette troisième stratégie permet d'aller plus loin dans notre compréhension des stratégies de coopétition et de leur management. Elle ouvre la voie à de nouvelles recherches se basant sur des fondements intégrant Deutsch et Nonaka.

Notre contribution n'est pas uniquement académique, elle est aussi managériale. Elle ouvre les champs des possibilités d'actions des dirigeants, en identifiant une stratégie contre-intuitive, pour maximiser les opportunités liées à une relation de coopétition. De plus, notre modèle intégrateur peut être réutilisé pour former les individus à la coopétition en leur permettant d'identifier trois stratégies et leurs implications organisationnelles.

Notre partie trois se conclut en posant les limites de notre recherche. Pour chaque limite nous identifions, cependant, de nouvelles opportunités de recherche. Ainsi, cette thèse « lève un lièvre ». Elle signale un fait significatif dissimulé qu'il faut continuer à explorer.

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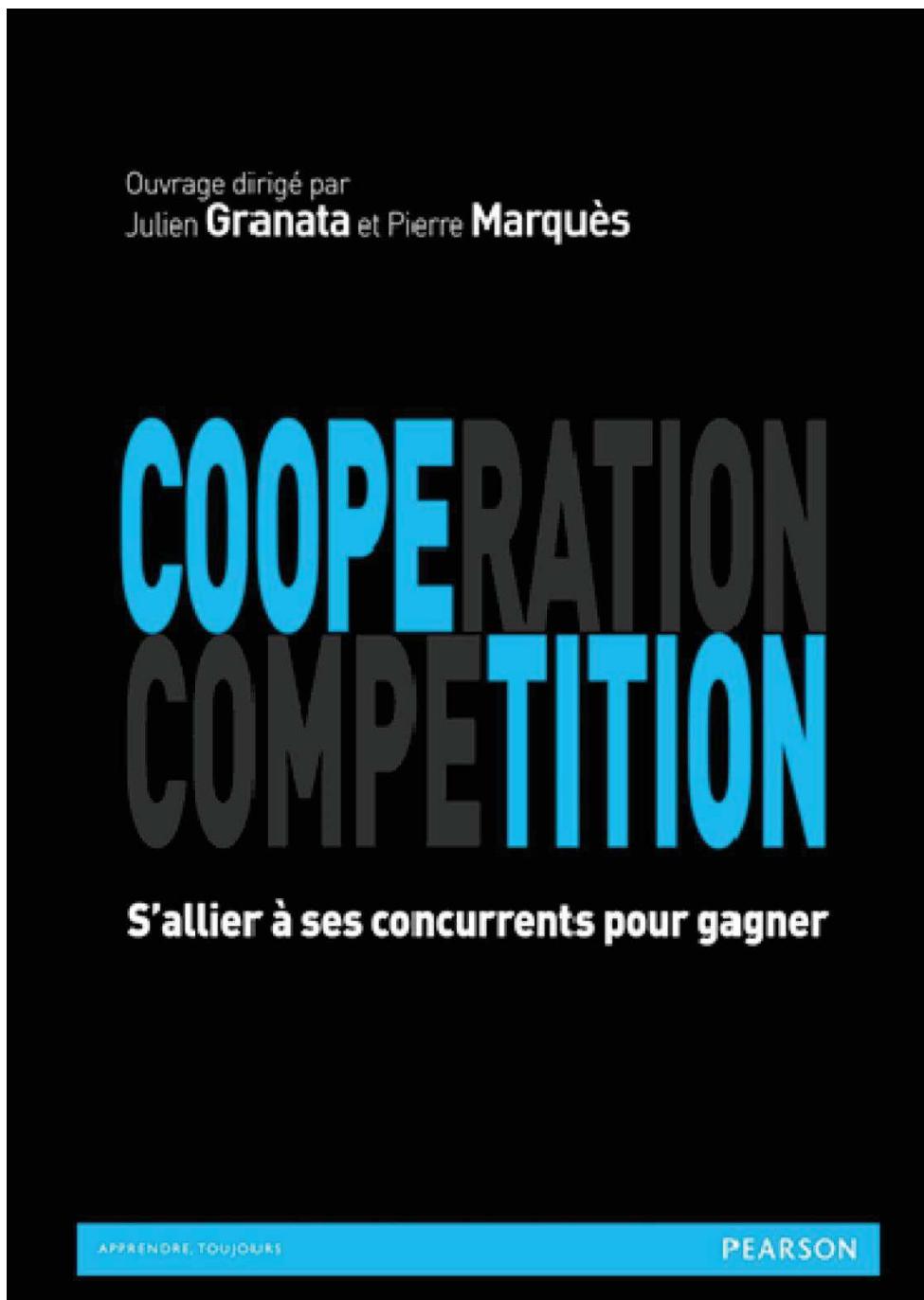
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Annex 1 ~ Bez et al., (2014)

« LE PATIENT ANGLAIS LORSQUE L'ALLIANCE SANOFI ET BMS DONNE
NAISSANCE A UNE INNOVATION MEDICALE MAJEURE »,

BEZ S.M., LE ROY F., GOURSAUD P., PELLEGRIN-BOUCHER E., (2014)
IN COOPETITION S'ALLIER TO SES CONCURRENTS POUR GAGNER
UNDER THE DIRECTION OF DE JULIEN GRANATA, PIERRE MARQUES, PEARSON, P125-153



Ouvrage dirigé par
Julien Granata et Pierre Marquès

Coopétition

S'allier à ses concurrents pour gagner

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Chapitre

Le Patient anglais

Lorsque l'alliance entre Sanofi et BMS donne naissance à une innovation médicale majeure

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« Aimez vos ennemis »
Parole de Jésus, Saint Mathieu

S'allier avec une entreprise de son secteur pour innover n'a pas nécessairement la faveur des dirigeants. C'est une démarche *a priori* contre-intuitive. Les concurrents ne peuvent pas, dans notre culture occidentale, être en même temps des partenaires. Cette conception n'est pas sans fondement. Les dangers de l'alliance avec des entreprises du même secteur sont bien réels. Cette stratégie crée notamment un risque de pillage de compétences

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par le partenaire-concurrent. Les entreprises ont donc tendance à éviter ce type de stratégie, soit en réalisant l'innovation seules, soit en coopérant avec une entreprise d'une autre industrie. Et si ce calcul était erroné ? Et si la peur de coopérer avec une entreprise du même secteur se traduisait par une forte sous-estimation des avantages que ces deux entreprises peuvent retirer de la coopération ? Les dirigeants sont-ils en mesure de se dire que s'allier avec un concurrent peut leur permettre d'aboutir à des innovations majeures ?

Ce chapitre aborde ces questions en étudiant le cas particulier d'une alliance entre deux entreprises de l'industrie pharmaceutique. Cette alliance est celle qui a été établie entre Sanofi et Bristol Myers Squibb (BMS) pour le développement et la commercialisation de deux médicaments : le Plavix et l'Aprovel. Ce cas montre toutes les potentialités de gains liés à la compétition. Il montre ainsi que la coopération, dans une logique *win-win-win*, bénéficie à trois types d'acteurs. Le premier gagnant est le client final, c'est-à-dire dans notre cas le patient, puisque la compétition entre BMS et Sanofi a permis de développer et de commercialiser plus rapidement deux nouveaux médicaments beaucoup plus efficaces que leurs prédecesseurs. Les deux autres gagnants, ce sont évidemment les entreprises en coopération. Le groupe Sanofi, à l'époque de la signature de l'alliance, était un groupe relativement jeune, de taille moyenne, qui n'avait pas les moyens optimum pour développer et commercialiser seul à l'échelle mondiale et aussi rapidement les deux molécules identifiées. Le groupe BMS, au moment de la conclusion de l'alliance, était à la recherche de nouvelles molécules à développer et à commercialiser dans un domaine thérapeutique où il avait déjà une place prépondérante et une expertise reconnue.

L'alliance entre BMS et Sanofi a permis de développer et de commercialiser deux médicaments radicalement nouveaux et beaucoup plus performants pour les patients. Ainsi, pour le Plavix et l'Aprovel, sont le résultat d'un processus d'innovation long, coûteux et risqué.

115 pays qui auront pu bénéficier de ce nouveau produit. Chacun des coopérateurs a obtenu des recettes décisives pour son développement, voire pour sa survie. Pour Sanofi, il est possible de chiffrer les recettes générées par l'alliance à une hauteur de 50 milliards d'euros. Sur ces 50 milliards d'euros, 30 milliards viennent de ses ventes directes et 20 de la relation avec BMS. Pour BMS, les recettes nettes provenant de l'alliance s'élèvent à près de 30 milliards d'euros. L'alliance a donc permis aux deux entreprises de générer ensemble un chiffre d'affaires de 80 milliards d'euros, soit 100 milliards de dollars. Ces chiffres doivent être mis en relation avec, comme détaillé ci-après, les coûts très élevés de l'innovation dans le secteur pharmaceutique.

Ce chapitre se propose de détailler les conditions dans lesquelles cette aventure coopérative a été réalisée. Il détaille dans une première section les caractéristiques de l'industrie pharmaceutique. Une deuxième section décrit la naissance de l'alliance et sa réussite. La troisième section explique que ce sont les besoins de financement liés au développement des produits qui sont en grande partie à l'origine de l'alliance. La quatrième section montre le développement rapide de leurs ventes sur le marché mondial, une deuxième raison pour laquelle ces deux entreprises se sont alliées. La dernière section expose toutes les autres économies de coûts permises par l'alliance.

Les caractéristiques de l'industrie pharmaceutique

La coopération entre Sanofi et BMS se déroule dans l'industrie pharmaceutique. Cette industrie, qui nécessite de forts investissements en R&D (recherche et développement), est, bien que rentable, fortement fragmentée. Pour comprendre ce cas, il faut avoir conscience que les produits pharmaceutiques, tels le Plavix et l'Aprovel, sont le résultat d'un processus d'innovation long, coûteux et risqué.

La pharmacie : une industrie qui nécessite de forts investissements en R&D

Le secteur pharmaceutique a pour activité la recherche, le développement, la production et la commercialisation des médicaments ou des vaccins pour prévenir et/ou guérir des maladies. C'est un secteur d'activité particulier qui concerne la santé et la vie des êtres humains. Le marché mondial du médicament a généré 856 milliards de dollars de chiffre d'affaires en 2012. À l'époque de la signature de l'accord entre Sanofi et BMS, c'est-à-dire au début des années 1990, le marché était quatre fois moins important, soit moins de 200 milliards de dollars¹.

Un secteur qui investit plus que les autres secteurs de haute technologie

Le secteur pharmaceutique est celui qui investit le plus en R&D en termes de montant global de budget R&D. Ainsi, dans le classement mondial de 2010 des entreprises qui investissent le plus en R&D, sept entreprises parmi les vingt premières appartiennent au secteur pharmaceutique. Les cinq plus grosses entreprises de cette industrie investissent plus de cinq milliards de dollars par an. En comparaison avec les industries de haute technologie, en 2011, les dépenses annuelles de ce secteur étaient cinq fois supérieures à celles de l'aérospatial et de la défense, quatre fois et demi supérieures à celles des industries chimiques et deux fois et demi supérieures à celles des logiciels et des services informatiques.

Un secteur néanmoins rentable

En 2001, en France, le niveau de profitabilité du secteur pharmaceutique était de 20 %. C'est le taux le plus élevé de tous les secteurs avec celui de l'industrie pétrolière². Le niveau de rentabilité des actifs était de 11,6 %. Il était très largement supérieur à celui des autres secteurs. De même, le chiffre d'affaires par employé était plus élevé que la moyenne des autres secteurs industrielles³.

Le taux de croissance de la profitabilité sur la période de 2002 à 2011 a été d'environ 25 %, juste derrière le secteur informatique des logiciels et des ordinateurs⁴. Ce secteur a connu un taux de croissance des ventes de 23,7 % entre 2002 et 2011, ce qui le place au premier rang pour la croissance des ventes. Les forts investissements en R&D des entreprises pharmaceutiques sont permis par cette rentabilité du secteur.

Un secteur de plus en plus fragmenté

Auparavant, le secteur pharmaceutique est en cours de mutation. Jusqu'aux années 1980, les entreprises qui dominaient l'industrie étaient des entreprises chimiques verticalement intégrées. Après 1980, les entreprises connaissent un processus de recentrage et de spécialisation, mais aussi de concentration et d'externalisation. Les entreprises sont de grande taille et présentes sur des marchés mondiaux. Elles entretiennent de nombreuses relations de coopération avec d'autres firmes, plus petites, plus spécialisées dans une étape du pro-

2. Philippe Abecassis et Nathalie Courinet, « Industrie pharmaceutique : les Conditions d'un nouveau paradigme technologique », in *Communication*, 2004.

3. INSEE, « Rentabilité des entreprises industrielles de 1990 à 2001 », Rapport CPCI - Fiche F13, 2003.

4. Commission européenne, « What Percentage of Private R&D Spending do the EU Firms in the Stoerboard Account For? », MEMO/12/948, 2012.

1. Direction des affaires publiques Leem. Les entreprises du médicament Leem, « Les entreprises du médicament en France : bilan économique », éditions LEEM Services, 2013.

cessus global d'élaboration du produit final. La forme organisationnelle devient la « firme en réseau ».

Une des raisons principales de cette mutation vient de ce que les « Big Pharma » ne peuvent pas toutes produire une innovation aussi rapidement que les PME de la biotechnologie (BioTech)⁵. En effet, le rapport aux compétences a changé. Pour innover, il faut avoir des compétences universelles et multidisciplinaires. L'avantage concurrentiel des entreprises devient la force de leur marque, leur réseau commercial et leur capacité à coordonner les compétences internes et externes. Elles ont donc de plus en plus recours à des contrats de coopération pour le développement de produits innovants. Ces évolutions bouleversent la façon de travailler des entreprises pharmaceutiques. D'après Gilles Brisson⁶, ancien président-directeur général d'Aventis Pharma France :

« Aujourd'hui déjà se développent à l'intérieur de l'entreprise de nouvelles fonctions qui sont l'identification des nouvelles technologies, de nouveaux faits scientifiques extérieurs, et qui donnent aux grandes entreprises un rôle d'assembleur de compétences : il ne s'agit pas de sous-traiter la recherche, car il est nécessaire qu'en interne les gens soient capables de diriger et contrôler ces réseaux de compétences internes et externes, mais bien de repenser le fonctionnement de l'entreprise. On doit grâce à cette nouvelle organisation inventer la "nouvelle recherche", une nouvelle culture de recherche et de travail en équipe. »

Un processus d'innovation long, coûteux et risqué

Ce secteur se caractérise par un processus de recherche, puis de développement et enfin de production long, coûteux, risqué, avec une courte durée de retour sur investissement à l'échelle mondiale.

Un processus long⁷

Le temps qu'une entreprise doit prendre pour développer un médicament ou un vaccin, et pour le rendre commercialisable, se situe entre 10 et 15 ans. Le processus est long car il se décompose en une série d'étapes. Ces étapes, avant 1980, se effectuaient de manière quasi séquentielle. Aujourd'hui, dans un souci d'accélération de la mise sur le marché, ces étapes se superposent légèrement. Concrètement, une molécule identifiée dans la phase exploratoire doit :

1. avoir réussi les essais précliniques ; ces essais sont fondés sur des organes isolés ou des animaux ; l'objectif est de tester l'efficacité (pharmacologie expérimentale), les effets secondaires (la toxicologie) et les propriétés pharmaceutiques (pharmacocinétique) ;
2. avoir réussi les essais cliniques ; ces essais, qui peuvent impliquer des centaines de patients, voire plusieurs milliers, sont effectués sur l'homme et se déroulent en trois phases :
 - la première permet de tester la tolérance ou l'innocuité du produit ;
 - la deuxième, l'efficacité sur de petites populations ainsi que la dose optimale (meilleur effet pour le moins d'effets secondaires) ;
 - la troisième consiste à tester l'efficacité et la sécurité des médicaments avec des études comparatives impliquant des placebos ou traitements de référence ;

5. Vivian Hunt, Nigel Manson, et Paul Morgan, *A Wake-up Call for Big Pharma Lower Profit Margins Suggest a Need for New Business Models*, McKinsey & Company, décembre 2011.

6. Gilles Brisson, « L'industrie du médicament : entre science, rentabilité et éthique », *Le Jardin et Le Range*, Revue de La Communauté Polytechnicienne, 2003.

7. Pharmaceutical Research and Manufacturers of America, « Chart Pack : Biopharmaceuticals in Perspective », www.phrma.org, 2012, 2.0 edition.

3. avoir obtenu l'autorisation de mise sur le marché ; une phase administrative doit avoir lieu qui consiste à fournir un dossier pour obtenir les accords de vente sur le marché ;
4. poursuivre parfois les essais cliniques une fois la commercialisation lancée ; les essais continuent pour chercher une extension de la molécule existante à d'autres domaines thérapeutiques (ces essais complémentaires commencent dès la phase des essais cliniques) ;
5. s'inscrire, en parallèle à la commercialisation, dans un processus de pharmacovigilance, qui consiste à suivre la sécurité du médicament, en recensant tous les événements liés à la prise du médicament.

Un processus coûteux⁸

En 2011, le montant du budget R&D de l'industrie pharmaceutique est de 135 milliards de dollars par an. En 2011, sur plus de 3 200 molécules en développement, seuls 35 nouveaux produits pharmaceutiques ont été lancés. Sachant que le coût estimé de mise au point d'une nouvelle molécule peut atteindre un milliard d'euros, soit 1,38 milliard de dollars. Ce coût varie selon qu'on prenne ou non en compte le coût des dossiers d'autorisation de mise sur le marché ou des coûts d'opportunité.

Depuis les années 1980, les coûts de R&D ont fortement augmenté : 138 millions de dollars en 1975 comparé au 1,3 milliard d'aujourd'hui. Cette augmentation s'explique, d'une part par l'augmentation des exigences pour les essais cliniques afin d'obtenir l'autorisation de mise sur le marché (exemple FDA). Concrètement on exige une augmentation du nombre d'études cliniques, du nombre de patients par étude et du nombre de tests par patient. Cette augmentation s'ex-

plique, d'autre part, par l'arrivée des biotechnologies. Les biotechnologies sont universelles et multidisciplinaires. Elles font appel à des connaissances et à des compétences multiples dans de nombreux domaines. Ces connaissances ne peuvent pas être utilisées seules et il est nécessaire de les relier entre elles. Elles impliquent donc un besoin d'ouverture des centres de R&D.

Par exemple, il est possible d'analyser l'évolution du budget R&D de Pfizer. En 2011, ce budget est de 8,4 milliards, alors qu'il représentait quatre milliards de dollars à la fin des années 1990 et 500 millions de dollars à la fin des années 1980. En 2011, le taux R&D/CA est de 14,2 %⁹.

Un processus risqué

Durant la phase de R&D, qui est longue et coûteuse, la réussite du médicament est incertaine. À chaque test, des effets secondaires ou un manque d'efficacité peuvent être identifiés et conduire à l'arrêt du projet. Au total, le taux d'échec est de presque 90 % depuis 1990.

Une période de vie des produits qui se raccourcit

La durée de vie sur un marché impacte la rentabilité des capitaux investis. Si un produit consiste en une réelle avancée, alors il a un quasi-monopole sur cette classe thérapeutique. Ce quasi-monopole est significatif car, sur une classe thérapeutique, les trois premiers médicaments occupent 80 % du marché mondial¹⁰.

Avec la concurrence des génériques, la durée d'exclusivité s'est réduite à la durée du brevet. Un brevet dure en moyenne 20 ans à partir de son dépôt sur la molécule. Comme il faut

⁹. Pfizer Inc. and Subsidiary Companies, « Appendix A 2013 Financial Report » 2013.

¹⁰. Direction générale compétitivité de l'industrie et des services, « Chapitre II : R&D des leaders pharmaceutiques », *Archives DGCIIS*, 2012, archives.dgciis.gouv.fr/2012/www.industrie.gouv.fr.../docu.../ed-b.pdf.

⁸. International Federation of Pharmaceutical Manufacturers & Associations, « The Pharmaceutical Industry and Global Health: Facts and Figures 2012 », 2012, IFPMA édition.

en moyenne 10 ans de développement, l'exclusivité commerciale ne dure au mieux qu'une dizaine d'années. À l'expiration du brevet, quand la version générique d'un médicament est commercialisée, elle peut capturer entre 84 % et 94 % du marché dans les premiers mois.

Il est nécessaire pour les entreprises de maximiser les ventes durant la période où elles en ont l'exclusivité. Cela se traduit par un raccourcissement des délais pour diffuser un médicament. Le temps pour que le médicament soit disponible auprès de la population cible doit être réduit.

La nécessité d'être présent à l'échelle internationale

L'échelle internationale pour la commercialisation s'impose pour amortir financièrement le montant de la R&D. En effet, le taux d'échec ou de non-rentabilité de nombreux médicaments, leur arrivée tardive et la concurrence précoce des génériques doivent être compensés par une échelle/cible plus grande à l'échelle mondiale.

La pharmacogénétique renforce cette nécessité de se situer à l'échelle internationale. En effet, elle permet de segmenter de manière très fine la population en fonction de certains gènes. Cela permet d'avoir des taux de réactions positives au médicament de plus de 80 % au lieu de 20 ou 30 %. Ce ciblage de la population pousse à la mondialisation des médicaments car il conduit à réduire le nombre de malades susceptibles d'en bénéficier. Pour compenser cette réduction, il faut servir les patients à l'échelle mondiale.

Synthèse : le secteur pharmaceutique au début des années 1990

Au début des années 1980, le secteur pharmaceutique est en mutation et le cycle de vie du médicament change. Les trois tendances qui se dessinaient à partir de cette période commencent à se manifester fortement dans les années 1990. Ces

tendances sont : 1) l'augmentation des coûts de R&D ; 2) la nécessité d'une commercialisation de plus en plus rapide et internationale et 3) une réorganisation du secteur par le développement de contrats d'alliances associé à une valorisation multidisciplinaire de la R&D et à l'augmentation des exigences des essais cliniques. Ces tendances poussent les entreprises pharmaceutiques à adopter des stratégies d'alliance.

Naissance et réussite d'une alliance

Au début des années 1990, Sanofi et BMS sont deux entreprises significatives de l'industrie pharmaceutique. Elles ont le même objectif : rechercher, développer, fabriquer et commercialiser des solutions thérapeutiques innovantes. Sanofi est plutôt présente sur le marché européen et BMS sur le marché américain. Toutefois, les deux entreprises sont présentes sur certains marchés globaux et développent des médicaments pour le traitement préventif des mêmes maladies communes comme les maladies cardiovasculaires. Ainsi, dans le domaine cardiovasculaire, Sanofi commercialise le Triclid et BMS commercialise le Pravachol et le Monopril¹¹. En 1993, Sanofi et BMS décident de créer une alliance pour développer et commercialiser ensemble deux molécules que Sanofi a découvertes. Le premier médicament est le Plavix, connu aussi sous le nom d'Iscover, et dont le nom générique est Clopidogrel. Le second médicament est l'Aprovel, aussi connu sous le nom d'Avapro ou Karvea, et dont le nom générique est Irbesartan. Il permet de traiter l'hypertension artérielle et l'insuffisance rénale chez les diabétiques de type 2.

11. Les produits mentionnés sont des produits différents (classes thérapeutiques différentes) : antigrippant *versus* troubles lipidiques et antihypertenseur, mais ils peuvent tous être utilisés dans la prévention des maladies cardiaques.

Pour ces deux molécules, Sanofi avait réalisé une série d'essais en phase précoce de développement pré-clinique qui lui permettait de prédire un futur de *blockbusters*, c'est-à-dire des médicaments à fortes ventes mondiales. Sanofi avait des perspectives de ventes qui dépassaient les 750 millions d'euros avant d'avoir signé l'accord d'alliance. Mais, ayant la phase de commercialisation, il restait à tester l'intérêt clinique réel, c'est-à-dire à arbitrer entre les bénéfices et les risques de ces médicaments.

À l'époque, en 1993, Sanofi est une jeune compagnie dans le secteur pharmaceutique international. Ce n'est qu'en 1991, suite à 15 années de recherche et se sentant prête à lancer, dans un délai de trois ou quatre ans, deux ou trois molécules originales sur le marché, que Sanofi s'est décidé à passer d'une stratégie de diversification à un recentrage sur les activités du domaine thérapeutique et de la beauté. Cette volonté de recentrage se traduit par la nécessité de s'internationaliser. Sanofi fait l'acquisition de Sterling Drug, la filiale pharmaceutique de Kodak, leader des auto-médicaments. Cette acquisition lui ouvre le marché américain. Cependant, malgré ce rachat et sa position de vingtième au rang mondial (1,4 % de part de marché avec 16,5 milliards de francs dans le médicament), Sanofi reste peu internationalisée. Sa rentabilité demeure faible par rapport aux grands groupes mondiaux. Elle est de l'ordre de 8 %, ce qui est bien en dessous des marges opérationnelles moyennes de l'époque, de l'ordre de 17 %.

Pour assurer le futur prometteur du Plavix, qui a un potentiel de *blockbuster*, Sanofi décide de ne pas continuer seule. Elle choisit de rechercher un partenaire pour le développement et la commercialisation du médicament. Le partenaire que Sanofi choisit est Bristol Myers Squibb (BMS). À l'époque, c'est une entreprise beaucoup mieux placée dans le palmarès des groupes pharmaceutiques, notamment dans le domaine cardiov不易aire, puisqu'elle est deuxième groupe mondial. En plus de ses

compétences en marketing, en R&D et en organisation de la production, BMS est reconnue pour sa capacité à mettre rapidement sur le marché les médicaments, en particulier sur des zones comme les États-Unis. En 1993, un certain nombre de ses brevets allaient expirer. BMS devait donc trouver un moyen pour gérer le laps de temps entre l'expiration de ces brevets et la mise sur le marché des molécules en développement. L'entreprise était à la recherche d'une opportunité de mise sur le marché d'un nouveau médicament et avait les ressources financières ainsi que l'expertise pour la réaliser rapidement. BMS maîtrisait particulièrement bien les essais de type 3 et le marketing pour la mise sur marché des médicaments.

L'alliance entre les deux entreprises se traduit par un succès commercial de grande ampleur, puisqu'elle génère 80 milliards d'euros de CA (100 milliards de dollars). Ce CA correspond au montant des ventes globales que les deux concurrents Sanofi et BMS se sont partagés (voir figure 4.1 d'après les documents de référence de Sanofi). Plus de 80 milliards d'euros de CA ont été générés par l'accord signé en 1993, depuis le lancement des produits de l'alliance qui a eu lieu fin 1997-début 1998, et jusqu'au moment de la restructuration de l'alliance liée à l'expiration des brevets en 2012.

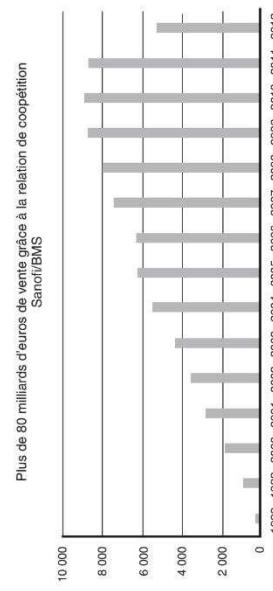


Figure 4.1 CA généré par l'alliance entre Sanofi et BMS (en millions d'euros)

Le Plavix est le deuxième médicament le plus vendu dans le monde pour l'année 2010. Cette année-là, uniquement avec le Plavix, Sanofi et BMS ont vendu pour presque sept milliards d'euros de produits et avec l'Aprovel, deux milliards d'euros. Le Plavix est aujourd'hui le médicament le plus prescrit pour prévenir les crises cardiaques. Il permet aussi de lutter contre l'apparition de caillots sanguins et certains autres problèmes circulatoires chez les personnes atteintes d'athérosclérose. Le Plavix concerne 92 millions de patients répartis dans 115 pays.

La cause principale de l'alliance : partager les coûts de développement

Dans le cas de l'alliance entre Sanofi et BMS, le groupe Sanofi avait financé seul l'ensemble de la recherche et les toutes premières phases de développement. En revanche, par le choix d'une stratégique de coopération, les coûts de développement ont été financés conjointement par les deux entreprises. Ce partage a permis d'avoir un niveau d'essais cliniques en adéquation avec le fort succès attendu¹². La méthode de calcul de l'ensemble des coûts évoqués dans ce chapitre est détaillée en annexe 3.

Les coûts de recherche supportés par le Groupe Sanofi seul

Sanofi a découvert les molécules à la base du Plavix et de l'Aprovel à la fin des années 1980. À la suite de ces découvertes, Sanofi a effectué une première série de tests permettant de déposer un brevet sur ces molécules. Ces tests ont permis

12. Le coût de la recherche et des premières phases de développement doit donc être séparé du coût du développement des dernières phases.

également d'estimer le potentiel de ces deux molécules, même s'il restait une forte incertitude sur la suite du développement. Suivant la méthode introduite par Forbes¹³ pour l'industrie pharmaceutique, nous estimons que Sanofi a dépensé pour l'Aprovel et le Plavix environ 450 millions d'euros de coûts de recherche.

Les coûts de développement partagés par Sanofi et BMS

À partir de 1993, des coûts de développement très élevés sont nécessaires pour la mise sur le marché des molécules pharmaceutiques. Pour le Plavix et l'Aprovel, ces coûts sont supportés conjointement par les deux coopéiteurs. Le coût de développement d'un médicament à partir d'une molécule variée d'une molécule à l'autre. Le coût est alors peu élevé. À titre d'exemple, pour une molécule contre le cancer, en 2008, il pouvait ne nécessiter que 300 patients¹⁴. Pour le Plavix, avec toutes les études achevées, en cours ou prévues, plus de 130 000 patients ont été impliqués dans le programme de recherche. D'après Sanofi, ce programme de recherche est le plus important de ce type.

Plus une entreprise doit montrer l'apport réel de son produit, en substitution par rapport à un produit existant sur le marché, plus le coût de développement est élevé. Dans le cas du Plavix, le produit concurrent était l'aspirine. Le coût de fabrication de l'aspirine était très faible et elle était déjà bien implantée dans les habitudes de consommation des patients. Pour le Plavix, il a donc été nécessaire de mener le plus grand

13. Forbes, «How Much Does Pharmaceutical Innovation Cost? A Look At 100 Companies», in Jean Jacques Cristofari, <http://pharmanalyse.fr/>, 16 août 2013.

14. Nelly Weinmann, *R&D des compagnies pharmaceutiques : ruptures et mutations*, Direction générale des entreprises, Observatoire des stratégies industrielles, Mission prospective - Études ministère de l'Economie, de l'Industrie et de l'Emploi, January 2008.

programme d'essais cliniques de l'époque. L'unique démonstration de l'efficacité supérieure du Plavix par rapport à l'aspirine, avec une tolérance aussi bonne, a nécessité d'impliquer 20 000 patients. Nous avons estimé les coûts de développement réalisés en coopération à 1,65 milliard d'euros.

Après le lancement du Plavix et de l'Apotrel, les essais cliniques ont continué. L'objectif de ces essais était d'étendre l'utilisation des produits à d'autres populations de patients que ceux visés par l'indication primaire et d'ainsi pouvoir obtenir un délai supplémentaire d'exclusivité. Le succès des essais sur la pédiatrie a permis à l'alliance d'obtenir six mois d'exclusivité supplémentaires. Le coût des essais complémentaires représente au moins 700 millions d'euros (377 millions d'euros entre 2007 et 2012 pour la zone Europe/Asie gérée par Sanofi en co-promotion). Les essais complémentaires ayant commencé au plus tard en 2001, il est nécessaire, au minimum, de doubler le montant des essais cliniques identifiés. Le tableau 4.1 permet d'identifier les coûts de R&D.

Tableau 4.1 Estimation des coûts de R&D (millions d'euros)

	Coût de recherche	Coût de développement	Coût des essais complémentaires	Coût total
Montants estimés	450	1 650	700	2 800
Répartition des coûts sans coopération	100 %	100 %	100 %	Sanofi : 2 800
Répartition des coûts avec coopération	Sanofi : 450	Sanofi : 825 BMS : 825	Sanofi : 350 BMS : 350	Sanofi : 1650 BMS : 175

Pour Sanofi, grâce à la coopération, l'économie de coût de R&D peut être estimée à 1,6 milliard d'euros et pour BMS elle peut être estimée à 1,175 milliard d'euros. Sachant qu'au moment du lancement, c'est-à-dire en 1998, Sanofi dépensait moins de 500 millions d'euros de R&D par an, et qu'elle avait 33 molécules en développement, elle n'aurait pas pu supporter seule le coût de développement du Plavix et de l'Apotrel,

qui dépassait initialement un milliard d'euros et qui s'avèrera finalement beaucoup plus important (2,8 milliards d'euros).

La deuxième cause de l'alliance : développer les chiffre d'affaires

Pour convaincre deux partenaires de faire une alliance, l'aboutissement à l'innovation est un premier argument, mais c'est encore mieux s'ils voient leur chiffre d'affaires augmenter. Nous montrons dans cette section comment cet objectif a été atteint très au-delà des espérances initiales.

Le développement du CA de Sanofi

Au début des années 1990, comme c'est encore le cas aujourd'hui, le marché américain est la première zone géographique consommatrice de médicaments. Dès le lancement du Plavix et de l'Apotrel, l'objectif du groupe Sanofi était de pénétrer le marché aux États-Unis. Néanmoins, en 1998, la force de vente de Sanofi n'était composée que de 800 visiteurs médicaux américains provenant principalement du rachat en 2001 de Sterling Drug. Ce nombre était insuffisant pour une exploitation à grande échelle de nouveaux médicaments. Une force de vente productive et efficace était d'autant plus nécessaire que le Plavix était souvent comparé à l'aspirine. Cette dernière était déjà implantée dans les habitudes des consommateurs et avait un coût de production et de vente très faible, ce qui la rendait très compétitive.

Sanofi, avec sa force de vente de l'époque, ne pouvait pas répondre au potentiel du marché pour ses découvertes. Il a donc été nécessaire de recourir à un partenaire pour profiter d'une force de vente déjà en place et, donc, permettre une pénétration rapide du marché américain. Sanofi choisit BMS, un groupe pharmaceutique à l'époque trois fois plus gros qu'elle, réputé pour la rapidité de mise sur le marché de ses médicaments.

Le fait que Sanofi ait permis à son concurrent BMS de commercialiser les deux médicaments qu'elle avait découverts et qu'ils avaient co-développés, lui a permis de générer une vingtaine de milliards de recettes supplémentaires. Ces recettes proviennent des redevances de découvreurs, de redevances de co-développement et des ventes de Sanofi à BMS.

La redevance de découverte

Le fait d'accepter de commercialiser à deux les médicaments qu'elle a découverts permet à Sanofi de toucher une redevance de découreur sur l'intégralité du chiffre d'affaires généré par les ventes des deux médicaments. Sanofi a touché une redevance, que nous estimons à 9,7 milliards d'euros, sur les 80 milliards d'euros liés aux ventes mondiales. Ainsi, Sanofi par ce principe a intérêt à rechercher la maximisation des ventes. Sur la base de documents de référence de Sanofi, la figure 4.2 montre l'évolution des gains liés à la redevance.

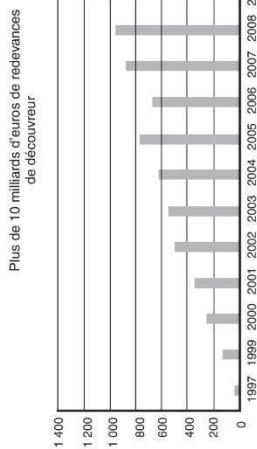


Figure 4.2 Les redevances de découreur de Sanofi (millions d'euros)

Les redevances de co-développeur

Les deux coopétiteurs ont développé ensemble les médicaments. Ils doivent donc recevoir des redevances sur chaque vente pour rémunérer le savoir-faire et le droit de propriété industrielle. Ainsi, chaque entité qui commercialise les produits

doit payer une redevance de développement. Deux flux d'argent se créent. Sanofi doit payer des redevances à BMS quand elle vend des produits et elle doit recevoir des redevances quand BMS vend des produits. Choisir un partenaire dont le réseau commercial est important et complémentaire permet ainsi d'avoir une balance positive entre ces deux flux. Il est donc possible de générer des ventes supplémentaires avec un médicament adéquat et un partenaire capable de le valoriser. Dans le cas présent, Sanofi a payé plus de trois milliards de redevance à BMS alors qu'elle a reçu de BMS autour de neuf milliards de redevance.

Les ventes de composants de Sanofi à BMS

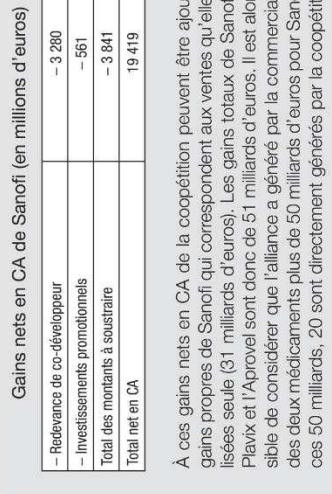
Pour fabriquer les médicaments qu'elle commercialise, BMS a acheté un certain nombre de composants à Sanofi. Le montant de ces ventes est de 3,8 milliards d'euros sur la période.

Les investissements promotionnels de Sanofi

Sanofi et BMS signent un accord en 2001 qui prévoit une augmentation de la quote-part de Sanofi dans l'investissement promotionnel et les résultats liés à la commercialisation d'Avapro, qui est la marque utilisée aux États-Unis pour l'Aprovel. Il est prévu que Sanofi verse environ 561 millions d'euros à BMS.

Récapitulatif des gains de la compétition pour Sanofi	
Gains bruts de Sanofi (recettes en millions d'euros)	
+ Redevance de découreur	10 232
+ Redevances co-développeur	9 140
+ Ventes à BMS	3 888
Total brut des gains en CA	23 260

Toutefois Sanofi a dû reverser à BMS des redevances de co-développeur qui doivent donc être soustraites des recettes. De même, il faut soustraire les 561 millions d'euros d'investissements promotionnels versés par Sanofi à BMS.



La représentation graphique des gains obtenus par Sanofi (voir Figure 4.3) a été réalisée en suivant la méthode décrite en annexe 2.

Comparaison des gains estimés de Sanofi en millions d'euros entre une situation sans et avec coopération

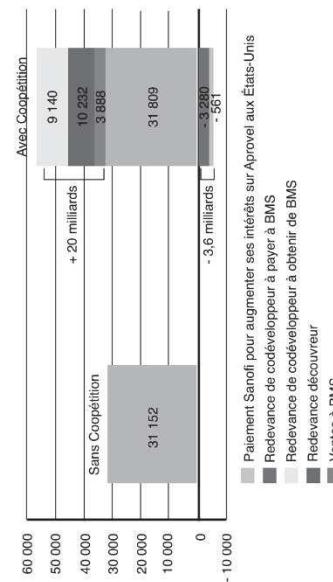


Figure 4.3 Les gains en CA¹⁵ pour Sanofi

15. Lorsque nous utilisons le terme gain, nous faisons référence aux recettes (montants positifs sur le graphique) moins les redevances payées (montants négatifs).

Le développement du CA de BMS

Lors de la signature de l'accord entre Sanofi et BMS, en 1993, BMS savait qu'elle serait dans une situation difficile à partir de 1998. En effet, à cette date se terminaient les brevets sur ses produits Toxal (cancer) et Glucophage (diabète), ce qui impliquait une forte perte de revenus. Or, BMS ne disposait pas de nouvelles molécules pouvant être commercialisées ayant deux années pleines, soit au début des années 2000. La perte estimée était de 500 millions de dollars entre 1998 et 2000. L'alliance avec Sanofi représentait une opportunité pour avoir accès à un produit avec un fort potentiel comme le Plavix. En effet, une étude menée par Bernstein Global Wealth Management envisageait les ventes à un milliard de dollars¹⁶. Cette étude estimait que ces ventes pouvaient être d'un montant deux à quatre fois plus important si les essais cliniques montraient que le Plavix était plus efficace que l'aspirine. Le Plavix deviendrait alors le premier choix pour les patients « à risque ».

Dans les estimations de BMS, l'alliance devait certes avoir un impact important sur le bénéfice net, mais elle ne devait pas être à l'origine de la croissance des bénéfices par actions de l'entreprise. Même si le Plavix était une réussite, l'impact de cette réussite sur les ventes projetées de BMS devait rester faible : entre un et quatre milliards sur les 15,2 milliards de dollars de ventes projetées par rapport aux ventes de 1996. Le Plavix devait générer 8 % de la croissance projetée de 15 % de BMS. De plus, l'impact devait être réduit par l'amputation sur les ventes d'environ 25 % de royalties pour Sanofi.

Dans les faits, avec les produits de l'alliance, BMS a complété 52 milliards d'euros. La marge de BMS sur ses ventes a été diminuée des royalties de découveur et de développeur que

16. Bernstein Global Wealth Management, « Bristol-Myers' Plavix: Impressive Drug, but No Earnings Boon », *Bernstein Research*, November 1, 1996.

BMS devait à Sanofi, mais a été augmentée des royalties de co-développeur que Sanofi devrait à BMS sur les territoires de Sanofi. Ainsi, dans les ventes faites par BMS, 32 milliards d'euros ont été perçus par cette entreprise. Plus précisément, depuis 1998, chaque année les ventes du Plavix représentent plus de 100 % des frais annuels de R&D globale de BMS.

Les 32 milliards d'euros supplémentaires générés par l'alliance pour BMS rémunèrent son réseau commercial qui a permis de distribuer ces produits sur des territoires où Sanofi était peu présent, tels que les États-Unis. De 2005 à 2012, la zone des États-Unis, territoire géré par BMS, a comptabilisé plus de 50 % des ventes de Plavix (hors 2006 avec seulement 47,2 %). Ces chiffres montrent l'importance de BMS dans la commercialisation. En gérant les ventes du Plavix aux États-Unis, BMS a participé uniquement sur cette zone à plus de 50 % des ventes du Plavix pour l'alliance, de 2005 à 2012, comme le montre le tableau 4.2 d'après les documents de référence de Sanofi.

Tableau 4.2 Pourcentage des ventes du Plavix réalisées aux États-Unis

	2005	2006	2007	2008	2009	2010	2011	2012
55 %	47 %	53 %	55 %	59 %	67 %	68 %	46 %	

récompensé par la réussite du Plavix sur ses marchés. BMS a également beaucoup gagné dans l'alliance. Ce succès du Plavix s'est avéré décisif pour la survie même de l'entreprise. En effet, les molécules que BMS avait développées seule en interne, et dont elle attendait un succès futur, n'ont pas eu la réussite escomptée. Grâce aux bénéfices dégagés par la coopération avec Sanofi, BMS a pu survivre à ces échecs commerciaux. Ainsi, en 2009 et 2010, les ventes des produits de l'alliance représentent environ 40 % des ventes nettes de BMS. Sans la coopération, BMS n'aurait pas pu commercialiser le Plavix ni l'Avapro, car ils sont tous les deux le fruit d'une découverte de Sanofi. Ainsi, son chiffre d'affaires sans compétition peut être assimilé à zéro. Les rapports annuels de BMS nous permettent d'identifier l'évolution des parts des ventes dans le tableau 4.3.

Tableau 4.3 Parts des ventes des produits de l'alliance sur les ventes totales de BMS

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
2 %	4 %	7 %	9 %	14 %	15 %	22 %	25 %	31 %	33 %	39 %	40 %	38 %	35 %	37 %	

Les gains estimés de BMS générés par la compétition sont considérables, de l'ordre de 52 milliards euros bruts.

Récapitulatif des gains de la compétition pour BMS

Gains bruts de BMS (recettes en millions d'euros)

+ Ventes de produits	48 899
+ Redevances co-développeur	3 280
+ Investissements promotionnels	561
Total brut des gains en CA	52 740

Toutefois BMS a dû reverser à Sanofi des redevances découvrant des redevances de co-développeur et a dû lui acheter des composants. Ces dépenses doivent donc être soustraites du gain brut en CA.

Les autres économies de coûts induites par la compétition

Le calcul des coûts est toujours un exercice difficile, même quand on dispose de toutes les données internes d'une entreprise. L'objectif ici est de tenter d'estimer les économies de coûts induites par la compétition.

Le processus de répartition des dépenses, hors coûts de recherche, peut être assimilé à un partage à 50 % par les deux coopérateurs. L'alliance mondiale s'organise autour de deux territoires géographiques : BMS sur le continent américain et l'Australie, et Sanofi sur les pays d'Europe et d'Asie. Selon ce modèle, deux territoires sont formés pour gérer de manière centralisée les dépenses telles que le marketing, le développement, les royalties et l'approvisionnement de chaque pays en produits finis. Les dépenses sont partagées en fonction du pourcentage de contrôle sur les territoires : 50,1 % pour les territoires où le partenaire est en charge des opérations et 49,9 %, là où le partenaire ne contrôle pas le territoire. Nous estimons donc que pour arriver au même niveau de vente final induit par la découverte des produits Plavix et Aprovel, le Groupe Sanofi aurait dû dépenser à peu près 20,9 milliards d'euros de coûts supplémentaires (partage à 50 % des coûts hors coût de la recherche de Sanofi avant l'alliance).

Les autres coûts, que nous n'avons pas encore traités, intègrent : 1) les coûts des produits vendus (coûts directs attribuables à la production des produits vendus qui comprennent le coût des matières premières et celui du travail); 2) les coûts de marketing/ventes/administratif; et 3) les autres coûts.

Les coûts de fabrication partagés par Sanofi et BMS

Les coûts des produits vendus sont les coûts directs de production. Ils comprennent les coûts des matières premières et ceux du travail. Pour les estimer, nous avons cherché à les

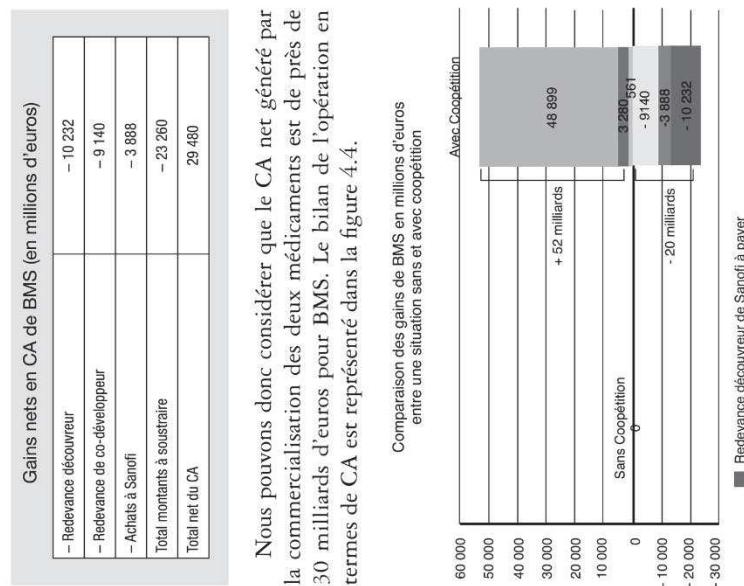


Figure 4.4 Les gains en CA¹⁷ pour BMS

17. Lorsque nous utilisons le terme gain en CA, nous faisons référence aux recettes (montants positifs sur le graphique) moins les redevances payées (montants négatifs).

identifier sur une zone géographique délimitée, avant de les généraliser à l'ensemble de l'alliance. Précisément, nous avons cherché à identifier sur une zone géographique le pourcentage des coûts de fabrication par rapport aux ventes. Nous avons ensuite rapproché ce pourcentage de l'ensemble des ventes mondiales de l'alliance. Nous estimons les coûts de fabrication à 29 milliards d'euros.

Les coûts marketing partagés par Sanofi et BMS

Les coûts marketing intègrent le salaire des employés intégrés à ce service, les frais directs en marketing, ceux liés à la vente mais aussi à l'externalisation de certaines tâches. Par exemple, la campagne publicitaire de 1998 qui vise directement les consommateurs du Plavix a été externalisée pour un montant de 35 millions d'euros. Ces 35 millions d'euros ne sont qu'une partie des coûts marketing dépendus dans le cadre de l'alliance. Ces derniers ont été estimés à 10,4 milliards d'euros.

Bilan global des économies de coûts

L'estimation des économies de coûts fait ressortir les éléments suivants : Sanofi a pu économiser la moitié des coûts de développement, la moitié des coûts de fabrication et la moitié des coûts de marketing et de publicité. Pour Sanofi, l'ensemble des économies de coûts peut être évaluée à 20,5 milliards d'euros (le montant que BMS a pris à sa charge) comme le montre le tableau 4.4.

Tableau 4.4 Estimation globale des économies de coûts (millions d'euros)^(a)

	Sans compétition Sanofi	Avec compétition Sanofi	Avec coopération BMS
Coûts de recherche	450	450	0
Coûts de développement	1 600	800	800

Coûts de fabrication	29 000	14 500	14 500
Coûts marketing, publicité	10 400	5 200	5 200
TOTAL	41 450	20 950	20 500

(a) Nous nous sommes focalisés ici sur les coûts principaux pour lesquels nous pouvions

obtenir des informations dans les documents de référence publics des entreprises. A ces

coûts il est nécessaire de rajouter des coûts de création et de gestion quotidienne de

l'alliance (coûts juridiques, management etc.). Ces coûts ne figurent pas dans la partie

financière des rapports annuels mais il est possible de considérer que leur montant reste

minime par rapport aux coûts étudiés.

Conclusion : s'allier avec une entreprise de son secteur pour le meilleur

L'alliance avec une entreprise du même secteur n'est pas la stratégie la plus prise par les dirigeants, notamment quand il s'agit d'innover. Ils préfèrent généralement coopérer avec des partenaires non-rivaux, pour éviter de se retrouver dans une situation de pillage potentiel de leurs savoir-faire. L'objectif de ce chapitre est de montrer que si cette peur du pillage de compétences est légitime, elle conduit également à sous-estimer tous les gains que peut apporter la coopération. Dans cette perspective, nous nous sommes attachés à montrer les gains de la coopération pour les patients, pour Sanofi et pour BMS, dans une logique *win-win-win* :

1. Pour les patients, le gain est majeur, puisque le Plavix et l'Aptovrel ont des propriétés thérapeutiques bien supérieures à celles des médicaments précédents. L'alliance entre Sanofi et BMS a permis le développement et la commercialisation de deux innovations majeures, ce qu'aucune des deux entreprises n'aurait pu réaliser seule. Ces produits n'auraient sans doute pas vu le jour sans coopération. Le premier avantage de l'alliance avec un concurrent est donc de permettre une innovation qui crée de la valeur pour le client final, ici le patient.

2. Pour Sanofi, la coopération a permis la réalisation de la phase de développement et la commercialisation aux États-Unis. Au total, les deux médicaments ont permis à Sanofi d'engranger 51 milliards d'euros de recettes. Au-delà de ces chiffres, à la fin de la coopération en 2012, Sanofi n'est plus la même entreprise qu'au début. Jusqu'au début des années 1990, Sanofi est un groupe jeune et encore peu internationalisé. Les réussites connues par le Plavix, et à un degré moindre par l'Aprovel, lui ont permis de s'engager dans un processus de développement sans précédent. Les recettes engendrées lui ont notamment permis de faire l'acquisition d'Aventis. Le Groupe Sanofi est aujourd'hui un groupe globalisé avec une forte implantation aux États-Unis.

3. Pour BMS, la coopération a permis la commercialisation aux États-Unis de deux *blockbusters* dont il n'est pas le découvreur. Les avantages liés à la coopération sont encore plus spectaculaires, puisque les recettes supplémentaires s'élèvent à 29 milliards d'euros. BMS a de plus économisé les coûts de recherche et partagé les coûts de développement, de production et de commercialisation. Les gains obtenus par l'alliance ont joué un grand rôle dans la survie même de BMS. Dans la même période, les molécules développées en propre n'ont pas eu le succès commercial escompté, et BMS n'aurait sans doute pas pu tolérer la baisse de son chiffre d'affaires, sur la base de son propre portefeuille de molécules, sans les recettes liées à l'alliance.

Pour Sanofi et BMS, à ces gains liés à l'alliance doivent s'ajouter ceux moins visibles liés aux économies de coût. Sanofi a supporté seule les coûts de recherche, mais elle a partagé avec BMS les coûts de développement, les coûts de production et les coûts de commercialisation. Pour Sanofi, l'économie de coûts peut être estimée à 20,500 milliards d'euros et pour BMS à 20,950 milliards d'euros. Les coûts de développement

ont été particulièrement élevés pour ces deux médicaments. Sanofi n'aurait pas pu les financer seule. Ceci explique en grande partie le recours à la coopération avec une entreprise du même secteur. De la même façon, il est possible de supposer que Sanofi n'aurait pas pu supporter seule l'ensemble des coûts de fabrication et surtout de commercialisation.

Alors est-il si dangereux de s'allier avec son concurrent et faut-il n'avoir recours à ce genre de stratégie qu'en dernière extrémité? Le cas de l'alliance BMS-Sanofi montre nettement le contraire. Le concurrent de Sanofi était clairement le meilleur partenaire possible. Seul un autre groupe pharmaceutique pouvait s'avérer aussi complémentaire dans les phases de développement, de production et de commercialisation. La coopération a fortement contribué à faire de Sanofi un groupe de taille mondiale ainsi qu'à pérenniser BMS. Ce constat conduit à proposer de reconSIDérer sérieusement l'évaluation des risques et des gains liés à la coopération. Il y a fort à parier que les risques sont fortement surévalués par les dirigeants alors que les avantages potentiels sont eux-mêmes très sous-évalués. Nous espérons que l'exposé d'un cas comme celui de la coopération entre BMS et Sanofi contribue à changer cette vision.

Investigation du terrain

Cette étude a reçu le soutien du programme du Labex Entreprendre «Stratégies inter-organisationnelles et innovation» de l'Université Montpellier 1. Cette recherche est fondée uniquement sur données secondaires. Les informations ont été collectées dans les états financiers de Sanofi et BMS :

- document de référence et rapport annuel de 2003 à 2012 de Sanofi;
- annual report de 1998 à 2012 de BMS.

Nous avons utilisé des articles, rapports de consultants, études, interview écrite, etc. (voir bibliographie) pour décrire le secteur, approfondir notre compréhension du cas et faire certaines estimations de coûts. Cet article a été co-écrit avec un professionnel de l'Alliance Management, Pascal Goursaud, afin d'orienter notre recherche et de confronter nos résultats à la réalité.

Annex 2 ~ Bez et al., (2016)

« COOPETITION : COMMENT CONJUGUER PROTECTION ET PARTAGE D'INFORMATIONS ?»,

BEZ S.M., LE ROY F., DAMERON S., (2016)

IN *S'INFORMER, SE PROTEGER, INFLUENCER*

UNDER THE DIRECTION OF DE ALICE GUILHON AND NICOLAS MOINET, PEARSON, P193-206

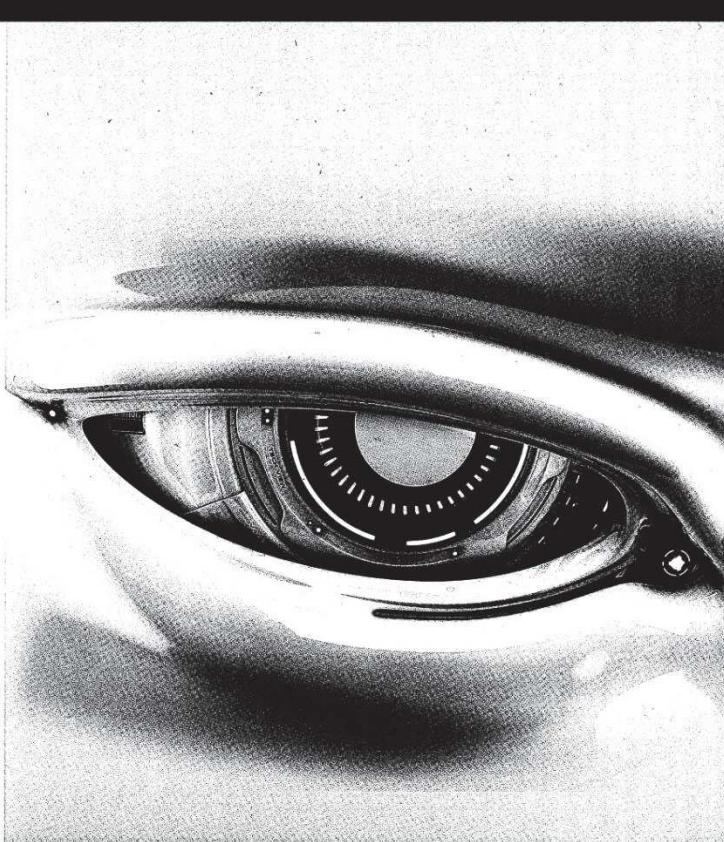
Intelligence économique

S'informer, se protéger, influencer

Sous la direction de

Alice
Guilhon

Nicolas
Moinet



La sécurité économique territoriale *stricto sensu* est surtout l'apanage des services de l'Etat. Selon la taille, le secteur d'activité et les enjeux de l'entreprise, tel ou tel service prendra en compte cette entreprise dans son portefeuille. En cas de conflit entre services, la coordination exercée par le préfet de région permet de désigner celui chargé du suivi de cette entité, voire un double suivi selon certaines spécificités.

Enfin, ce panorama serait incomplet sans évoquer deux autres acteurs qui contribuent à la sécurité économique territoriale : les chambres consulaires et les acteurs privés.

En effet, les chambres de commerce et d'industries (CCI) sont en lien direct avec les entreprises et mènent des actions de sensibilisation à la sécurité économique, le plus souvent en organisant des conférences faisant intervenir les agents des services de l'Etat ou des experts privés.

En second lieu, le développement de l'intelligence économique en France depuis 2003 a vu la naissance de plusieurs dizaines de cabinets privés d'intelligence économique (dont beaucoup ont été créés par d'anciens agents des services de renseignements de l'Etat). Au-delà de la sensibilisation menée par les services de l'Etat, certains de ces consultants procèdent à des audits de sécurité particulièrement pointus.

En raison de la diversité des configurations, chaque entreprise, voire chaque territoire est en mesure de trouver un conseiller public ou un expert privé pour analyser et préconiser des améliorations à sa sécurité économique.

Section 4 – La coopération, comment conjuger protection et partage de l'information

La coopération, qui consiste à coopérer avec ses concurrents, est une stratégie de plus en plus fréquente. Les entreprises hésitent de moins en moins à s'engager dans des alliances avec leurs concurrents pour gagner la double course à la globalisation (taille critique, leader, etc.) et à la technologie (innovation, processus, R&D, etc.). Les gains associés aux stratégies de coopération peuvent être tout à fait spectaculaires. Pour autant, la coopération n'est pas sans risque. Le risque principal est celui du pillage de compétences et de technologies par le compétiteur (Fernandez et al., 2015).

Toute la difficulté de la mise en œuvre d'une stratégie de coopération réside dans la tension entre la nécessité de s'ouvrir et de partager de l'information avec ses coéquipiers, tout en restant suffisamment fermé pour protéger l'information vitale pour l'entreprise, c'est-à-dire ses talents, ses brevets, son organisation, ses projets. C'est la gestion de cette tension informationnelle qui est au centre des réflexions proposées dans cette section. Comment doit-on gérer le partage de l'information nécessaire à la coopération lorsque cette information peut être réutilisée par le partenaire/concurrent ?

Afin de répondre à cette question, nous exposerons, dans une première partie, la portée et les limites des stratégies de coopération. Nous développerons, dans une deuxième partie, la problématique de partage de l'information dans les relations de coopération.

Nous terminerons en montrant la façon dont une entreprise peut gérer cette situation paradoxale de partage et de protection.

1. La coopération, une stratégie sous tension

La coopération, facteur de performance

La coopération a émergé comme nouveau concept à la fin des années 1990. Sous l'impulsion d'auteurs comme Brandenburger & Nalebuff (1996), puis Bengtsson & Kock (1999, 2000), la coopération a été progressivement reconnue comme une stratégie pertinente et porteuse pour l'entreprise²⁰⁷. La coopération est une relation paradoxale qui émerge quand deux entreprises rivales coopèrent pour atteindre un objectif commun. L'intérêt et la spécificité du concept de coopération sont de mettre l'accent sur le paradoxe de la situation. La coopération entre les entreprises n'éteint pas la rivalité entre elles. Les entreprises combinent et encouragent simultanément des relations de compétition et de coopération.

La coopération est considérée comme une forme de stratégie supérieure aux stratégies de coopération pure et de compétition pure²⁰⁸. En effet, une entreprise qui suit une stratégie de coopération se place dans une situation où elle peut bénéficier à la fois des avantages liés à la coopération et des avantages liés à la compétition. La coopération permet à l'entreprise d'avoir accès de façon quasi gratuite à des ressources, des compétences et des connaissances qu'elles ne possèdent pas en propre. La compétition pousse les entreprises à améliorer leurs produits-services, à innover, à introduire des nouvelles combinaisons productives, etc. Les entreprises qui suivent des stratégies de coopération ont donc accès à des ressources supplémentaires par la coopération tout en étant stimulées par la compétition pour employer ces ressources de façon efficiente. Elles sont, par la suite, plus performantes.

Les gains potentiels liés à la coopération avec un concurrent sont très nombreux. Cette coopération peut, premièrement, permettre d'importantes économies de coûts. Deux concurrents ont, ainsi, le même type d'approvisionnement et tout intérêt à coopérer pour s'approvisionner en commun auprès des mêmes fournisseurs. Des concurrents ont également des systèmes de production proches ; ils peuvent donc facilement les mutualiser pour obtenir des économies d'échelle. Il en est de même pour le partage des coûts de R&D, de marketing, de distribution, etc. La coopération entre concurrents peut, de deuxièmement, être l'occasion de nouveaux apprentissages. Deux concurrents ont des ressources et compétences à la fois proches et différentes. Il y a donc de nombreuses opportunités de croisement de ces ressources et compétences pour générer des appren- tissages originaux et fructueux²⁰⁹.

Dans cette perspective, plusieurs cas de succès de la coopération peuvent être mis en évidence. Il en est ainsi de la coopération entre Sony et Samsung dans la TV à écran plat. Les deux entreprises ont co-développé la technologie LCD et ont décidé de continuer à vendre séparément leurs télévisions. Sony et Samsung sont dans une relation typique de coopération, en coopérant pour le développement d'une nouvelle technologie et en rivalisant pour la commercialisation des produits qui intègrent cette nouvelle technologie.

Un second cas exemplaire de succès de coopération est l'alliance entre BMS et Sanofi dans l'industrie pharmaceutique²¹⁰. Ces deux entreprises ont établi une alliance pour le développement, la production et la commercialisation de deux médicaments, le Plavix et l'Aprovel. La coopération a été un succès en termes d'innovation et en termes financiers. Les partenaires se sont partagés les coûts de développement, de production et de distribution. La coopération a permis la création du Plavix, un médicament qui bénéficie à 92 millions de patients dans 115 pays, ainsi que de l'Aprovel, qui a connu un succès moindre, mais tout de même remarquable. Au total, la coopération a généré un chiffre d'affaires de pas moins de 80 milliards d'euros !

Les risques de la coopération

Si la coopération est porteuse de vertus pour l'entreprise et semble incontournable dans certains secteurs, elle n'en est pas moins une stratégie risquée. Coopérer avec son rival augmente le risque d'imitation de ses ressources et compétences. Normalement, le processus de copie des ressources d'un concurrent performant est difficile. Les entreprises compétitives sont, par nature, celles qui ont des ressources uniques et difficiles à imiter. Lorsque deux entreprises décident de coopérer, les barrières à l'imitation tendent à se fragiliser, voire à disparaître, en raison de la création d'interfaces et de connexions entre les partenaires.

Lorsque les entreprises optent pour des stratégies de coopération, elles se retrouvent donc confrontées à un dilemme²¹¹. Il s'agit de s'ouvrir pour partager des ressources avec un concurrent, tout en restant suffisamment fermé pour conserver des actifs stratégiques uniques. Il faut essayer simultanément d'absorber le savoir-faire de son concurrent pour s'enrichir et protéger son cœur de compétences²¹².

Le pillage de compétences est tellement réalisable qu'il est parfois considéré comme le motif principal de la coopération. Dans un véritable « agenda caché », c'est parce qu'une entreprise a pour projet d'imiter les ressources et compétences de son concurrent qu'elle va lui proposer un accord de coopération (Hamel, 1991). Comme chaque compétiteur a

²⁰⁷ Yami, S., Castaldo, S., Dagnino, G. B., & Le Roy, F., *Cooperation: winning strategies for the 21st century*, Edward Elgar, Cheltenham, UK, Northampton, MA, USA, 2010.

²⁰⁸ Le Roy, F., & Sanou, F. H., « Does Competition Strategy Improve Market Performance: an Empirical Study in Mobile Phone Industry », *Journal of Economics and Management*, 17, 2014, pp. 63-94.

²⁰⁹ Gnyawali, D., & Park, B., « Co-operation between giants: Collaboration with competitors for technological innovation », *Research Policy*, 40(5), 2011, pp. 650-66.

²¹⁰ Bez, S. M., Le Roy, F., Pellegrin-Boucher, E., & Goursaud, P., « Le patient anglais », In Marquès, P. & Granata, J. (Eds.), *Cooperation: S'allier à ses concurrents pour gagner*, Tours: Pearson France, 2014, pp. 126-153.

²¹¹ Pellegrin-Boucher, E., Le Roy, F., & Gurau, C., « Competitive strategies in the ICT sector: typology and stability », *Technology Analysis & Strategic Management*, 25(1), 2013, pp. 71-89.

²¹² Le Roy, F., & Fernández, A.-S., « Managing Cooperative Tensions at the Working-group Level: The Rise of the Competitive Project Team », *British Journal of Management*, 26, 2015, pp. 671-688.

le même agenda caché, il s'agit alors d'un double jeu de dupe. Chacun tente de s'approvisionner le plus possible le savoir-faire de l'autre, tout en se protégeant autant que possible de l'imitation de son propre savoir-faire.

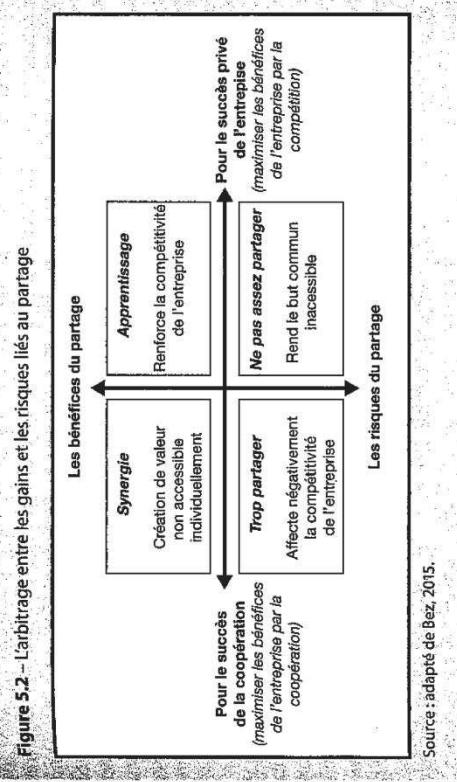
En résumé, la coopération est une stratégie à fort potentiel de performance tout en étant risquée. Les risques liés à la coopération en font une stratégie sous tension. La coopération est une relation qui peut être « gagnant-gagnant », mais également « gagnant-perdant ». Il est donc capital pour le succès de cette stratégie de savoir gérer les risques qui lui sont associés en mettant en place un management strict de la relation, en mettant en présence des ressources humaines « stres » et préparées à ces risques, en ne permettant qu'un accès limité aux espaces physiques et sensibles de l'entreprise, etc.

2. La problématique du partage de l'information

Dans une situation de coopération, certaines ressources et compétences doivent être partagées avec son coopérateur tout en protégeant de l'imitation les ressources et compétences clés. Toute la difficulté vient du fait que la logique de développement du projet commun s'oppose en partie à la logique de l'entreprise. En effet, le succès du projet commun dépend de l'intensité du partage de l'information entre les partenaires. Ainsi, du point de vue du projet, un contexte de partage d'informations sans contrainte doit être encouragé. En revanche, du point de vue de l'entreprise, les salariés impliqués dans le projet n'ont peut-être pas intérêt à adopter un comportement purement coopératif. En effet, les informations qui sont partagées pour le succès du projet commun peuvent être réutilisées par les partenaires sur d'autres projets qui eux sont menés en compétition. Le choix stratégique idéal serait de maximiser les gains de la coopération tout en limitant l'information apportée²¹³. Mais cette option semble irréalisable car le partenaire serait aussi conduit à minimiser son apport.

Le partage de l'information constitue donc une décision stratégique difficile à prendre. En s'inspirant de la théorie des jeux, pour maximiser son intérêt privé, l'entreprise peut vouloir partager ses informations stratégiques pour deux raisons : s'assurer du succès de la coopération et donc maximiser sa part relative dans ce succès ; et profiter de cette coopération pour apprendre. Cependant, le partenaire étant un concurrent, à ces deux bénéfices correspondent deux risques : le risque de trop partager et le risque de ne pas partager suffisamment. La combinaison de ces deux dimensions permet d'identifier quatre situations : synergie, apprentissage, trop de partage, et pas assez de partage (voir figure 5.2).

Figure 5.2 – L'arbitrage entre les gains et les risques liés au partage



Synergie

Cette situation revient à accepter de partager en considérant que le partage est profitable du fait de la complémentarité entre les cooptateurs. Elle permet de créer une nouvelle combinaison d'experts et de ressources, ce qui ne serait pas possible individuellement. Cette nouvelle combinaison permet des économies de coûts, ainsi que la réduction du temps nécessaire pour développer une technologie ou un produit.

Par exemple, Sanofi avait découvert deux molécules avec un fort potentiel de *blockbusters*, le Plavix et l'Apriovel. Cependant, à l'époque, Sanofi était très peu présent aux Etats-Unis (premier marché mondial). Ainsi, Sanofi s'est allié avec BMS, qui est une entreprise américaine, pour co-développer et co-commercialiser ces deux molécules. Par ce choix, Sanofi a pu maximiser ses ventes aux Etats-Unis grâce à son concurrent BMS, dont le réseau de distribution était implanté et efficient.

Apprentissage

Dans cette situation, accepter de partager est profitable à l'entreprise par le biais de l'accès aux compétences externes qu'elle peut alors internaliser et réutiliser dans d'autres projets. L'entreprise peut vouloir limiter au maximum l'information qu'elle partage et en même temps essayer de s'approprier le maximum de connaissances. Hamel parle de « course à l'apprentissage » (Hamel, 1991). Cependant, limiter le partage a un impact négatif sur l'opportunité d'apprentissage, car le cooptateur ne donnera que s'il constate que l'entreprise donne. Si l'entreprise veut apprendre, elle doit donner.

213. Ilonen, I. & Vuori, V., « Risks and benefits of knowledge sharing in co-operative knowledge networks », *International Journal of Networking and Virtual Organisations*, 13(3), 2013, p. 209.

Par exemple, un représentant d'une société de haute technologie dans une interview sur la sécurité de la connaissance soutient : « Nous avons des activités de réseautage très précieuses. Et tout le monde sait que si vous allez à un groupe avec l'intention seulement d'acquérir des connaissances en ne donnant rien, vous n'allez pas gagner beaucoup. Si tous les membres du réseau sentent que tout le monde participe, alors le résultat est meilleur. Ensuite, il est très important de savoir ce que nous pouvons apporter au réseau et ainsi gagner quelque chose en retour. Lorsque ces réseaux sont construits, il est très important que les participants comprennent la valeur de la connaissance, et les règles sont claires pour tous les participants » (Ilonen & Vuori, 2013).

L'apprentissage peut se faire sur des technologies et du savoir-faire. Par exemple, General Motors, le géant de l'automobile, a utilisé son alliance NUMMI avec son concurrent Toyota pour apprendre le *lean manufacturing* et le réutiliser dans la majorité de ses projets. Gary Cowger, le vice-président de General Motors des relations sociales et frais généraux, soutient : « Les racines de nos progrès proviennent du *Toyota Production System* [TPS]. Nous avons appris d'eux [Toyota]. Et nous devons donner le crédit à ceux qui en sont à l'origine.»²¹⁴ L'apprentissage peut se faire en termes d'intelligence économique directement liée à la compréhension de son environnement stratégique et des intentions de son concurrent.²¹⁵ En effet, en travaillant avec un concurrent, l'entreprise accède à des informations clés sur le comportement et la stratégie de ce dernier, et confronte sa vision de l'environnement externe à celle de ce même concurrent. Par exemple, dans l'industrie spatiale, l'alliance entre Thales et Astrium pour la fabrication d'un satellite a posé des problèmes de partage d'informations. Les ingénieurs ne voulaient pas partager toutes les informations techniques qui auraient permis au coopétiteur d'identifier ses forces et ses faiblesses. La compétition est donc bien un lieu de collecte d'informations sur le concurrent.

Trop de partage

Collaborer avec un concurrent peut conduire à « armer » son propre concurrent avec ses propres armes (information/savoir-faire). Ainsi, partager dans une coopération peut conduire à affaiblir la position concurrentielle de l'entreprise dans les projets où elle est en compétition avec le partenaire.

Par exemple, en 2005, un appel d'offre pour la fabrication de TGV à destination du marché chinois est remporté par Siemens. Siemens vend ainsi 60 trains ICE3 au gouvernement chinois. En contrepartie, Siemens accepte un transfert de technologie à son partenaire chinois.²¹⁶ Les TGV sont assemblés en Chine, par des Chinois, à partir de pièces issues de Siemens. Dès 2008, le premier CRH3 chinois sort directement des chaînes de production du partenaire chinois... et devient le concurrent direct du ICE 3 de Siemens sur les marchés chinois, puis sur les marchés mondiaux !

²¹⁴ Inkpen, A. C., « Learning Through Alliances: General Motors and NUMMI », *California Management Review*, 47(4), 2005, pp. 114-136.

²¹⁵ Dameron, S. & Gareaud, L., « De l'intelligence économique à l'intelligence stratégique », In Nogaiewski, G. & Perret, V. pour Dauphine Recherche en Management (eds), *L'état des entreprises 2014*, collection Repères, La Découverte, 2014.

²¹⁶ Jolly, D., *Les entreprises qui font la Chine*, Eyrolles, Paris, 2011.

Pas assez de partage

La facilité avec laquelle des entreprises peuvent partager des informations dépend de l'intensité de la concurrence. Si cette intensité est trop forte, les individus vont être réticents à partager. Et donc l'objectif commun ne sera peut-être pas atteint. Par exemple, dans l'industrie spatiale, le succès de l'alliance entre Thales et Astrium était menacé par une surprotection de l'information (Fernandez & Chiambaretto, à paraître). Les employés refusaient de partager les informations techniques qu'ils jugeaient comme confidentielles. Un manager de projet expliquait ainsi que : « Les ingénieurs nous ont dit «nous ne voulons pas partager car c'est notre cœur de métier, et nous ne voulons pas donner ce type d'information».

Pour résumer, fixer le niveau de partage de l'information est une décision stratégique difficile à prendre. Les entreprises doivent choisir le niveau de partage de l'information en fonction des bénéfices et risques anticipés (voir figure 5.2). Deux cas extrêmes sont possibles : tout partager (partage excessif) ou ne pas assez partager (partage insuffisant). Le partage excessif signifie partager sans retenue toutes les informations possédées dans l'entreprise. Cette situation extrême est risquée car l'entreprise peut perdre son avantage concurrentiel. Le partage insuffisant est faussement attractif. En limitant le partage de l'information, l'entreprise se protège de la perte de son avantage concurrentiel. Cependant, dans ce cas, elle risque de ne pas profiter du potentiel de la coopération qui l'avait conduite à coopérer initialement (coût d'opportunité). Dans une situation intermédiaire entre ces deux extrêmes, tout l'art consiste à savoir manager les tensions informationnelles.

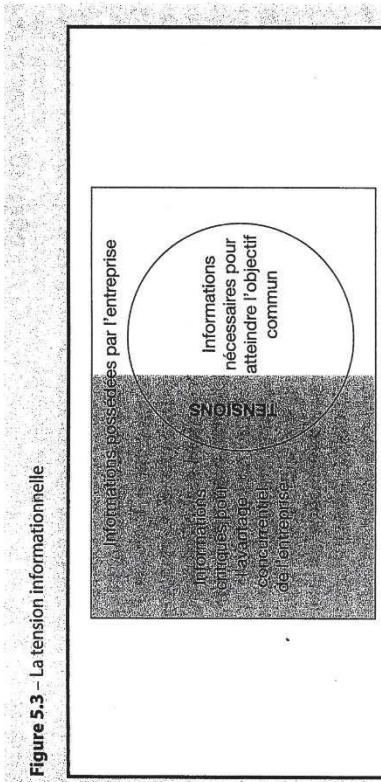
3. Manager la tension informationnelle

Une entreprise en coopération est confrontée à un problème de superposition entre les informations critiques pour le succès de la coopération et les informations critiques pour l'avantage concurrentiel de l'entreprise. Fernandez et Chiambaretto²¹⁷ qualifient cette situation de « tension informationnelle » (voir figure 5.3). Les entreprises aimaient ne pas partager les informations qui leur assurent un avantage concurrentiel (partie en gris foncé à la figure 5.3). Sauf que, certaines d'entre elles sont nécessaires pour le succès du projet. En ce sens, les entreprises sont donc contraintes de partager.

Pour gérer la protection des informations critiques simultanément pour la coopération et pour l'entreprise, l'entreprise peut « limiter l'absorption/imitation par le coopéteur ». Le partage des informations critiques ne générera pas de tension si l'utilisation de ces informations était limitée au projet en coopération. Le problème est lié au fait que le coopéteur peut réutiliser ces informations dans les projets en compétition. Oxley²¹⁸ parle de « risque d'appropriation ». Donc en limitant l'absorption, l'entreprise limite les risques d'appropriation par l'autre.

²¹⁷ Fernandez, A. S. et Chiambaretto, P. (à paraître), « Managing tensions related to information in competition », *Industrial Marketing Management*, Special Issue.

²¹⁸ Oxley, J. E., « Appropriability Hazards and Governance in Strategic Alliances: A Transaction Cost Approach », *Journal of Law, Economics, and Organization*, 13(2), 1997, pp. 387-409.

Figure 5.3 – La tension informationnelle

Source : adapté de Fernandez et Chiambaretto, à paraître.

Comment limiter l'absorption par le compétiteur tout en partageant des informations avec lui ? Cette question est centrale dans la réussite d'une stratégie de coopération. En réponse, deux principes permettent de manager le risque de la coopération : le principe de séparation et le principe d'intégration²¹⁹.

Le principe de séparation

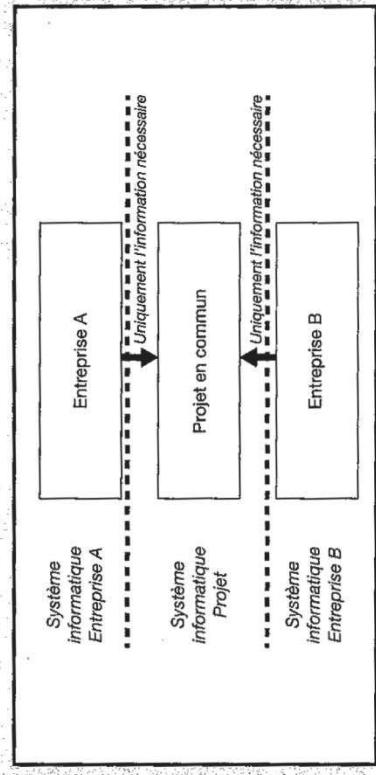
Le premier principe pour manager la tension informationnelle est le principe de séparation. Ce principe consiste à séparer les informations à partager selon des projets. Si les informations sont nécessaires à la réussite du projet en coopération, elles sont partagées avec le compétiteur. Si elles ne sont pas nécessaires à la réussite du projet, elles ne sont pas partagées.

Si nous reprenons l'exemple de la coopération entre Astrium et Thales, la solution choisie pour résoudre le risque du partage de l'information a consisté à mettre en place un système informatique qui respecte le principe de séparation. Au niveau du projet, le système informatique spécifique cumule les informations nécessaires au projet provenant des deux entreprises. Mais l'accès à ce système informatique est protégé. Les personnes non impliquées dans le projet ne peuvent pas y avoir accès.

Pour renforcer le principe de séparation, il est possible de mettre en place un système formel et informel qui permet de contenir l'information partagée uniquement à la coopération. Ce système empêche la réutilisation des informations partagées dans les projets en compétition. Le système formel consiste en une protection légale basée sur des contrats, des clauses de confidentialité, etc. Le contrôle plus informel peut, par exemple, consister à introduire de la complexité. Une complexité qui prend forme en mettant en

place une structure où les informations partagées ne sont qu'une partie d'un tout plus global et donc non assimilable.

Le principe de séparation est un premier niveau de protection des informations. Ce principe consiste à exclure du partage toutes les informations qui ne contribuent pas à la réussite du projet. Toutefois, ce principe a des limites. Il ne permet pas de prévenir l'ensemble des fuites intentionnelles ou accidentelles. En effet, malgré le système informatique, ce sont les individus qui partagent et décident de partager. Et ces derniers peuvent décider de partager des informations qu'ils ne devraient pas partager (fuites intentionnelles), mais aussi de partager sans s'en rendre compte des informations stratégiques pour l'entreprise (fuites accidentnelles).

Figure 5.4 – Le principe de séparation

Source : adapté de Fernandez et Chiambaretto, à paraître.

Le principe d'intégration

L'entreprise peut décider que le management de la tension informationnelle repose sur ses employés et sur leur capacité à intégrer individuellement la logique coopétitive. Ce principe d'intégration consiste à laisser les employés gérer le paradoxe de la coopération et juger par eux-mêmes les informations à partager. Leurs décisions sont alors guidées par la volonté d'optimiser les bénéfices de la situation de coopération. Le principe d'intégration repose sur le postulat que les employés sont capables d'accepter la situation paradoxale que génère la coopération et d'en optimiser les bénéfices²²⁰. Par exemple, en termes de partage d'information, il peut être profitable pour l'entreprise que les employés laissent fuiter de manière délibérée certaines informations. En effet, ces fuites délibérées s'accompagnent souvent d'une contrepartie positive pour l'entreprise.

²¹⁹ Le Roy, F. & Fernandez, A.-S., « Managing Competitive Tensions at the Working-group Level: The Rise of the Competitive Project Team », *British Journal of Management*, 26, 2015, pp. 671-688.

²²⁰ Luo, Y., « A competition perspective of global competition », *Journal of World Business*, 42(2), 2007, pp. 129-144.

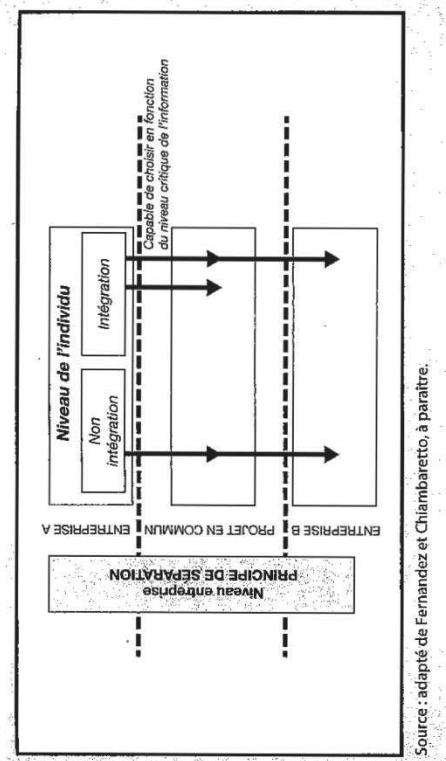
Le rôle des employés dans le partage de l'information est clé. Le choix de partager résulte d'un processus de négociation progressif et quotidien, et non d'une décision processuelle automatique. Ce n'est pas le résultat d'un simple calcul coût/avantage. Il n'est donc pas possible de mettre en place une liste figée d'informations à partager ou à ne pas partager. L'employé doit constamment prendre sa décision en fonction du degré de nécessité de l'information, des informations qu'il pourra recevoir en retour, mais aussi du risque de trop partager ou de ne pas assez partager.

Partager ou non une information n'est pas un choix binaire pour les employés. Ces derniers peuvent agir sur la modalité du partage de l'information. Les employés ont la liberté d'effectuer un partage des connaissances en suivant un principe « d'offuscation »²²¹. L'offuscation consiste à rendre flou le lien de causalité qui intéresse l'autre entreprise en noyant ce lien dans un ensemble d'informations avec « des causalité plâcebos ». L'entreprise peut ainsi partager des connaissances sans pour autant se défaire de ses connaissances critiques.

Dans le cas de coopération entre Astrium et Thales, les managers de projet ont intégré le paradoxe. Le manager de projet, avant de donner une information nécessaire pour le succès du projet, choisit s'il accepte que l'information partagée puisse être reprise par l'entreprise partenaire. Il la transforme en information non appropriable. Par exemple, en agrégant les données sans donner de détails sur la méthode ou la structure de coût. Ainsi, pour un manager de projet, « il est clair que nous essayons de ne pas donner une totale visibilité ou donner une information qui n'est pas liée au projet »²²².

Le principe d'intégration se révèle efficace pour manager le partage de l'information. Les employés intègrent le paradoxe coopétif et le choix de l'information à partager reste à leur discréction. Leur rôle est clé dans le partage de l'information. Toutefois, le management de l'information ne peut pas repose uniquement sur le principe d'intégration. L'organisation doit nécessairement surveiller les employés à cause des fuites d'information intentionnelles et involontaires. Les fuites intentionnelles sont ainsi fondées sur une intention de privilégier l'intérêt du projet au détriment de celui de l'entreprise. Les employés lorsqu'ils sont intégrés au projet en coopération avec le partenaire sont dans une situation de double loyauté. Ils assument le fait de gérer l'arbitrage entre les bénéfices du partage et les risques du partage. L'organisation doit nécessairement s'assurer que cet arbitrage se fait au profit de l'entreprise et pas uniquement au profit du succès du projet.

Figure 5.5 – Principe d'intégration de la tension informationnelle



Source : adapté de Fernandez et Chiambaretto, à paraître.

Par exemple, un contrôleur de gestion impliqué dans une alliance d'un groupe automobile français soutient: « Avec [mon homologue de l'autre entreprise] j'étais capable de – on était capable d'avoir des discussions complètement off, voire des trucs que moi je ne disais pas en interne (...), mais qui me permettait d'influencer sur telle ou telle position pour comprendre, etc. Et de la même façon pour elle. Donc ça a permis de mettre pas mal d'huile dans les ronages quand même ».

De plus, l'organisation doit sensibiliser les individus aux fuites informationnelles involontaires pénalisantes pour l'entreprise. Ces fuites sont qualifiées d'involontaires car elles peuvent être provoquées par un manque de vision globale de la stratégie de l'entreprise. Dans ce cas, l'employé n'arrive pas à percevoir le caractère stratégique de certaines informations. Elles peuvent être aussi provoquées par la fierté et/ou l'ego de l'employé. Afin de légitimer sa place dans le projet, il va vouloir montrer qu'il maîtrise le sujet et peut donc partager des informations qu'il ne devait pas partager²²³. Par exemple, un cadre dirigeant d'un grand groupe français constate: « On a des formations sur la sûreté de l'information, des sensibilisations. Mais, mais bon, nos ingénieurs sont de grands naïfs. »

De plus, l'employé ne peut pas protéger une information sans le soutien d'une organisation adéquate. Par exemple, un employé ne pourra pas protéger une information s'il

221. Baumard, P., « Learning in Competitive Environments », In S. Yami, S. Castaldo, G. B. Dagnino, & F. Le Roy (Eds.), *Competition: Winning Strategies for the 21st Century*, Edward Elgar, Cheltenham, 2010, pp. 74-94.
 222. Bez, S. M., « Partager et protéger l'information dans la compétition », Document de Travail, MRM-Stratégie/Chaire IE et Stratégie de l'entreprise, Université Montpellier et Université Paris-Dauphine, Montpellier, Paris, 2015.

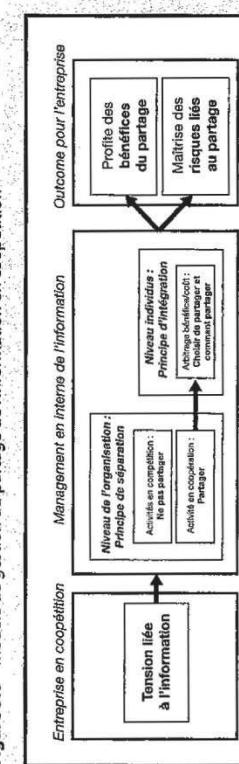
223. Van den Hooft, B., Schouten, A. P. & Simonovski, S., « What one feels and what one knows: the influence of emotions on attitudes and intentions towards knowledge sharing », *Journal of Knowledge Management*, 16(1), 2012, pp. 148-158.

n'y a pas la possibilité de contrôler l'accès au système d'information²²⁴. L'entreprise ne peut pas laisser cet enjeu aux seules mains des employés ; elle doit contrôler les fuites délibérées et involontaires et mettre en place une structure adéquate de protection de l'information.

Un modèle global

Pour gérer les tensions informationnelles, le principe de la séparation et le principe d'intégration ont avantage à être employés simultanément (voir figure 5.6). Le principe de séparation permet un premier niveau de protection, en définissant le périmètre de la coopération et les informations qu'il est possible de partager. Une fois définies les informations qu'il est possible de partager, il est nécessaire que les individus intègrent le paradoxe coopétif pour gérer les échanges d'informations tout au long de l'évolution du projet. Ce double management par la séparation et l'intégration permet de profiter du partage de l'information tout en maîtrisant les risques liés au partage.

Figure 5.6 – Modèle de gestion du partage de l'information en coopération



Source : adapté de Bez, 2015.

La coopération est donc un choix stratégique performant, mais risqué. Afin d'avoir une balance positive entre les bénéfices et les risques, l'entreprise doit être capable de maîtriser le partage d'informations et la protection des connaissances. Concrètement, cet équilibre peut être atteint en combinant deux principes de management : le principe de séparation et le principe d'intégration. L'entreprise n'a pas nécessairement besoin de choisir entre ces deux principes mais gagne à les combiner. Ainsi, l'entreprise peut séparer les informations à partager ou non en fonction de leur nécessité vis-à-vis du succès du projet (principe de séparation). Elle peut ainsi contenir les informations partagées au projet en coopération en empêchant la réutilisation par le compétiteur. Mais elle peut simultanément demander aux individus en charge de la coopération de gérer l'approvisionnement des informations partagées (principe d'intégration). Cette solution implique que l'entreprise fasse des choix structurels d'organisation, mais aussi qu'elle augmente

le niveau d'alerte de ses salariés vis-à-vis de cette situation de coopération (formation, recrutement). En d'autres termes, il faut qu'elle adopte un comportement délibéré de gestion des tensions informationnelles en situation de coopération.

Conclusion

La notion de protection est plus large qu'il n'y paraît. Ainsi ne s'agit-il pas simplement d'enfermer ses dossiers dans une armoire forte ou de porter chaque soir les documents confidentiels à la déchiqueteuse, actions essentielles au demeurant. Il peut s'agir également de « briefer » ses collaborateurs sur les informations à ne pas diffuser et sur celles qu'il est possible, au contraire, de donner... en guise de monnaie d'échange. Car si tout acteur cherche à obtenir des informations sur les autres, il y a fort à pari que les autres cherchent à se procurer des informations sur lui. Or, pour recevoir, il faut savoir donner, appâter même. Les joueurs de Dame savent bien : il faut savoir « sacrifier des pions » pour en prendre davantage. « Voir sans être vu » nécessite donc de protéger ses informations stratégiques au sens large du terme. « Lorsque vous fermez à clef les portes d'un laboratoire, disait Pasteur, vous enfermez plus de choses à l'extérieur du laboratoire qu'à l'intérieur. » Protéger en enfermant ou protéger en diffusant ? Il n'existe pas de recette miracle, mais des choix stratégiques à opérer. Ici, une entreprise préfèrera payer une amende plutôt que de diffuser ses résultats financiers aux organismes officiels. Mais là, elle préférera les rendre publics, consciente que la visibilité ainsi obtenue pourrait lui attirer de nouveaux clients...

On le voit, la sécurité économique est une porte d'entrée sur l'ensemble des dimensions de l'intelligence économique, puisqu'elle implique ou est dépendante des actions de veille, management des connaissances et influence.

Vous trouverez des activités correspondant à ce chapitre à la page dédiée au livre sur www.pearson.fr.

²²⁴Jiang, X., Li, M., Gao, S., Bao, Y. & Jiang, F., « Managing knowledge leakage in strategic alliances: The effects of trust and formal contracts », *Industrial Marketing Management*, 42(6), 2013, pp. 983-991.

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Abstract

We investigate how a focal firm strategizes and manages coopetition through the specific lens of knowledge sharing. Based on two case studies of two firms considered as masters in the management of coopetition, we identify three ways to create and pursue the focal firm's current and future advantage in a coopetitive project. The two first ways confirm the dominant research approach of coopetition which argues that a focal firm should reduce the coopetitor's internalization of the knowledge shared. Or, even obstruct it totally (i.e. reduce or restrict totally the focal firm's knowledge transparency). Indeed, the value creation of a coopetitive project's success can be jeopardized by the fear of knowledge sharing between competitors. The reduction or restriction of its knowledge transparency is a key organizational solution to overcome this fear of knowledge sharing and thus this fear of collaborating with a competitor. Alternatively, we identified a third way of strategizing and managing coopetition which goes one step further. By building on our empirical results, Deutsch's theory of conflict resolution and Nonaka's organizational knowledge creation theory, we argue that the creation and pursuit of current and future advantage for a focal firm in a coopetitive project can also consist of implementing a strategy and management based on greater and freer transparency. In that case, the dominant coopetitive knowledge sharing adages of "protecting" or even "sharing and protecting" shift into "sharing and enabling for constructive capturing." This third way opens academic research opportunities based on broader theoretical roots than Hamel's approach of inter-firm relationships in which the strategic intent is a learning race and one of the key organizational elements is minimized transparency. This third way also has managerial contributions. Indeed, it increases top management analytical capability by generating a new counter-intuitive insight: enabling a competitor in a coopetitive project can be strategic tool to create and pursue current and future advantages for themselves. Moreover, our integrated framework can be reused to train top managers' analytical coopetitive capabilities by making them aware about three ways of strategizing and managing coopetition.

Key words: coopetition, management of coopetition, strategy of coopetition, knowledge sharing, knowledge protecting, knowledge capturing

Résumé

Cette thèse explore la question suivante : Comment les entreprises gèrent-elles la coopétition par le prisme du partage de connaissances ? et à quelles intentions stratégiques répondent ces choix managériaux ? Notre principal résultat consiste en l'identification de trois stratégies de coopétition, chacune reposant sur un management particulier du partage de connaissances. Les deux premières s'inscrivent dans la continuité des travaux existants sur la coopétition. Elles adoptent une approche Hamelienne de course à l'apprentissage, dans laquelle la gestion du partage consiste à trouver des techniques pour partager la connaissance critique pour le succès du projet commun, sans permettre au partenaire d'internaliser la connaissance. Ces techniques consistent à « protéger » ou « partager & protéger ». En revanche, la troisième stratégie identifiée, à l'inverse des prédictions de la littérature sur la coopétition, encourage un partage plus ouvert et intensif qui peut même aller jusqu'à renforcer le coopétiteur avec sa connaissance. Mais si l'entreprise s'engage dans cette stratégie ce n'est pas par altruisme ou par volonté d'aider l'autre, mais parce qu'elle perçoit une opportunité pour capturer de nouvelles connaissances. Ainsi, les entreprises ont conscience de la dynamique positive de création de connaissances qui va être générée en partageant de manière transparente au lieu de réduire la transparence (i.e., processus de capture de valeur constructif). Cette troisième stratégie permet d'aller plus loin dans notre compréhension des stratégies de coopétition et de leur management. Elle ouvre la voie à de nouvelles recherches se basant sur des fondements intégrant Deutsch et Nonaka. Notre contribution n'est pas uniquement académique, elle est aussi managériale. Elle ouvre les champs des possibilités d'actions des dirigeants, en identifiant une stratégie contre-intuitive, pour maximiser les opportunités liées à une relation de coopétition. De plus, notre modèle intégrateur peut être réutilisé pour former les individus à la coopétition en leur permettant d'identifier trois stratégies et leurs implications organisationnelles.

Mots clés: coopétition, management de la coopétition, stratégie de coopétition, partage de connaissances, protection des connaissances, capture de connaissances

