Long Range Planning xxx (2017) 1–22

Contents lists available at ScienceDirect

Long Range Planning

journal homepage: http://www.elsevier.com/locate/lrp

Implementing the right project structure to achieve coopetitive innovation projects

Anne-Sophie Fernandez [a,*], Frédéric Le Roy [b], Paul Chiambaretto [c]

[a] *Montpellier Research in Management, Montpellier Management – University of Montpellier, Espace Richter – Rue Vendémiaire – Bât B, CS 19519, 34960 Montpellier Cedex, France*

[b] *Montpellier Research in Management, Montpellier Management – University of Montpellier & Montpellier Business School, Espace Richter – Rue Vendémiaire – Bât B, CS 19519, 34960 Montpellier Cedex, France*

[c] *Montpellier Research in Management, Montpellier Business School & i3-CRG, École Polytechnique, CNRS, Université Paris-Saclay, 2300 Avenue des Moulins, 34080 Montpellier, France*

A R T I C L E I N F O

Article history:
Available online xxx

Keywords:
Coopetition
Risk of opportunism
Economic and technological risks
Coopetitive project team
Separated project team
Case study
Space industry

A B S T R A C T

This research focuses on the project structure used by coopetitors to achieve common innovation projects. Scholars have recently identified an original but complex project structure that they call the Coopetitive Project Team (CPT). However, other project structures can also be implemented by coopetitors to achieve innovation. Therefore, we address the following question: for which types of innovation projects is CPT appropriate? We argue that coopetitors need to use CPT for high-risk and high-cost projects when the aim is to develop radical innovation. CPT allows coopetitors not only to develop innovation capabilities through close resource and knowledge sharing but also to manage the risk of opportunism. Conversely, coopetitors should use another project structure, Separated Project Teams (SPTs), for low-cost and low-risk projects when the aim is to develop incremental innovation. The SPT design allows coopetitors both to achieve the goal of the project and to minimize the risk of opportunism. To confirm our assumptions, we studied the project portfolios of Airbus and Thales, two firms in the space satellite industry. Our findings confirm that coopetitors should implement CPTs to handle innovation projects that are costly, risky and highly innovative. CPTs permit the sharing of knowledge and the management of high opportunism risk, both of which are necessary to achieve radical innovation. Conversely, coopetitors rely on SPTs for low-cost projects that require a low degree of knowledge sharing, thus avoiding the risk of opportunism in achieving their incremental innovation objectives.

Introduction

A major driver of coopetition strategies is product innovation (Ritala and Hurmelinna-Laukkanen, 2009; Gnyawali and Park, 2009, 2011). However, the impact of coopetition on innovation performance remains controversial. In an initial perspective, based on *Transaction Cost Theory* (TCT), previous scholars found a negative or neutral impact of collaboration

* Corresponding author.
E-mail addresses: anne-sophie.fernandez@umontpellier.fr (A.-S. Fernandez), frederic.le-roy@umontpellier.fr (F. Le Roy), p.chiambaretto@montpellier-bs.com (P. Chiambaretto).

http://dx.doi.org/10.1016/j.lrp.2017.07.009

between competitors on product innovation (Arranz and Arroyabe, 2008; Park and Russo, 1996; Nieto and Santamaría, 2007; Santamaria and Surroca, 2011). In contrast, other scholars building on the *Dynamic Capabilities Theory* (DCT) found a positive impact of collaboration between competitors on product innovation (Quintana-García and Benavides-Velascoa, 2004; Ritala and Hurmelinna-Laukkanen, 2009; Gnyawali and Park, 2009, 2011). Considering these mixed results, recent studies have shown that the relationship between coopetition and innovation can be moderated by various variables, including innovation radicalness. However, these studies also obtained mixed results. Some studies concluded that the impact of coopetition is higher for incremental innovation than for radical innovation (Ritala, 2012; Bouncken et al., 2017), whereas other studies have shown the opposite effect (Bouncken and Fredrich, 2012).

These mixed results are not surprising. The impact of coopetition can be positive, negative or even neutral on both incremental and radical innovation depending on how the innovation project is managed (Le Roy and Czakon, 2016). Because coopetition strategies are paradoxical, they are filled with tensions that can be turned into a win-win or a win-lose relationship, depending on the governance or management of the relationship (Fernandez et al., 2014; Bengtsson et al., 2016a, 2016b; Bouncken et al., 2016). We thus argue that the management of the relationship is critical for the success of coopetition for both incremental and radical innovations.

Focusing on the management of coopetition, Fernandez et al. (2014) highlighted coopetitive tensions at three levels inter-organizational, organizational, inter-individual and explained that the management of these coopetitive tensions relies on the combination of the separation principle and the integration principle. Investigating in greater detail the tensions related to information, Fernandez and Chiambaretto (2016) showed that the management of information in a coopetitive project depends on the nature of the information, i.e., its criticality and appropriability. Coopetitors combine formal control mechanisms to address information criticality with informal control mechanisms to address information appropriability. Finally, Le Roy and Fernandez (2015) recently identified a new project structure to manage coopetitive innovation projects, named the Coopetitive Project Team (CPT). A CPT is a team that is separated from the parent firms and dedicated to the development of a single innovation project. Team members from competing firms are pooled and work together on a daily basis to develop innovation capabilities. Although the CPT seems to be an appropriate project structure to design innovative projects between competitors, it is also costly, complex and very risky. Indeed, it is an *ad hoc* structure, with its own managerial line, processes and infrastructures. This structure has been investigated in a context in which the coopetitors were forced to work closely together to develop an innovation that none of them would have been able to develop alone. However, for innovation projects that are less challenging and require less knowledge exchange, the relevance of such a complex and costly project structure should be investigated. Thus, we aim to answer the following research questions. Is CPT relevant to all innovation projects developed in coopetition? For which types of innovation projects is CPT appropriate? Are there other project structures used by coopetitors to achieve common innovation projects?

In conducting our research, we build a framework using the theoretical lenses of both the TCT and the DCT. We argue that for incremental innovation projects, characterized by low economic and technological risks and costs, coopetitors do not need to implement a CPT structure but rather a less costly, simpler and less risky structure. We call this structure the Separate Project Team (SPT) and we show that it is sufficient to achieve incremental innovation while limiting economic and technological risks and costs. In contrast, we argue that coopetitors must adopt a costly, complex and risky structure such as CPT when they aim for radical innovation projects characterized by high economic and technological risks and costs. The CPT allows coopetitors to develop innovative capabilities by sharing similar and complementary knowledge while managing the risks of plunder and unintended spillovers.

To assess the relevance of our framework, we conducted a qualitative case study of the project portfolios of two major competitors in the telecommunications satellite industry: Airbus Defense and Space (ADS) and Thales Alenia Space (TAS). Analyzing the features of several innovation coopetitive projects, we confirm the reasoning that underlies our theoretical framework.

Our findings reveal first that incremental innovation projects between competitors are associated with the use of the SPT project structure. Because these projects require limited knowledge sharing, the two coopetitors work separately to avoid unintended spillovers and interact only punctually, at the interfaces. Second, we show that radical innovation projects are, in contrast, associated with the use of a CPT project structure. Because these projects imply sharing an extensive amount of knowledge, the coopetitors cannot work separately and must be pooled in a unique common project team. In this team, employees from competing firms collaborate closely on a daily basis to create new technologies together. Meanwhile, the CPT is managed by two project managers from both companies, allowing for control over the behavior of the team members from both sides, limiting the risk of opportunism.

Our contributions to the coopetition literature are threefold. First, we provide insights into the management of coopetitive innovation projects. Our research points out two project structures that can be used by coopetitors to achieve innovation projects: SPT and CPT. The SPT is a simple, low-cost and low-risk project structure implemented by coopetitors to manage incremental innovation projects. In contrast, the management of radical innovation projects requires the implementation of a more complex, more costly and more risky project structure, namely the CPT. Although the CPT would be unnecessary to achieve success in incremental innovation project, it is essential for the success of radical innovation projects. Second, we provide insights into the debate relative to the impact of coopetition on innovation. In line with previous studies, we show that proper management of coopetition is essential to develop innovation projects. Implementing the appropriate project structure according to the degree of innovation of the project (SPT for incremental and CPT for radical) enhances likelihood of project success. Finally, our findings offer a new perspective on the management of coopetition and encourage further research to go beyond the study of principles and tools to investigate the relevant project structures for the success of coopetition strategies.

Theoretical background

Literature review and research questions

Coopetition and innovation

The first authors to introduce the concept of coopetition defined it broadly as the interplay situated in a “value net” between a focal firm, its customers, its suppliers and its complementors (Brandenburger and Nalebuff, 1996). More narrowly, coopetition can be defined as a “dyadic and paradoxical relationship that emerges when two firms cooperate in some activities, and at the same time compete with each other in other activities” (Bengtsson and Kock, 2000, p. 412). This narrower approach offers a better understanding of coopetition and its implications (Gnyawali and Park, 2011). One of the specificities of coopetition resides in the paradoxical combination of cooperative behaviors to create a common value and competitive behaviors to capture the value jointly created (Bengtsson and Kock, 2014; Ritala and Tidström, 2014). Building on Bouncken et al., 2015 definition, we define coopetition as a paradoxical relationship in which economic actors jointly create value through cooperative interactions, while simultaneously competing to capture part of that value.

The impact of coopetition strategies on innovation remains the subject of active theoretical and empirical debates (Ritala et al., 2016). From a theoretical standpoint, the literature is structured around two opposing perspectives (Estrada et al., 2016): the TCT and the DCT.

The first perspective, based on the TCT, argues that coopetition cannot be a fruitful strategy for innovation because of the risk of opportunism (Arranz and Arroyabe, 2008; Nieto and Santamaría, 2007; Park and Russo, 1996; Santamaria and Surroca, 2011). Collaborating with a competitor to achieve innovation involves the sharing of knowledge, resources and competencies. This sharing is the core feature of the collaboration. However, because of the opportunistic character of the coopetitor, the knowledge shared can be used for the individual objectives of the coopetitors instead of for the common good (Czakon, 2010; Ritala and Tidström, 2014; Bouncken and Fredrich, 2016; Fernandez and Chiambaretto, 2016). Firms invest substantial resources in innovation projects with little certainty about the value created. Under such inherently risky circumstances, firms are encouraged to engage in opportunistic behaviors (Das and Teng, 2000; Estrada et al., 2016). Therefore, participants in coopetition strategies are incentivized to behave opportunistically to capture a higher share of the value jointly created than the coopetitor (Ritala and Hurmelinna-Laukkanen, 2009; Ritala and Tidström, 2014).

In contrast, the second perspective, based on the DCT, concludes that coopetition is a fruitful strategy for innovation (Jorde and Teece, 1990; Quintana-García and Benavides-Velascoa, 2004; Ritala and Hurmelinna-Laukkanen, 2009; Gnyawali and Park, 2009, 2011). The DCT considers organizational capabilities and, more specifically, dynamic capabilities as a major source of firm performance (Teece et al., 1997; Teece and Pisano, 1994; Eisenhardt and Martin, 2000; Teece, 2007). Accordingly, combining firms' knowledge can lead to the development of dynamic capabilities (Helfat and Peteraf, 2003). More precisely, innovation capabilities will result from recombining complementary knowledge (Kogut and Zander, 1992). According to the DCT, coopetition allows firms to benefit from both competition and collaboration by allowing access to a wider portfolio of resources and competencies (collaboration), while stimulating innovation and permanently improving the product (competition). Consequently, coopetition appears to be a relevant strategy to achieve product innovation through the combination of complementary knowledge (Quintana-García and Benavides-Velascoa, 2004; Padula and Dagnino, 2007; Ritala and Hurmelinna-Laukkanen, 2009; Gnyawali and Park, 2009, 2011).

The absence of a theoretical consensus is in accordance with the mixed empirical results. While many contributions have tried to assess the impact of R&D collaborations with competitors on innovation, no clear relationship has been found. Some research shows either no (Miotti and Sachwald, 2003; Knudsen, 2007; Santamaria and Surroca, 2011) or a negative impact (Nieto and Santamaría, 2007; Kim and Parkhe, 2009; Un et al., 2010). Other contributions find that cooperation between competitors has a positive impact on product innovation (Belderbos et al., 2004; Luo et al., 2007; Neyens et al., 2010; Tomlinson, 2010; Peng et al., 2012).

These contrasting results have pushed some authors to draw a distinction between incremental and radical innovation. Considering that developing a radical innovation requires sharing more knowledge with the partner than developing an incremental innovation, Nieto and Santamaría (2007) concluded that working with a competitor is not compatible with radical innovation. Following this approach, the lower the innovativeness of the project, the higher the positive impact of coopetition. Bouncken and Kraus (2013) validated this point of view by establishing that although coopetition can trigger radical innovation, it can harm extremely novel revolutionary innovation. However, other contributions have shown opposite results, such as Bouncken and Fredrich (2012), with coopetition having a stronger positive impact for radical innovation than for incremental innovation.

Please cite this article in press as: Fernandez, A.-S., et al., Implementing the right project structure to achieve coopetitive innovation projects, Long Range Planning (2017), http://dx.doi.org/10.1016/j.lrp.2017.07.009

To explore the innovation types more deeply, recent studies have introduced other distinctions. For example, Ritala and Sainio (2014) showed that coopetition is negatively related to technological radicalness and positively related to business-model radicalness. Focusing on the phase of development of a new product, Bouncken et al. (2017) revealed that coopetition has a positive impact on incremental innovation in the pre-launch and launch phases, whereas it has a positive impact on radical innovation only in the launch phase.

With the objective of explaining the differences between the various empirical results, other studies have investigated the impact of contingency variables on the relationship between coopetition and innovation. Focusing on external contingency variables, Ritala (2012) found that market uncertainty and network externalities strengthen the positive impact of coopetition on innovation and market performance. In the same way, Bouncken and Kraus (2013) showed that technological uncertainty has a moderating impact on the success of coopetitive innovation. Finally, Le Roy et al. (2016) revealed that coopetition has a positive impact on product innovation when the parties are geographically distant.

Another set of explanations is given by contributions focusing on internal contingency variables. For example, Bouncken and Kraus (2013) showed that sharing knowledge with the partner and learning from the partner foster the positive impact of coopetition on innovation performance. Ritala and Hurmelinna-Laukkanen (2013) argued that the firm's potential absorptive capacity and its appropriability regime increase the positive effect of coopetition on innovation. Estrada et al. (2016) underlined that coopetition has a positive effect on product innovation performance only when internal knowledge sharing mechanisms and formal knowledge protection mechanisms are present. Finally, Bouncken et al. (2016) investigated the role of governance on innovation and showed that relational governance generates more innovation than transactional governance in a coopetitive setting. As a whole, these contributions underline that the key success factor of coopetition for innovation is inside the coopetitive capabilities of the firms (Park et al., 2014; Bengtsson et al., 2016b).

The key role of coopetition management

Among the various coopetitive capabilities, managerial capabilities are essential both to achieve product innovation and to create a win-win relationship (Park et al., 2014). Without appropriate management, the innovation could fail and coopetition could yield a win-lose relationship. Thus, managing coopetition is considered the missing link between coopetition strategy and performance (Le Roy and Czakon, 2016).

Managing coopetition is a pervasive research question, and recent research has identified several principles for managing coopetition successfully (Tidström, 2014; Fernandez et al., 2014; Le Roy and Fernandez, 2015; Fernandez and Chiambaretto, 2016; Seran et al., 2016; Pellegrin-Boucher et al., in press). The first principle, separation, advocates a functional, temporal or spatial separation of the management of competition and the management of collaboration (Bengtsson and Kock, 2000; Herzog, 2010; Poole and Van de Ven, 1989). The second principle, integration, encourages individuals to transcend paradoxes (Chen, 2008; Farjoun, 2010; Luo et al., 2006; Oliver, 2004). Managers involved in coopetition must develop a coopetitive mindset both to internalize the paradoxical nature of coopetition and to efficiently manage the related tensions (Chen, 2008; Gnyawali and Park, 2011; Luo et al., 2006; Raza-Ullah et al., 2014). Finally, the co-management principle states that firms can implement specific project structures in which they replicate managerial positions to manage potential tensions between the partners (Le Roy and Fernandez, 2015).

A few empirical contributions have gone beyond theoretical principles and identified the real stakes involved when managing coopetitive tensions at the project level (Fernandez et al., 2014; Herzog, 2010; Le Roy and Fernandez, 2015). These studies confirm the importance of both principles (Herzog, 2010) and the combination of those principles in managing coopetitive tensions (Fernandez et al., 2014; Fernandez and Chiambaretto, 2016; Pellegrin-Boucher et al., in press).

However, a discussion of the principles required to efficiently manage coopetition is insufficient to explain the conditions under which coopetition positively affects product innovation. Efficiently managing coopetition relies not only on principles but also on the project structure of the common project. From that perspective, recent research by Le Roy and Fernandez (2015) has identified a new project structure used by coopetitors to achieve product innovation, called a Coopetitive Project Team (CPT).

The authors show that coopetitors implement CPT to pool their technological, financial and human resources. Individuals from competing firms are integrated into the same project structure and work together on a daily basis (Le Roy and Fernandez, 2015). Both parent firms horizontally share the management of the CPT. Two managers (one from each competing firm) are responsible for the management of all team tensions and all project difficulties. This dual managerial line drives the CPT and is responsible for all strategic decisions at the project level. The coordination of the CPT is mostly informal.

One key characteristic of the CPT is the absence of a vertical hierarchy between the two project managers. They make all decisions together. If they cannot agree, they go to a dual committee, a non-hierarchical body composed of an equal number of members from each coopetitor. Committee members will discuss the issue and find a solution. The dual structure is replicated at the lower levels of the project. A manager from one parent firm heads each segment; a deputy is appointed from the other parent firm. Again, there is no hierarchy between the head and the deputy, and both managers make all decisions jointly (cf. Fig. 1).

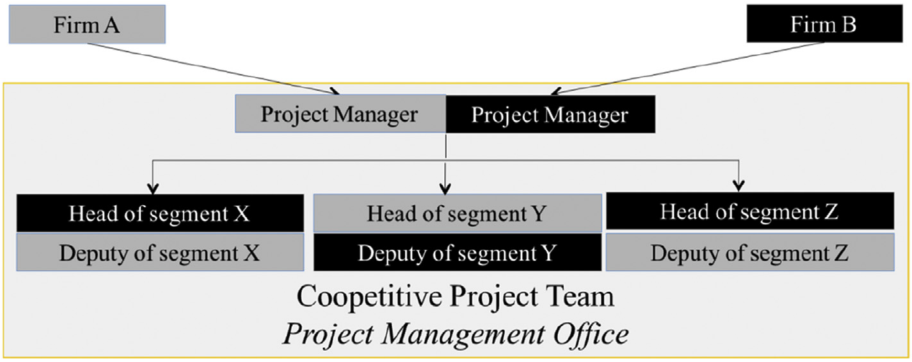

Fig. 1. CPT structure (source: adapted from Le Roy and Fernandez, 2015).

The reasons for adopting this project structure remain under-investigated. Is the CPT relevant to all innovation projects developed in coopetition? For which types of innovation projects is CPT appropriate? Are there other project structures used by coopetitors to achieve common innovation projects? This research aims to provide insights into these questions.

Theoretical framework

Characterizing innovation projects

The willingness to develop innovation is a key driver of coopetition strategies (Gnyawali and Park, 2011). Nevertheless, not all innovation projects present the same characteristics. The first way to classify innovation projects is along the "innovativeness" or "degree of innovation" dimension (Kock et al., 2011). Usually, innovations or innovation projects presenting a "high degree of innovation" are novel innovations that represent strong technological or market breakthroughs or that can change the rules of the industry (Danneels and Kleinschmidt, 2001). This dimension is important because several contributions have shown that coopetition is more or less efficient for different types of innovation projects according to their degree of innovation (Bouncken and Fredrich, 2012; Bouncken and Kraus, 2013; Ritala and Hurmelinna-Laukkanen, 2013; Bouncken et al., 2017).

The second dimension (which is highly correlated with the first dimension) is the degree of risk generated by the project. As explained by Kotabe and Scott Swan (1995) and Bouncken and Kraus (2013), highly innovative projects tend to be very resource demanding and risky for the collaborating firms. Two types of risks need to be distinguished, *economic and technological risks*, relative to achieving the goals of the project, and *opportunism* risks, which are based on the possibilities of plunder by the coopetitors.

The risk dimension is essential to understand not only coopetition strategies (Gnyawali and Park, 2009, 2011; Chiambaretto et al., 2016) but also the management of the tensions associated with these strategies (Fernandez et al., 2014; Fernandez and Chiambaretto, 2016). Firms would prefer to develop innovation alone, but high R&D costs and risk of failure force them to collaborate with their competitors. Coopetitors can divide the costs of their innovation and reduce their time-to-market by combining their strategic resources (Grant and Baden-Fuller, 2004; Yami and Nemeh, 2014).

These two dimensions (the degree of innovation and the level of risk) are highly correlated, and it is generally admitted that the higher the degree of innovation, the higher the associated risks (either economic, technological or learning) (Bouncken et al., 2017). Consequently, considering the symmetry between the degree of innovation and the level of risk, we can consider the existence of two main types of innovation projects. On the one hand, some innovation projects present a lower degree of innovation and risk. We will name these projects "incremental innovation projects." On the other hand, some projects aim to develop innovations that have a high degree of innovation and present strong risks. For the sake of simplicity, we will name these innovation projects "radical innovation projects." With this distinction in mind, one can address the question of the most efficient project structure to manage coopetitive innovation.

Innovation projects and project structure in a coopetitive setting

Radical innovation projects. Starting with radical innovation projects, most scholars agree that firms are increasingly less able to have all of the knowledge needed for radical innovation. They need access to a partner's complementary knowledge.

Coopetition facilitates a synergetic effect that creates new knowledge (Quintana-García and Benavides-Velascoa, 2004). Indeed, direct competitors have portfolios of complementary resources that encourage the adoption of coopetition strategies (Ritala and Hurmelinna-Laukkanen, 2009; Gnyawali and Park, 2009, 2011). Collaboration with a direct competitor is an opportunity both to access its capabilities and to create new capabilities together.

Because resources are similar and complementary, the potential of learning between competitors is higher than for traditional alliances (Baumard, 2010; Bouncken and Fredrich, 2016; Fernandez and Chiambaretto, 2016). A common language and similar processes facilitate the successful combination of competitors' knowledge (Inkpen, 2000). Thus, technology and knowledge sharing between competitors increases innovative capabilities. Simultaneously, the risk of plunder is a key brake on knowledge exchange. Coopetition appears as a risky strategy under which coopetitors attempt to bridge learning asymmetries (Fernandez et al., 2014) and absorb new knowledge (Ritala and Hurmelinna-Laukkanen, 2013). The risk of knowledge plunder is even stronger in the early phases of development, which are characterized by a high level of uncertainty and difficulties securing knowledge, whereas for the later phases, functionalities are more visible, allowing firms to divide tasks between them (Bouncken et al., 2017).

Based on Bengtsson et al., 2016b typology of coopetitive situations, we can classify radical innovation projects as situations that require both a high level of cooperation (for the project to succeed) and a high level of competition (because the information exchanged is highly critical). Under these circumstances, the CPT appears to be a project structure that allows team members to work closely with one another and share information to readily develop the innovation capabilities that are essential to achieving radical innovation for radical innovation projects. Close and full knowledge sharing allows the team to acquire innovation capabilities and thus to develop radical innovation. The CPT permits a firm to monitor knowledge creation and supervise the behavior of the coopetitor. The risk of opportunism is managed by the dual managerial line. Any deviance or signal of opportunism will be detected by project managers and communicated to the steering committee. The parent firm, a member of the steering committee, will order the individual to change his behavior, thus avoiding project failure (Le Roy and Fernandez, 2015).

However, the CPT takes a long time to implement. It is a complex and costly project structure because of the duplication of managerial functions. Within the team, the decision-making process is slow because it follows a double-loop, especially when there are tensions and conflicts to manage. If the steering committee is involved in negotiations, the decision-making process requires more time to resolve conflicts. This is a long and continuous process in which parent firms must simultaneously consider their interests and the project's interests. Because the CPT is a complex and costly project structure, we argue that it should be used only for certain projects—i.e., costly and risky projects with the goal of achieving radical innovation.

Incremental innovation projects. Incremental innovations are usually associated with minor changes or modifications in terms of technology or market positioning (Garcia and Calantone, 2002; Ritala and Hurmelinna-Laukkanen, 2013). Therefore, these innovation projects are both less risky and less costly for firms than radical ones. For example, regarding knowledge leaks or risks, incremental innovation projects are less risky that radical ones because the outcomes are less ambiguous and uncertain; however, less knowledge is created (Bouncken et al., 2017). Consequently, it makes little sense to adopt a costly project structure such as the CPT, and a simpler project structure may be preferred.

Because they require less combined knowledge than do radical innovation projects, we argue that incremental projects do not require the partnering firms to develop new innovation capabilities together. As close and daily interactions become less important, there is no incentive to build a common project team that is co-located in the same place. For these cost-driven innovation projects, partners are much more interested in efficiency (Ettlie et al., 1984).

Consequently, the functioning of the project should rely on both precise task division and formal coordination. Coopetitors should perform their tasks independently, limiting the interactions between team members to the project interfaces. Each managerial line is responsible for its own team. Drawing a parallel with Bengtsson et al., 2016b typology of coopetitive situations, we can stamp incremental innovation projects as configurations requiring not only a limited level of cooperation (because the project does not require a high level of information exchange) but also a reduced level of competition (because the project is not critical for the partnering firms).

We call this project structure the SPT. We argue that the SPT is sufficient to accomplish projects that involve a low level of innovation. In such projects, there is no need to combine similar and complementary knowledge to create new capabilities. Knowledge sharing remains limited to interfaces (project coordination), thus reducing the risk of plunder and unintended spillovers. Thus, the SPT allows the achievement of low-innovation projects while protecting the core knowledge of the firm against the opportunism of its coopetitors.

In summary, we argue that the choice of project structure is driven by two project features: (1) the risks and costs associated with the innovation project and (2) the degree of innovation (cf. Fig. 2). For low-cost, low-risk and low-innovation projects, firms do not need to implement a CPT and should instead opt for a simpler project structure, which we call the SPT. Conversely, the CPT should be designed so that the costs and risks of radical innovation projects can be shared. The success of the project relies on the pooling of similar knowledge bases to develop new innovation capabilities.

Please cite this article in press as: Fernandez, A.-S., et al., Implementing the right project structure to achieve coopetitive innovation projects, Long Range Planning (2017), http://dx.doi.org/10.1016/j.lrp.2017.07.009

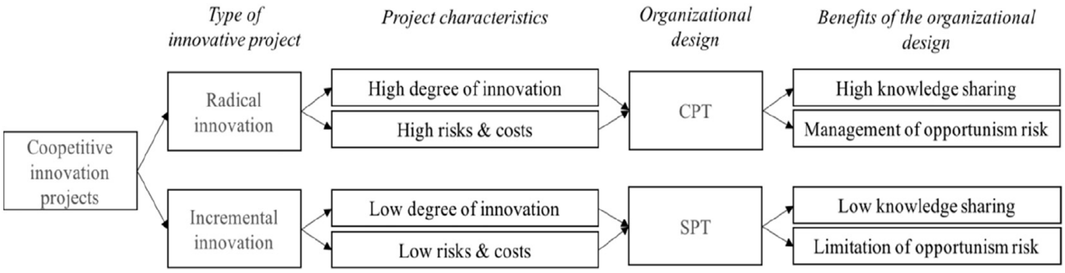

Fig. 2. Theoretical framework.

Research methods

Case study

This research aims to explain the project structures implemented by coopetitors to achieve common innovation projects, depending on the innovativeness of the project. Because our objective is to describe and understand a new phenomenon (rather than to test propositions), an exploratory research design is appropriate (Miles et al., 2013). In line with the recommendations from Bengtsson et al. (2010), we conducted a case study to illuminate the coexistence of different project structures used by coopetitors to achieve common innovation projects (Yin, 2013).

Case-based exploratory methods are appropriate for understanding poorly understood phenomenon (Eisenhardt, 1989) with multiple and complex elements (Dodgson et al., 2008) that evolve over time (Langley, 1999). In-depth studies are the best means of exploring a multi-faceted and paradoxical phenomenon such as the coexistence of multiple coopetition designs for innovation (Dowling et al., 1996; Gnyawali and Park, 2011).

Empirical setting

Coopetition for innovation is frequently observed in high-tech industries (Gnyawali et al., 2006). To understand why coopetitors use different designs to achieve innovation projects, it is best to study an industry organized by projects, because tensions and managerial issues are more likely to appear at the intra-firm level (Tidström, 2014; Le Roy and Czakon, 2016). Accordingly, we conducted our research in a high-tech industry organized by projects: the space industry (Dussauge and Garrette, 1997).

The space industry includes all activities leading to the production of aircraft, missiles and spacecraft and thus requires diverse and sophisticated technologies to answer the demands of both private and public clients. Europe is currently the world's second largest space power in budgetary terms. Like NASA in the US, European space agencies such as the European Space Agency (ESA) and the National Centre for Space Studies (CNES) are actively involved in structuring industrial activities by developing and coordinating space programs.

This study focuses on telecommunications satellite manufacturing, the most competitive segment of the space industry. The world market in this industry segment is divided among five major manufacturers, including three Americans firms, i.e., Boeing (Boeing Space Systems), Lockheed Martin (Lockheed Martin Space Systems) and Loral (Loral Space and Communications), and two Europeans firms, i.e., Airbus (Airbus Defense and Space) and Thales (Thales Alenia Space).

In addition, there are local competitors from emerging countries (China, India, Brazil, and Russia) that lead their local markets and threaten to encroach on international markets over the long term. These firms from emerging markets do not yet have the capacity to compete with American or European manufacturers in the international markets, but they have often already mastered the technologies and could become strong competitors in the future.

Manufacturers compete to respond to tenders from space agencies (institutional markets) and from telecom operators (regional and international markets). These telecom operators are regional (Eutelsat and Arabsat) or international (Intelsat and Inmarsat) companies with substantial financial capabilities. They employ fleets of satellites and sell services to TV channels, Internet service companies, etc.

Private telecom operators capture the highest share of the value created in the chain and are thus considered highly profitable companies. After publication of the tender, each manufacturer decides whether to respond, and if so, it must define in what manner to respond to the bid: alone, with a partner or with a competitor. The manufacturer can compare the benefits, risks and costs of each strategic choice.

Once the tender is accepted, the manufacturer is in charge of developing the satellite. A telecommunications satellite consists of two parts: the platform and the payload. The payload includes the receiving antennas, the repeaters and the transmitting antennas. The platform is the vehicle responsible for the smooth launching of the satellite and maintaining the satellite in the space environment. The platform is relatively standardized for a range of products, whereas the payload is adapted to the requirements of each client. Thus, every project contains some innovation, and each project's degree of innovation depends on the client's requirements.

Please cite this article in press as: Fernandez, A.-S., et al., Implementing the right project structure to achieve coopetitive innovation projects, Long Range Planning (2017), http://dx.doi.org/10.1016/j.lrp.2017.07.009

ADS and TAS manage large portfolios of innovation projects, enabling us to investigate different projects simultaneously. We focus our attention on analyzing innovation projects developed jointly by these competitors, ADS and TAS, to determine whether SPT or CPT is used to achieve the coopetitive innovation objectives.

Data collection

Primary and secondary data were collected to enable the use of triangulation techniques (Lincoln and Guba, 1985; Eisenhardt, 1989; Gibbert et al., 2008).

Two of our cases, Alphabus and Yahsat, have already been studied from a coopetition perspective (Fernandez et al., 2014; Le Roy and Fernandez, 2015; Fernandez and Chiambaretto, 2016). These previous studies were focused on coopetitive tensions and their management at multiple levels (Fernandez et al., 2014) or at the working-group level (Le Roy and Fernandez, 2015) and on the management of tensions related to information in coopetitive innovation projects (Fernandez and Chiambaretto, 2016). However, these previous studies did not investigate the project structures used by coopetitors to achieve innovation projects. To provide original insights into the characteristics of the project structures implemented to achieve innovation projects in coopetition, a new phase of data collection was implemented.

Thus, we conducted 34 new semi-structured interviews with CEOs, department heads, project managers and team members[1] (cf. Table 1). Nine interviews were conducted with CEOs and department heads from both firms (ADS and TAS). Fifteen interviews were conducted with project managers and team members of five innovation projects that used SPTs (ChinaSatcom, Antrix, Gazprom, Arabsat 4 and Arabsat 5). Ten interviews were conducted with project managers and team members of two innovation projects that used CPTs (Alphabus and Yahsat) (cf. Table 2).

The interviews were recorded and then transcribed as soon as possible to preserve the quality of the data (Gibbert et al., 2008). Following Gioia et al. (2013), we assured the interviewees that their names would not be used. Secondary data were obtained from various sources, including internal documents (e.g., contracts, presentations, meetings and reports) and external documents (e.g., news articles and industry reports). The combination of primary and secondary sources allowed us to triangulate the collected information by crosschecking facts and dates to avoid potential interpretation biases.

Table 1
Distribution of the interviewees.

Interviewees	Data collection
CEOs and department heads	9 interviews
Project managers and team members (using SPTs)	15 interviews
Project managers and team members (using CPTs)	10 interviews
TOTAL	34 interviews

Table 2
Distribution of the interviews conducted by project.

Project name	Project structure	Coopetitors	Number of interviews
ChinaSatcom	SPT	ChinaSatcom and TAS	2
Antrix	SPT	Gazprom and TAS	3
Gazprom	SPT	Antrix and ADS	2
Arabsat 4	SPT	ADS and TAS	4
Arabsat 5	SPT	ADS and TAS	4
Yahsat	CPT	ADS and TAS	4
Alphabus	CPT	ADS and TAS	6

Data analysis

The empirical material (primary and secondary data) was coded following Miles et al., 2013. Two stages can be differentiated within the analytical process. A first round of coding followed the literature to identify projects corresponding to different strategies: competition, collaboration, SPTs and CPTs. This round was essentially deductive and helped us ensure that our chosen case was relevant to illustrating our framework.

Then, a second inductive round of coding was undertaken to isolate and illuminate the drivers and features of each project. This second round was inspired by the method proposed by Corley and Gioia (2004) and Gioia et al. (2013) and entailed coding our material in different steps. We began by identifying first-order categories, which allowed us to label the interviews. Then, we attempted to arrange the first-order categories within the second-order themes to link the first-order categories with the previous literature and to identify potential nascent concepts or mismatches.

[1] The duration of interviews ranged from 48 to 161 min. The average duration was 75 min. With the exception of five conference calls, all interviews were conducted face-to-face.

Please cite this article in press as: Fernandez, A.-S., et al., Implementing the right project structure to achieve coopetitive innovation projects, Long Range Planning (2017), http://dx.doi.org/10.1016/j.lrp.2017.07.009

Finally, we attempted to combine the second-order themes into aggregate dimensions to study the relationships among them (Fig. 3). To implement the different steps in the inductive round, we used NVivo 10 software (QSR International) to conduct the content analysis and to design arborescence. We will use the results verbatim to illustrate our findings in the next section. To preserve confidentiality, we refer to the companies as firm A and firm B.

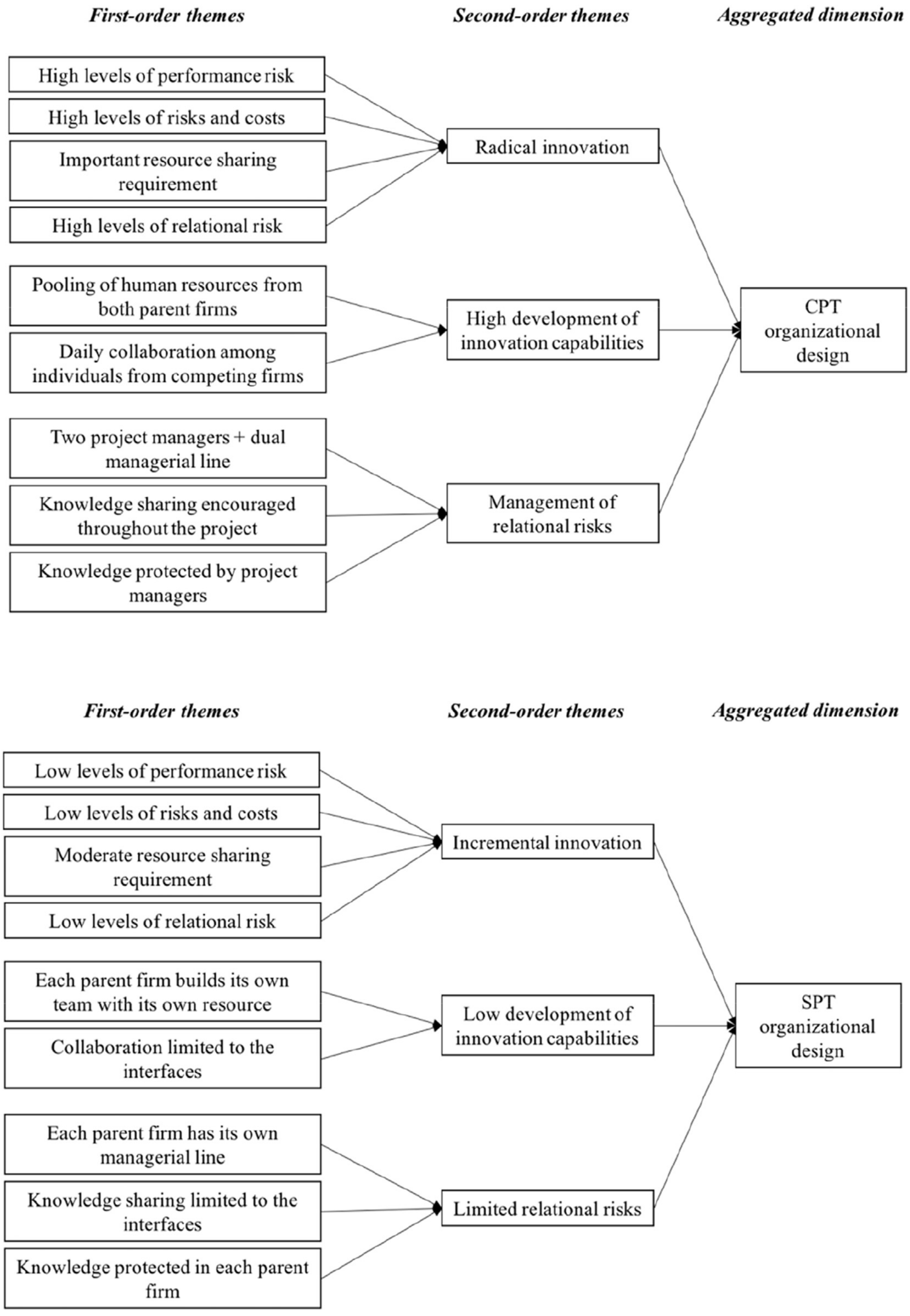

Fig. 3. The coding process.

Findings

We studied innovation projects conducted jointly by two competitors, ADS and TAS, based on a general coopetition strategy. The analysis of multiple coopetitive innovation projects revealed two distinct project structures: SPTs and CPTs. We explore the characteristics of these projects in detail below.

Innovation projects between competitors using SPTs

Our research revealed two situations in which coopetition strategy was implemented using the SPT structure: (1) when ADS or TAS collaborated with a local partner in emerging markets, and (2) when ADS and TAS decided to collaborate vertically. We explored both situations.

Incremental innovation projects with a local competitor

ADS and TAS collaborate with local competitors when they seek to access emerging markets. To ADS and TAS, emerging countries such as Argentina, Brazil, Russia, India or China typically represent markets with high potential. However, European manufacturers are typically unable to make their own bid on a tender from such an emerging country. Emerging countries have developed their own industries, and local companies specializing in the manufacture of space components have progressively emerged. These local companies are growing rapidly and compete with European and American manufacturers in their domestic markets. To facilitate the development of local firms, emerging countries force global manufacturers to bid on their tenders in collaboration with a local firm. This coopetition strategy was adopted by ADS with Antrix (India), and by TAS with ChinaSatcom (China) and Gazprom (Russia) (Quote 1, Appendix).

The collaboration between a European manufacturer and a local firm is not without coopetitive tensions. The local firms already dominated their local markets and expected to expand their activities into international markets. Through cooperation, they believed that they would acquire sufficient knowledge to become strong global competitors. Thus, local firms and European manufacturers were not only direct competitors in local markets but also future competitors in global markets (Quote 2, Appendix).

The satellite projects were associated with low levels of economic and technological risk. Indeed, the tenders concerned small telecommunication satellites that were moderately powerful for simple missions. Thus, these innovation projects were not technically challenging. The European manufacturers had all of the necessary competencies to develop them alone (Quote 3, Appendix).

If the economic and technological risks are low, there are some risks of opportunism for these projects. Through cooperation, local firms expected to obtain core knowledge of how to manufacture a telecommunications satellite. These firms' objective was both to access a wide knowledge portfolio and to acquire the necessary know-how to develop technologies that would allow them to compete on the global market. From the European manufacturer's perspective, the risk of imitation and spoliation was high. Through cooperation, the European manufacturer was developing a potential future competitor. Thus, it was critical to design an appropriate project structure to minimize the risk of opportunism (Quotes 4 and 5, Appendix).

ADS and TAS decided to use SPTs to manage these innovation projects in emerging markets. To ensure the product's quality and reliability, the European manufacturer led the contract as the prime contractor. The local firm was considered the main subcontractor. Satellite manufacture was precisely divided between both partners. The local firm was responsible for developing the platform (the standard part of the satellite), and the European manufacturer was entrusted to develop the payload (the innovative part of the satellite) (Quote 6, Appendix).

The manufacturing of the platform by the local firm typically reduced the total cost of the satellite by 25%, allowing the prime contractor to formulate a more price-competitive offer. This vertical division implied a clear separation of both the risks and the costs between the European manufacturer and the local firm. Each partner was only responsible for its share of the activity. Benefits were also divided according to the industrial division.

To achieve the goals of the innovation project, both the European manufacturer and the local firm designated an internal project team to lead its share of the project. Each team remained located within its parent firm and was supervised by its internal managerial staff. Informal interactions between team members were almost impossible. Coordinating the SPT was undertaken by formal meetings that were planned and scheduled by top managers. The SPT was a convenient design for European manufacturers in emerging markets because it limited interactions at the operational level and therefore minimized the risk of opportunism of the innovation project (Quote 7, Appendix).

Incremental innovation projects between European competitors

ADS and TAS also sometimes collaborate to win bids against third-party competitors. In the global markets, ADS and TAS compete not only against one another but also against major American manufacturers (Boeing, Lockheed, etc.). When ADS and TAS alone could not make a better offer than their American rivals, they adopted a coopetition strategy.

In this regard, the case of Saudi Arabia is particularly interesting. The first satellite for this country was ordered by the Saudi Arabian telecom operator Arabsat. The Arabsat 1-A satellite was manufactured by TAS. Satisfied with this first contract, the client entrusted TAS to develop the next innovation and the next satellite. TAS developed five satellites for Arabsat.

A long-term relationship was thus established between Arabsat and TAS. Unfortunately, the most recent project was not a complete success. In 2001, three years after its launch, the Arabsat 3-A satellite experienced a critical technical issue. The functioning of the solar panels had broken down, and the platform was out of order, leading to the death of the satellite thirteen years before the end of its projected lifespan.

After this incident, Arabsat was disappointed and lost its trust in TAS. For its next innovation, it did not want to contract with TAS. In 2003, Arabsat issued a new global tender for the fourth generation of satellites. Because of the bad commercial relationship between Arabsat and TAS, the only European manufacturer capable of making a bid was ADS. The competition against American manufacturers was intense. To win, ADS had to formulate the best offer both technically and economically.

To improve its competitiveness, ADS decided to collaborate with TAS. There were two reasons for this choice. First, TAS's components were cheaper than ADS's components. Second, it was easier and less risky to collaborate with a European partner, even if it was also a competitor, than with an American partner.

Because TAS was dogged by its bad reputation with this client, the formulation of a common offer was impossible. Thus, ADS decided to make its bid as the prime contractor and associated TAS as its main subcontractor (Quote 8, Appendix). This vertical collaboration aimed both to make the most competitive bid and to maximize the chances of winning the competition against the American manufacturers (Quote 9, Appendix). The client was not easy to convince but eventually accepted this configuration because the offer was more attractive than the American bids.

ADS and TAS collaborated to achieve the incremental innovation required for the fourth generation of Arabsat satellites. This new generation of satellites was not highly challenging for the manufacturers. It required the new development of only a few components. Thus, the coopetitors did not need to share their strategic knowledge to create new ones. A strict vertical division of industrial activity was possible (Quotes 10 and 11, Appendix).

The coopetitors used an SPT. An ADS project team was responsible for the platform manufacturing, whereas a team at TAS was in charge of the payload. Both working teams remained located at their parent firms and had no formal or informal interactions during the project. Tasks and work packages were coordinated by managers following a formal and agreed-upon schedule. The risks and the costs of the innovation project were divided between ADS and TAS based on the industrial division. Each partner was responsible both for its share of its activity and for the management of its sub-team (Quote 12, Appendix).

The SPT organization fostered the development of the fourth generation of Arabsat (4-A, 4-AR and 4-B), launched in 2006 and 2008. The client was satisfied and accepted the same vertical coopetition strategy between ADS and TAS, designed with a SPT, for the next fifth generation of Arabsat (5-A, 5-B and 5-C), launched in 2010 and 2011.

Innovation projects between competitors using CPT

To answer technological challenges, ADS and TAS must collaborate horizontally. Two radical innovation projects have been developed by ADS and TAS based on this horizontal coopetition strategy: Alphabus and Yahsat.

Radical innovation project between ADS and TAS: Alphabus

As telecommunications services evolve, more powerful satellites with higher capacities are required. The current range of European products—Eurostar (ADS) and Spacebus (TAS)—were too limited to keep up with the evolution of the demand. Boeing Space Systems had developed a new top-of-the-range line of products and was leading the market. ADS and TAS wanted to develop their own platform for heavy and powerful payloads to compete with Boeing (Quote 13, Appendix).

Developing the new platform development represented a massive R&D investment. According to public data, 400 million euros were initially invested in the project. The real budget, although not public, was more than twice the initial investment. The end of the project was expected in four years, but ADS and TAS took four more years to design and build Alphabus. The four additional years of development had to be funded. The platform was finished in 2012, and the first Alphasat satellite was launched in 2013.

Each manufacturer had a maximum cash flow of 15 million euros for all its R&D in the telecommunications sector, which was insufficient for either to develop Alphabus alone. The development of Alphabus required financial support but public institutions could not fund the development of two platforms. Thus, in June 2005, CNES and ESA encouraged ADS and TAS to collaborate to develop a top-of-the-range platform (Alphabus) and a corresponding range of satellites (Alphasat).

Alphabus was a radical innovation. Developing the project was highly challenging for the coopetitors. They had to address high levels and multiple sources of economic and technological risk (Quotes 14 and 15, Appendix). The first source of risk was technological. Alphabus aimed at becoming the core technology of the European space industry. Thus, it was essential to avoid breakdowns or dysfunctions. The coopetitors had to anticipate the development of new components to replace obsolete ones. They had to think up the future and imagine the forthcoming technologies to build a strong competitive advantage (Quote 16, Appendix).

The second source of risk was commercial. Because solving a technical problem issue once the satellite is in orbit is almost impossible, clients prefer reliable to new technologies. ADS and TAS were thus developing a new technology not knowing if they would have clients.

The third source of risk was related to uncertain demand. Alphabus was positioned in a niche in the top-of-the-range market segment (Quote 17, Appendix). The volume of the demand was highly uncertain, which questioned the profitability of the niche. Because satellites such as Alphabus were too heavy and two powerful for small telecom operators, ADS and TAS targeted large telecom operators. However, there were only a few large telecom operators, and they did not all have the financial capacity to buy a product as expensive as Alphabus. Moreover, the top-of the-range market segment had some overlaps with the middle range market. Spacebus and Eurostar could thus compete with Alphabus for powers of approximately 12 kW.

Considering the high levels of economic and technological risk of the Alphabus project, ADS and TAS decided to employ a CPT (Quote 18, Appendix). ADS and TAS pooled their strategic resources and core competencies in a CPT that was governed by a Project Management Office (PMO). The responsibilities and liabilities of the PMO were divided equally between both partners (Quote 19, Appendix).

The client received a single offer signed jointly by ADS and TAS, noting the dual management and the equal risk sharing. The partners were committed to a full risk sharing on a no-fault basis. Both firms assumed all the financial, technological and commercial risks regardless of whether they came from ADS or TAS (Quote 20, Appendix).

From the coopetitors' perspective, the CPT design was the best option to develop the innovation for several reasons. First, the CPT was the optimal project structure to handle the technological risk. The conceptualization of the platform and of the forthcoming technologies required the core competencies of both ADS and TAS. Close collaboration among team members from both firms was necessary to explore the limits and the potential of the current knowledge. Alphabus was so sensitive technologically that it required the best of each partner.

The objective of the CPT was to encourage the sharing of strategic resources to create new resources, such as the avionics. The aim of the CPT was also to stimulate mutual learning processes among team members (Quote 21, Appendix). These learning processes could also benefit each partner's range of products. Thus, ADS learned from TAS about mechanical and chemical propulsion, and TAS learned from ADS about electronic systems and systems for altitude control. The close and daily interactions between team members from both parent firms fostered the development of innovative components that neither could have produced alone.

Second, the CPT design allowed coopetitors to manage their risk of opportunism. Because the success of Alphabus relied on the development of new innovation capabilities, close collaboration between team members was absolutely essential. However, this collaboration exposed ADS and TAS to high risks of imitation and spoliation (Quote 22, Appendix). The application of the co-management principle permitted the sharing of both critical information and key resources for the development of Alphabus while limiting the risk of opportunism at the team level. The presence of two managers at each level of the project management structure regulated information flows and prevented unwanted transfers of knowledge between individuals. Thus, the CPT design allowed coopetitors to control the risk of opportunism.

Third, the CPT was the best project structure for managing the commercial risk. Because convincing a client to be the first to test the technology was a major issue for the Alphabus project, ADS and TAS decided to promote the quality of the innovation. They communicated about the CPT structure, about the pooling of the strengths of each firm and about the involvement of the best engineers from each firm in the project. They explained that Alphabus was built on the combination of the best available space technology. The CPT structure evidenced the quality and helped promote the platform. The CPT helped convince clients to buy Alphabus. Supported by ESA, Inmarsat bought the first platform and launched the first Alphasat XL in July 2013.

Fourth, the CPT seemed to be the best project structure to manage uncertain demand. The CPT that was designed for the development of the platform partners signed a formal agreement that stipulates its priority over Eurostar and Spacebus. This agreement avoided any competition between coopetitors' product ranges and aimed at promoting Alphabus. The CPT had to respond with Alphabus to any tender concerning a powerful satellite. Moreover, the CPT could not compete against an internal team from either ADS or TAS. Within the CPT, the combination of market competencies from both parent firms was essential to ensure the development and the promotion of Alphabus and Alphasat. Thus, the CPT was essential to market an innovative product such as Alphabus.

Radical innovation project between ADS and TAS: Yahsat

In August 2007, Al Yah Satellite Communications Company (Yahsat) signed a contract called Yahsat with ADS and TAS for the manufacture of a dual system of satellite communications. Yahsat also involved a radical innovation. The development of the project was highly challenging for both coopetitors. They had to handle and address the high levels and multiple sources of economic and technological risks (Quote 23, Appendix).

The first source of risk was financial (Quote 24, Appendix). With a total value of approximately 1.6 billion euros, Yahsat was one of the most important projects in the entire space industry. Typically, a telecommunications satellite program costs between 200 and 300 million euros. Thus, Yahsat represented six to seven times the average value of a regular project. In 2007, the turnovers of ADS and TAS on their space activities were respectively approximately 4.6 billion euros and 2.6 billion dollars. Yahsat represented almost half of the turnover of ADS and almost the entire turnover of TAS in the space industry.

The budget of the contract explained part of the financial risk. This financial risk was even more important because the client was a new actor in the space industry, and Yahsat was its first telecommunications project. The company emerged in the early 2000s as an offshoot of the government of the United Arab Emirates. ADS and TAS had little information regarding the client's solvency, its capacity to meet its obligations, or its reliability. This uncertainty represented an added source of financial risk for the manufacturers. If for some reason the client was unable to pay during the three years, both manufacturers would be on the verge of bankruptcy.

ADS and TAS required strong assurances from their parent group and from an external insurance company. However, the 1.8-billion euros for Yahsat was too risky even for COFACE. The Thales and Airbus groups refused to insure 100% of the project.

Consequently, ADS and TAS decided to answer the tender together, dividing the financial risk, allowing the ADS and Thales groups to insure 50% of the project.

As a client, Yahsat lacked the experience necessary to engage in space activities and preferred a turnkey contract. ADS and TAS were responsible for the manufacture, the launching and the controlling of two satellites, two ground stations transmitting signals and information and a military telecommunications network.[2] Unlike traditional and common satellite projects, Yahsat did not agree to pay the full price upon order or even upon delivery of the product. Instead, 15% of the payment was required at the satellite's launch. The rest of the price was spread out over three years. Consequently, ADS and TAS had to assume high levels of financial risk, in addition to all the other risk they were assuming.

The second source of risk was technological. The Yahsat project extended beyond a single satellite and required a complete turnkey system. When a client buys a satellite, it has two options. First, it can purchase a satellite in a traditional client-supplier relationship in which the client is in charge of the launching of the satellite and of controlling the satellite over its lifetime. The satellite manufacturer assumes the technical risks of dysfunctions or breakdowns until the satellite launches. Second, the client can outsource the launching and the controlling to its satellite manufacturer. The manufacturer becomes a provider of a turnkey system and assumes the risks of dysfunctions or breakdowns over the entire lifetime of the satellite.

Because launching and orbital positioning are critical steps, the manufacturer assumes higher levels of technical risks in a turnkey system than in a standard satellite contract. In previous collaborations, ADS was in charge of the platform and TAS was in charge of the payload. In Yahsat, the industrial division followed the equity of the financial division. Each manufacturer was in charge of 50% of the manufacturing, approximately 0.9 billion euros. This division avoided jeopardizing the project's success. However, ADS and TAS remained competitors and expected to work on the most interesting work packages of the project, corresponding to the most sophisticated technological parts of the system.

Considering the financial and technological sources of risk, ADS and TAS decided to share all the risks on *a no-fault basis.* They committed to assume—jointly and severally—the risks at all stages of the project. To fulfill their commitments, the partners needed to work very closely together, to supervise the work of both and to efficiently manage project interfaces (Quotes 25 and 26, Appendix).

The CPT appeared as the best structure to achieve the project based on the rule of *risk sharing on a no-fault basis.* Supervision of the CPT was shared equally by both coopetitors. This dual management was essential to manage the resources from the competing firms. The risk sharing and the co-management of the project encouraged ADS and TAS to pool their best resources and competencies in the CPT. The pooling of each firm's strengths ensured that the client received the best and most reliable product.

The close and daily collaboration between team members gave primacy to the project's achievement. When a technical issue appeared, it was not important to find the firm that was responsible but instead to collaborate closer at the team level to find the best solution for the project, even if that meant revising the industrial division and leaving the manufacture of a key component to the partner (Quote 27, Appendix). Considering the high levels of financial and commercial risk, it was essential for ADS and TAS to divide and to assume this risk jointly. The appropriate project structure corresponding to this risk sharing appeared to be a CPT.

However, the close and daily collaboration between team members also increased the risk of opportunism. Team members from competing firms worked in the same building, interacting with each other during coffee breaks for years, thus increasing the risks of unwanted transfers and imitation. The CPT represented an optimal organizational solution to manage the risk of opportunism. Built on a dual managerial structure, the CPT permitted the firms to control information and resource exchanges between team members (Quotes 28 and 29, Appendix).

The CPT was governed by two project managers, one from ADS and one from TAS. Both project managers decided jointly what should be shared or protected and when and how, along with what to do in the event of information leakage. This co-management principle was essential to limit the risk of opportunism throughout the project. The CPT therefore represents an optimal design to manage the risk of opportunism of a radical innovation project.

Discussion

Innovation project characteristics and project structure

This study investigates why and under what circumstances coopetitors implement different project structures when developing common innovation projects. Based on our theoretical framework, we identified two main types of innovation projects: (1) incremental innovation projects characterized by a low degree of innovation and moderate risks and (2) radical innovation projects characterized by a high degree of innovation and a high level of risk.

We investigated a portfolio of innovation projects in the space industry. Our analysis of the different cases of collaborations between competitors reveals the coexistence of two project structures: SPTs and CPTs. The project portfolio level of analysis adopted in this research offers an original perspective by simultaneously investigating both project structures —while offering interesting insights into the drivers of these project structures (cf. Table 3).

[2] Exclusively restricted from civilian use.

Table 3
Cross-case analysis.

Project name	Alphabus	Yahsat	Antrix, ChinaSatcom, Gazprom	Arabsat 4 and 5
Type of innovation pursued	Radical	Radical	Incremental	Incremental
Knowledge or resource sharing requirement	High	High	Low	Low
Economic and technological risks	High	High	Low	Low
Risk of opportunism	High	High	Moderate	Moderate
Project structure	CPT	CPT	SPT	SPT

Our findings revealed that coopetitors rely on SPTs to achieve incremental innovation projects. The risk of opportunism remains because the partners are competitors but the economic and technological risks associated with the project are limited because the degree of innovation is also reduced (Bouncken et al., 2017). In this configuration, the knowledge sharing required for the project to succeed is very restricted so that the interactions between individuals can be limited to simple coordination at the interfaces (cf. Fig. 4).

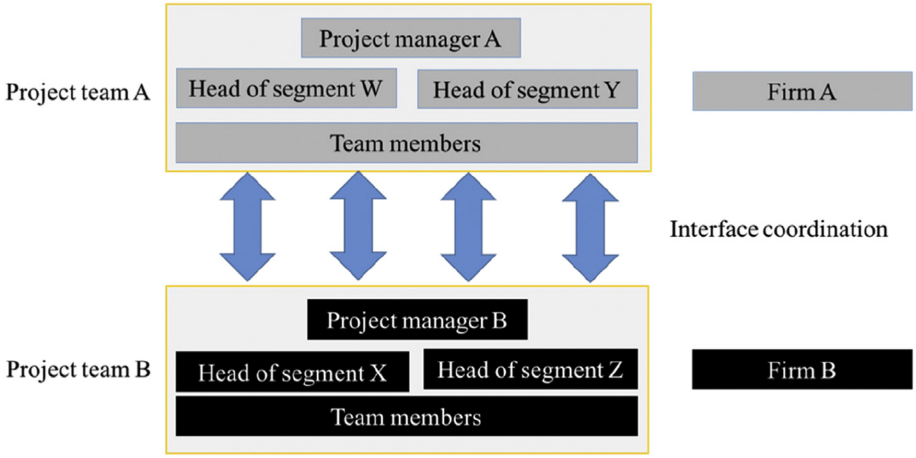

Fig. 4. SPT structure.

By limiting knowledge sharing, the SPT reduces not only the opportunity to develop innovative capabilities but also the risk of opportunism. It is unsurprising that the SPT structure has been adopted both when the partners engage in innovation projects with emerging countries and when implementing the incremental innovation projects conducted by ADS and TAS (Arabsat). This finding allows the formulation of proposition 1:

Proposition 1. *Coopetitors design SPTs to achieve innovation projects characterized by low levels of risks, costs and innovativeness.*

In contrast, our findings revealed that for radical innovation projects, the requirements in terms of the project structures change considerably. To develop a radical innovation together, coopetitors must generate new knowledge and capabilities together, requiring them to access their partners' resources and competencies (Gnyawali and Park, 2011). Under these circumstances, coopetitors have no choice but to share the fostered knowledge and maximize their chances of success. To do so, daily interactions between team members are needed because such opportunities create meaningful opportunities to improve innovative capabilities. Nevertheless, these flows of information and knowledge must be strongly regulated to prevent leaks or unintended spillovers (Baumard, 2010; Baruch and Lin, 2012; Fernandez and Chiambaretto, 2016). Consequently, the coopetitors investigated in our cases relied on the CPT to encourage the necessary knowledge sharing while limiting the risk of opportunism. This finding allows the formulation of proposition 2:

Proposition 2. *Coopetitors design CPTs to achieve innovation projects characterized by high levels of risks, costs and innovativeness.*

Similarities and differences between SPT and CPT

Once the drivers of the SPT and CPT have been identified, it is important to return to the key characteristics of these project structures (cf. Table 4).

The SPT has mostly been used for standard or incremental innovation projects between competitors (projects with emerging countries and Arabsat). Because these incremental innovation projects did not require any co-development, the coopetitors did not need to pool their strategic resources or their core competencies to develop innovation capabilities.

Table 4
SPT and CPT.

	Separate Project Team	Coopetitive Project Team
Nature of project		
Type of innovation pursued	Incremental	Radical
Knowledge or resource sharing required	Limited	Important
Economic and technological risks	Low	High
Risk of opportunism	Moderate	High
Project structure		
Team composition	No pooling of human resources and each parent firm builds its own team with its own resources	Pooling of human resources from both parent firms in which individuals from competing firms work together
Team management	Single management structure in which each parent firm has its own management	Dual management structure with a dual steering committee + two project managers, one each from both parent firms
Daily collaboration	No	Yes
Knowledge sharing	Limited to the interfaces	Encouraged throughout the project
Knowledge protecting	Knowledge protected in each parent firm	Knowledge plunders controlled by the project managers

Instead, ADS and TAS had previously mastered the technologies necessary to deliver these standard innovation projects. Furthermore, ADS and TAS had developed routines in their previous collaborative experiences to facilitate task division between the coopetitors. Each partner was responsible for the achievement of 50% of the project and designed an internal team allocated with its own resources. Each team continued to be located within its parent firm and was supervised internally by its own managers. Each team remained located in its parent firm. Thus, there were no daily interactions between team members and no common (or dual) management or supervisory structure for the common project. Knowledge sharing was formal and limited to the project interfaces.

In contrast, the CPT was used to achieve radical innovation projects such as Yahsat and Alphabus. These two projects were not only technically challenging but also the most important space projects of the decade. Meeting the challenges of high-intensity innovation projects requires intensive co-development among coopetitors. Therefore, pooling human resources and increasing interactions between employees from both parent firms was essential to build upon the mutual strengths of the firms and encouraged mutual learning among team members.

Nevertheless, because the development of a radical innovation generates new knowledge, such a project can also result in knowledge transfers and unintended informational spillovers (Baumard, 2010; Bouncken and Fredrich, 2016; Fernandez and Chiambaretto, 2016). To prevent this situation, a unique configuration is created with a dual managerial line responsible for the strategic choices of the project. For each key function, two managers (one from each firm) are responsible, without any hierarchy between them, to make all decisions together (Le Roy and Fernandez, 2015). By doing so, the partnering firms limit the risks of opportunism and knowledge leakage. This dual structure is reinforced by a dual management and supervisory structure.

Coopetition and innovation

The impact of coopetition on innovation is a central question in this research. This question has been previously addressed, but led to opposite findings and the creation of debate among scholars. According to the TCT, some scholars believe that coopetition cannot be a fruitful strategy for innovation (Arranz and Arroyabe, 2008; Nieto and Santamaría, 2007; Park and Russo, 1996; Santamaria and Surroca, 2011). In contrast and in line with the DCT, other scholars argue that coopetition should have a positive impact on innovation (Belderbos et al., 2004; Luo et al., 2007; Neyens et al., 2010; Tomlinson, 2010; Peng et al., 2012). Recently, some studies demonstrated that the impact of coopetition seems higher on incremental rather than on radical innovation (Bouncken and Kraus, 2013; Bouncken et al., 2017), whereas other studies obtained the opposite results (Bouncken and Fredrich, 2012).

Our findings contribute to this debate by showing that coopetition can be fruitful for both incremental and radical innovations. We show that coopetition capabilities, and more precisely, the adoption of relevant project structures, can strengthen the positive impact of coopetition on innovation, regardless of the degree of innovation. This result is in line with the recent contributions of Estrada et al. (2016) and Bouncken et al. (2016), which underlined the key role of managerial tools and relevant governance in fostering the impact of coopetition on innovation. More precisely, we highlight that for incremental innovation projects with competitors, the SPT appears to be the most appropriate project structure. In contrast, we reveal that for radical innovation projects with competitors, the CPT is a more relevant project structure. Our results confirm the role of “management” as the missing link between coopetition and innovation performance (Le Roy and Czakon, 2016).

Contributions to the literature

This research contributes to several aspects of the literature. First, we provide insights into the literature dedicated to the management of coopetitive innovation projects. We point out two project structures used by coopetitors to achieve innovation projects: SPTs and CPTs. A comparison between the structures allows us to establish the most appropriate project structure depending on the characteristics of the innovation project. Thus, we show that the SPT is the most relevant project structure to achieve incremental innovation projects that are characterized by low risks and low costs. In contrast, we show that the CPT is the most relevant project structure to achieve radical innovation projects that are characterized by high risks and high costs.

Second, our findings offer a better understanding of the impact of coopetition on innovation. Some scholars try to establish a direct link between coopetition and innovation. This research shows that the relationship between coopetition and innovation is not direct but relies on the type of project structure implemented to achieve innovation projects. The impact of coopetition should be positive on both incremental and radical innovation depending on the project structure adopted by coopetitors.

Third, this research contributes to the literature dedicated to the management of coopetition. While previous studies investigated the different principles or tools that can be used to manage coopetitive tensions and develop coopetition capabilities (Fernandez et al., 2014; Le Roy and Fernandez, 2015; Fernandez and Chiambaretto, 2016), we extend these previous studies by investigating the relevance of two types of project structures—SPTs and CPTs—implemented by coopetitors to achieve innovation projects. We highlight that project structure is a key point for the success of coopetition strategies. Therefore, it seems necessary to further investigate the question of relevant coopetition project structure in future studies, not only for R&D coopetition but also for other types of coopetition.

Managerial implications

Our findings might represent interesting guidelines for top managers and for project managers involved in innovation processes. First, our findings show that coopetition is a fruitful strategy to achieve incremental and radical innovation projects, as long as the right project structure is implemented for the project team. Thus, we recommend top managers adopt coopetition strategies to foster their innovation policies. Second, when competitors want to achieve incremental innovation projects, we recommend top managers design an SPT. In contrast, when competitors want to achieve radical innovation projects, they should implement a CPT. CPT encourages the sharing of the necessary knowledge to develop innovation capabilities while controlling for the risks of opportunism and knowledge leakage of the coopetitors. Finally, because the CPT is a complex and costly structure, we underline that it should be exclusively used for radical innovation projects. The implementation of this project structure for incremental innovation projects would be unprofitable.

Conclusion

Coopetition strategies have been widely adopted by competitors to foster innovation. Because coopetition requires both significant knowledge exchange for the success of the joint project and the creation of mechanisms to avoid unintended knowledge or information spillovers, the central question is which project structure is best suited for coping with this strategy.

This study shows that firms can successfully manage coopetition by adopting different project structures depending on the type of innovation project. Coopetitors involved in incremental innovation projects should rely on SPTs, whereas those involved in radical innovation projects should prefer CPTs. Thus, coopetition appears to be a relevant strategy to develop both incremental and radical innovations.

These conclusions cannot be accepted without considering their limitations, which offer interesting perspectives for further studies. The main methodological limitation comes from the embeddedness of our findings in a specific industry and period. Assuming that telecommunications satellite manufacturing is a setting that is representative of other high-tech industries, similar findings might be obtained in similar industries. Nonetheless, our assumptions must be extended to new empirical settings with different technology intensities.

Another perspective for further research might involve the governance question. Our findings suggest that innovation projects require different types of project structures according to their degree of innovation and risks. While a recent contribution has introduced the question of the governance of innovation projects between competitors (Bouncken et al., 2016), we suggest investigating the most relevant types of governance according to the degree of innovation and the risk of the projects.

Finally, decision making between economic and opportunism risks in choosing an appropriate project structure may be a short-term decision. In our case studies, partners compare the risks of failure and the risks of spoliation. However, managers' decisions seem driven by a short-term perspective, in which the project success may seem more urgent than the long-term knowledge management. It may thus prove interesting to adopt a more dynamic perspective and introduce a time dimension into the decision-making process of the forms of coopetition.

Overall, further research is necessary for a better understanding of the relevance of coopetition for innovation. Coopetition should have a positive impact on innovation, creating cross-fertilization of knowledge between competitors. Nevertheless, coopetition can also have a negative impact on innovation because of the risks of plunder and unintended spillovers. Accordingly, management plays a crucial role in benefiting from competition and avoiding negative effects. Future studies dedicated to this key success factor are encouraged to provide new insights into coopetition for both theory and practice.

Acknowledgements

This article benefitted from the financial support of the Labex Entreprendre. The authors would like to thank the editor and the two anonymous reviewers for their insightful suggestions and inspiring comments.

Appendix. Quotes from interviews

Quote No	Respondent	Quote	Analysis
1	Head of tenders – Firm A	*With emergent countries, it is always the same scheme. We provide the payload and the partner builds the platform. We do that with China for example. Depending on the contract, we are the prime contractor with the payload or the subcontractor for the payload. It is always the same.*	Industrial division with firms from emergent countries
2	Head of Business Unit Telecom – firm B	*Collaborating with Indians or Russians is a bit like a client-supplier relationship except that we do the same job, they build satellite and we are competitors in the local markets.*	Coopetition and potential tensions with firms from emergent countries
3	Head of tenders – Firm B	*It depends on the markets. With the Russians, to get the market, it is easier to cooperate with a Russian company. And then it is easy for the industrial division to decide. The Russians, they have a strong competence in mechanical heat but they lack competence in power and avionics. They are not competent with electronics. But, we are. We are very good at it. So, we share the project according to our competences. It is very easy.*	Industrial division according to complementarities between ADS or TAS and coopetitors from emergent countries (limited resource sharing)
4	Head of Business Unit Telecom – firm B	*In the cooperation with emergent countries, each firm is responsible for its part of the activity. So, for us it is not risky. We do not assume the risk of the partner. Above all, with the Russians or Chinese. We do not take any risks, financial or technical. We do not know what could happen. It is fault based. This is what we use when we do not know much about the platform. It reduces the technical risk. We know that they do not just want to collaborate. They want to learn from us. So, we avoid the risk.*	Limitation of the risks taken by global manufacturers when they collaborate with coopetitors from emergent countries
5	Head of tenders – Firm A	*When we collaborate with emergent countries, we sign memorandums of understanding that define precisely what each partner should do, its liabilities, its rights and its obligations. We do not know the partner very well. We know that the partner wants to copy our know-how in a way. So, we chose to build two different teams, working in parallel. At the team level, we coordinate the activity at times to be sure that both works can be combined.*	Contractual boundaries established to limit the risks when global manufacturers collaborate with coopetitors from emergent countries
6	Project manager (project with Russia) – Firm B	*Each firm builds its own part of the satellite. We hold meetings to coordinate the activity and to integrate the bus and the payload at the end. For us, for our teams, it is the same as working for a competitive program. They do not feel the difficulties of the cooperation but they work in the same places with the same access to the information and the plants.*	Building of separated teams and coordination at the interfaces

(*continued on next page*)

Please cite this article in press as: Fernandez, A.-S., et al., Implementing the right project structure to achieve coopetitive innovation projects, Long Range Planning (2017), http://dx.doi.org/10.1016/j.lrp.2017.07.009

(*continued*)

Quote No	Respondent	Quote	Analysis
7	Head of Business Unit Telecom – firm B	*On the Chinese market, we refused to collaborate closely with the local partner for obvious reasons of technology transfer; we did not want to do that. Therefore, we worked separately and coordinated our roles.*	The choice of SPT in the Chinese market
8	Arabsat project manager – firm A	*For the generation of Arabsat 4, we were the main contractor and XXX was responsible for the payload. An Arabsat satellite is platform YYY and payload XXX.*	The vertical division of Arabsat
9	Arabsat project manager – firm B	*At a time when Arabsat was trying to lower prices by competing with XXX, we decided to collaborate and split the program instead of selling satellites at a loss. Therefore, the marriage between our two companies, both our strengths, was relevant to winning the competition, which was aggressive, especially in terms of price, because at some point one can no longer compete on price.*	Essential collaboration among European manufacturers
10	Head of Business Unit Telecom – firm B	*Arabsat is not the same as Alphabus or Yahsat. For Alphabus, we developed the platform together. For Arabsat, we share the risks but we divided the work. Firm A is prime and builds the platform but we do the payload. It was not complicated.*	Comparison of the Alphabus/Yahsat and Arabsat => easier to design the project structure for Arabsat
11	Arabsat project manager – firm B	*When we had experience with the same product, it was easier. We easily got organized and the sharing was easy to define.*	
12	Arabsat project manager – firm A	*It is easier to collaborate with a subcontractor even if it is a competitor than to innovate with a competitor. When we bid with a competitor, we can divide the tasks very precisely and work internally. The tasks and liabilities are easily allocated and the coordination at the interfaces is pretty simple. It does not require much effort. We work internally as we do on other projects. We are used to it; the same activities, the same methods, and the same rigor. We are autonomous. But, when we develop something new with firm B, it is not the same. The information sharing is complicated, the task division is complicated; no, it is not the same.*	Complexity of industrial division depending on the type of innovation project
13	Head of Business Unit Telecom – firm A	*It did not exist in Europe because it was really expensive and complicated and because nobody was able to do it. It is only thanks to our joint efforts that we have been capable of developing it.*	Coopetition chosen to compete against American companies
14	Alphabus project manager –firm B	*We did it with X, a common huge platform called Alphabus, because none of the companies were able to develop it alone. It is too expensive and risky for one company. Thus, to achieve this platform for heavy and powerful satellites, we decided to collaborate.*	High levels of risks associated with Alphabus
15	Alphabus project manager – firm A	*The more we upgrade products, the more we develop top-of-the-range products, the higher the risks are, and the more necessary it is to share them.*	
16	Alphabus project manager – firm B	*When we build a satellite with firm A or with another partner, there is no novelty, no real innovation. It is very easy. The task division is easy. But, Alphabus is completely new. Everything was new. We had to invent a new organization and it was not easy.*	Complexity of the task division depending on the type of innovation project

Please cite this article in press as: Fernandez, A.-S., et al., Implementing the right project structure to achieve coopetitive innovation projects, Long Range Planning (2017), http://dx.doi.org/10.1016/j.lrp.2017.07.009

(*continued*)

Quote No	Respondent	Quote	Analysis
17	Alphabus project manager – firm A	*In this product range, we need huge investments for a very small number of satellites. It is a very small segment of the market, with high investments and high risks.*	High levels of commercial risks associated with Alphabus
18	Alphabus project manager – firm B	*Alphabus is a co-development and a co-responsibility. We are responsible for 50% and we assume 50% of the risks, and we are very transparent about we are doing, except for some zones considered sensitive from a technological point of view. Nevertheless, 90% of the work is visible to both partners.*	The co-development of Alphabus
19	Head of Business Unit Telecom – firm B	*It is easier to work with foreigners; I mean firms from emergent countries such as Russia, China, or Argentina because the contract is detailed. Everything is written. There are less difficulties. For Alphabus, we cannot put everything in the contract because we are developing something new together. We need flexibility. So at the end, a lot of difficulties appeared about the organization of the project, the division of the tasks and the conflicts between engineers.*	Different levels of tensions depending on the innovation project
20	Alphabus project manager – firm B	*It is more difficult to create a common product. Each firm defends its own team, its own know-how. It is not easy to make people from both firms work together on a common platform. It is easier to work on different parts of the product separately.*	High difficulties when the common project concerns radical innovation
21	Alphabus project manager – firm A	*First, there is a lot of sharing. I think there are more than 200 items to share: information, thermal models, mechanical models, data, hardware, a lot of things. It must be understood that a satellite is as complex as an aircraft, but it is never the same thing twice. Therefore, we need thousands of different items and components. For that reason, there is a lot of sharing, we identify the need to share not only now but also in the future, and we must also share the responsibilities and even establish protective barriers.*	The key resources shared for the development of Alphabus
22	Head of Business Unit Telecom - firm B	*When we collaborate with XXX on Alphabus, we acquire and develop new competencies. This is the food of the project. It is the same for YYY. They learn from us. We know that our partner could run with the technologies used in the project, combined with its technologies, making it a stronger competitor.*	Learning and risk of spoliation
23	Yahsat project manager – firm A	*Yahsat is a turnkey contract, meaning a full delivery of two satellites and their launching, a lot of ground segments, so the amount of the entire contract is approximately 1.6 billion dollars. The first thing is that neither TAS nor ADS could have taken the risk of such a contract. When we sign a contract, there is always a risk. There are high levels of financial risks corresponding to the value of the contract if a major problem occurs. We always have contractual clauses providing that if we are more than a year late, depending on the circumstances, the contract can be canceled.*	High levels of risk associated with Yahsat

(*continued on next page*)

Please cite this article in press as: Fernandez, A.-S., et al., Implementing the right project structure to achieve coopetitive innovation projects, Long Range Planning (2017), http://dx.doi.org/10.1016/j.lrp.2017.07.009

(*continued*)

Quote No	Respondent	Quote	Analysis
24	Yahsat project manager – firm B	*This is a contract that is far too important just for one firm. The shareholders of TAS and ADS did not want to take this risk. Therefore, it was decided to develop Yahsat 50-50.*	High levels of financial risk associated with Yahsat
25	Head of Business Unit Satellite - firm B	*When we collaborate with emergent countries, we share the risks according to the share of the contract. For Yahsat or Alphabus, no matter what happens, we share the risks on a no-fault basis. We have solidarity. So, it is riskier. We depend on the partner to achieve the project.*	Different risk sharing depending on the type of innovation project => different project structures implemented
26	Yahsat project manager – firm A	*Because Yahsat was one of the riskiest projects that we have ever done, Firm B wanted to be a co-prime contractor, to share the risks and be equal in front of the client. The condition of being co-prime contractors was to work together and not as subcontractors. This is why we decided to build a common team together.*	
27	Head of Business Unit Telecom - firm A	*When we collaborate with a competitor on strong innovation projects, we prefer the rule of risk sharing on a no-fault basis. Globally, this means that everyone is responsible for the risks. Ok? A no-fault basis means that whatever the origin of the breakdown, you are in solidarity. For instance, that is what we did on Yahsat.*	The risk-sharing rule
28	Yahsat project manager – firm B	*Concerning information confidentiality, it is more complicated, for example. We are facing higher tensions and additional difficulties because we are not used to it. It is new and required the implementation of some innovative and new organization. It was interesting but different and not so simple. Both companies have different processes, different methods. At the beginning, we had to learn to work together, to communicate at the engineering level but also at the integration level. We did not have the exact same methods.*	Different levels of tensions regarding information sharing/protection depending on the type of innovation project
29	Yahsat project manager – firm A	*Even for the team members it is more complicated. They are perceived as spies by their colleagues, those who remain working in the company. They loose their identity.*	Different levels of tensions for team members depending on the type of innovation project

References

Arranz, N., Arroyabe, J.C., 2008. The choice of partners in R&D cooperation: an empirical analysis of Spanish firms. Technovation 28, 88–100. http://dx.doi.org/10.1016/j.technovation.2007.07.006.

Baruch, Y., Lin, C.-P., 2012. All for one, one for all: coopetition and virtual team performance. Technol. Forecast. Soc. Change 79, 1155–1168. http://dx.doi.org/10.1016/j.techfore.2012.01.008.

Baumard, P., 2010. Learning in coopetitive environments. In: Yami, S., Castaldo, S., Dagnino, G.B., Le Roy, F. (Eds.), Coopetition: Winning Strategies for the 21st Century. Edwar Elgar, pp. 74–99.

Belderbos, R., Carree, M., Lokshin, B., 2004. Cooperative R&D and firm performance. Res. Policy 33, 1477–1492. http://dx.doi.org/10.1016/j.respol.2004.07.003.

Bengtsson, M., Eriksson, J., Wincent, J., 2010. Co-opetition dynamics – an outline for further inquiry. Compet. Rev. An Int. Bus. J. Inc. J. Glob. Compet. 20, 194–214. http://dx.doi.org/10.1108/10595421011029893.

Bengtsson, M., Kock, S., 2014. Coopetition—Quo vadis? Past accomplishments and future challenges. Ind. Mark. Manag. 43, 180–188. http://dx.doi.org/10.1016/j.indmarman.2014.02.015.

Bengtsson, M., Kock, S., 2000. "Coopetition" in business networks—to cooperate and compete simultaneously. Ind. Mark. Manag. 29, 411–426. http://dx.doi.org/10.1016/S0019-8501(99)00067-X.

Bengtsson, M., Kock, S., Lundgren-Henriksson, E.-L., Näsholm, M.H., 2016a. Coopetition research in theory and practice: growing new theoretical, empirical, and methodological domains. Ind. Mark. Manag. 57, 4–11. http://dx.doi.org/10.1016/j.indmarman.2016.05.002.

Bengtsson, M., Raza-Ullah, T., Vanyushyn, V., 2016b. The coopetition paradox and tension: the moderating role of coopetition capability. Ind. Mark. Manag. 53, 19–30. http://dx.doi.org/10.1016/j.indmarman.2015.11.008.

Bouncken, R.B., Clauß, T., Fredrich, V., 2016. Product innovation through coopetition in alliances: singular or plural governance? Ind. Mark. Manag. 53, 77–90. http://dx.doi.org/10.1016/j.indmarman.2015.11.011.

Bouncken, R.B., Fredrich, V., 2016. Learning in coopetition: alliance orientation, network size, and firm types. J. Bus. Res. 69, 1753–1758. http://dx.doi.org/10.1016/j.jbusres.2015.10.050.
Bouncken, R.B., Fredrich, V., 2012. Coopetition: performance implications and management antecedents. Int. J. Innov. Manag. 16, 1250028. http://dx.doi.org/10.1142/S1363919612500284.
Bouncken, R.B., Fredrich, V., Ritala, P., Kraus, S., 2017. Coopetition in new product development alliances: advantages and tensions for incremental and radical innovation. Br. J. Manag. http://dx.doi.org/10.1111/1467-8551.12213.
Bouncken, R.B., Gast, J., Kraus, S., Bogers, M., 2015. Coopetition: a systematic review, synthesis, and future research directions. Rev. Manag. Sci. 9, 577–601. http://dx.doi.org/10.1007/s11846-015-0168-6.
Bouncken, R.B., Kraus, S., 2013. Innovation in knowledge-intensive industries: the double-edged sword of coopetition. J. Bus. Res. 66, 2060–2070.
Brandenburger, A.M., Nalebuff, B.J., 1996. Co-opetition. Doubleday, New York.
Chen, M.-J., 2008. Reconceptualizing the competition– cooperation relationship: a transparadox perspective. J. Manag. Inq. 17, 288–304. http://dx.doi.org/10.1177/1056492607312577.
Chiambaretto, P., Gurău, C., Le Roy, F., 2016. Coopetitive branding: definition, typology, benefits and risks. Ind. Mark. Manag. 57, 86–96. http://dx.doi.org/10.1016/j.indmarman.2016.05.009.
Corley, K.G., Gioia, D.A., 2004. Identity ambiguity and change in the wake of a corporate spin-off. Adm. Sci. Q. 49, 173–208. http://dx.doi.org/10.2307/4131471.
Czakon, W., 2010. Emerging coopetition: an empirical investigation of coopetition as inter-organizational relationship instability. In: Yami, S., Castaldo, S., Dagnino, G.B., Le Roy, F. (Eds.), Coopetition: Winning Strategies for the 21st Century. Edward Elgar, pp. 58–72.
Danneels, E., Kleinschmidt, E.J., 2001. Product innovativeness from the firm's perspective: its dimensions and their relation with project selection and performance. J. Prod. Innov. Manag. 18, 357–373. http://dx.doi.org/10.1111/1540-5885.1860357.
Das, T.K., Teng, B.-S., 2000. Instabilities of strategic alliances: an internal tensions perspective. Organ. Sci. 11, 77–101. http://dx.doi.org/10.1287/orsc.11.1.77.12570.
Dodgson, M., Mathews, J., Kastelle, T., Hu, M.-C., 2008. The evolving nature of Taiwan's national innovation system: the case of biotechnology innovation networks. Res. Policy 37, 430–445. http://dx.doi.org/10.1016/j.respol.2007.12.005.
Dowling, M.J., Roering, W.D., Carlin, B.A., Wisnieski, J., 1996. Multifaceted relationships under coopetition: description and theory. J. Manag. Inq. 5, 155–167. http://dx.doi.org/10.1177/105649269652008.
Dussauge, P., Garrette, B., 1997. Anticipating the evolutions and outcomes of strategic alliances between rival firms. Int. Stud. Manag. Organ. 27, 104–126.
Eisenhardt, K., Martin, J., 2000. Dynamic capabilities: what are they? Strateg. Manag. J. 21, 1105–1121.
Eisenhardt, K.M., 1989. Building theories from case study research. Acad. Manag. Rev. 14, 532–550.
Estrada, I., Faems, D., de Faria, P., 2016. Coopetition and product innovation performance: the role of internal knowledge sharing mechanisms and formal knowledge protection mechanisms. Ind. Mark. Manag. 53, 56–65. http://dx.doi.org/10.1016/j.indmarman.2015.11.013.
Ettlie, J.E., Bridges, W.P., O'Keefe, R.D., 1984. Organization strategy and structural differences for radical versus incremental innovation. Manag. Sci. 30, 682–695. http://dx.doi.org/10.1287/mnsc.30.6.682.
Farjoun, M., 2010. Beyond dualism: Stability and change as a duality. Acad. Manag. Rev. 35, 202–225. http://dx.doi.org/10.5465/AMR.2010.48463331.
Fernandez, A.-S., Chiambaretto, P., 2016. Managing tensions related to information in coopetition. Ind. Mark. Manag. 53, 66–76. http://dx.doi.org/10.1016/j.indmarman.2015.11.010.
Fernandez, A.-S., Le Roy, F., Gnyawali, D.R., 2014. Sources and management of tension in co-opetition case evidence from telecommunications satellites manufacturing in Europe. Ind. Mark. Manag. 43, 222–235. http://dx.doi.org/10.1016/j.indmarman.2013.11.004.
Garcia, R., Calantone, R., 2002. A critical look at technological innovation typology and innovativeness terminology: a literature review. J. Prod. Innov. Manag. 19, 110–132. http://dx.doi.org/10.1111/1540-5885.1920110.
Gibbert, M., Ruigrok, W., Wicki, B., 2008. Research notes and commentaries what passes as a rigorous case study? Strateg. Manag. J. 1465–1474. http://dx.doi.org/10.1002/smj.
Gioia, D.A., Corley, K.G., Hamilton, A.L., 2013. Seeking qualitative rigor in inductive research: notes on the Gioia methodology. Organ. Res. Methods 16, 15–31. http://dx.doi.org/10.1177/1094428112452151.
Gnyawali, D.R., He, J., Madhavan, R., 2006. Impact of co-opetition on firm competitive behavior: an empirical examination. J. Manag. 32, 507–530. http://dx.doi.org/10.1177/0149206305284550.
Gnyawali, D.R., Park, B.-J.(Robert), 2011. Co-opetition between giants: collaboration with competitors for technological innovation. Res. Policy 40, 650–663. http://dx.doi.org/10.1016/j.respol.2011.01.009.
Gnyawali, D.R., Park, B.R., 2009. A multilevel conceptual model. J. Small Bus. Manag. 47, 308–330.
Grant, R.M., Baden-fuller, C., 2004. A Knowledge Accessing Theory of Strategic Alliances.
Helfat, C.E., Peteraf, M.A., 2003. The dynamic resource-based view: capability lifecycles. Strateg. Manag. J. 24, 997–1010. http://dx.doi.org/10.1002/smj.332.
Herzog, T., 2010. Strategic Management of coopetitive relationships in CoPS – related industries. In: Yami, S., Castaldo, S., Dagnino, G.B., Le Roy, F. (Eds.), Coopetition: Winning Strategies for the 21st Century. Edward Elgar, pp. 200–216.
Inkpen, A.C., 2000. A note on the dynamics of learning alliances: competition, cooperation, and relative scope. Strateg. Manag. J. 21, 775–779.
Jorde, T.M., Teece, D.J., 1990. Innovation and cooperation: implications for competition and antitrust. J. Econ. Perspect. 4, 75–96.
Kim, J., Parkhe, A., 2009. Competing and cooperating similarity in global strategic alliances: an exploratory examination. Br. J. Manag. 20, 363–376. http://dx.doi.org/10.1111/j.1467-8551.2008.00580.x.
Knudsen, M.P., 2007. The relative importance of interfirm relationships and knowledge transfer for new product development success. J. Prod. Innovation Manag. 117–138.
Kock, A., Gemünden, H.G., Salomo, S., Schultz, C., 2011. The mixed blessings of technological innovativeness for the commercial success of new products. J. Prod. Innov. Manag. 28, 28–43. http://dx.doi.org/10.1111/j.1540-5885.2011.00859.x.
Kogut, B., Zander, U., 1992. Knowledge of the firm, combinative capabilities, and the replication of technology. Organ. Sci. 3, 383–397. http://dx.doi.org/10.1287/orsc.3.3.383.
Kotabe, M., Scott Swan, K., 1995. The role of strategic alliances in high-technology new product development. Strateg. Manag. J. 16, 621–636. http://dx.doi.org/10.1002/smj.4250160804.
Langley, A., 1999. Strategies for theorizing from process data. Acad. Manag. Rev. 24, 691–710. http://dx.doi.org/10.5465/AMR.1999.2553248.
Le Roy, F., Czakon, W., 2016. Managing coopetition: the missing link between strategy and performance. Ind. Mark. Manag. 53, 3–6. http://dx.doi.org/10.1016/j.indmarman.2015.11.005.
Le Roy, F., Fernandez, A.-S., 2015. Managing coopetitive tensions at the working-group level: the rise of the coopetitive project team. Br. J. Manag. 26, 671–688. http://dx.doi.org/10.1111/1467-8551.12095.
Le Roy, F., Robert, M., Lasch, F., 2016. Choosing the best partner for product innovation: talking to the enemy or to a friend? Int. Stud. Manag. Organ. 46.
Lincoln, Y.S., Guba, E.G., 1985. Naturalistic Inquiry. SAGE Publications.
Luo, X., Rindfleisch, A., Tse, D.K., 2007. Working with rivals: the impact of competitor alliances on financial performance. J. Mark. Res. 44, 73–83. http://dx.doi.org/10.1509/jmkr.44.1.73.
Luo, X., Slotegraaf, R.J., Pan, X., 2006. Cross-functional "coopetition": the simultaneous role of cooperation and competition within firms. J. Mark. 70, 67–80. http://dx.doi.org/10.1509/jmkg.70.2.67.
Miles, M.B., Huberman, A.M., Saldana, J., 2013. Qualitative Data Analysis: a Methods Sourcebook. SAGE Publications.
Miotti, L., Sachwald, F., 2003. Co-operative R&D: why and with whom? Res. Policy 32, 1481–1499. http://dx.doi.org/10.1016/S0048-7333(02)00159-2.

Neyens, I., Faems, D., Sels, L., 2010. The impact of continuous and discontinuous alliance strategies on startup innovation performance. Int. J. Technol. Manag. 52, 392–410.
Nieto, M.J., Santamaría, L., 2007. The importance of diverse collaborative networks for the novelty of product innovation. Technovation 27, 367–377. http://dx.doi.org/10.1016/j.technovation.2006.10.001.
Oliver, A.L., 2004. On the duality of competition and collaboration: network-based knowledge relations in the biotechnology industry. Scand. J. Manag. 20, 151–171. http://dx.doi.org/10.1016/j.scaman.2004.06.002.
Padula, G., Dagnino, G., 2007. Untangling the rise of coopetition: the intrusion of competition in a cooperative game structure. Int. Stud. Manag. Organ 37, 32–52. http://dx.doi.org/10.2753/IMO0020-8825370202.
Park, B.-J.(Robert), Srivastava, M.K., Gnyawali, D.R., 2014. Walking the tight rope of coopetition: impact of competition and cooperation intensities and balance on firm innovation performance. Ind. Mark. Manag. 43, 210–221. http://dx.doi.org/10.1016/j.indmarman.2013.11.003.
Park, S.H., Russo, M.V., 1996. When competition eclipses cooperation: an event history analysis of joint venture failure. Manag. Sci. 42, 875–890. http://dx.doi.org/10.1287/mnsc.42.6.875.
Pellegrin-Boucher, E., Le Roy, F., Gurău, C., n.d. Managing Selling Coopetition: a case study of the ERP industry. Eur. Manag. Rev. http://onlinelibrary.wiley.com/doi/10.1111/emre.12123/full (in press).
Peng, T.-J.A., Pike, S., Yang, J.C.-H., Roos, G., 2012. Is cooperation with competitors a good idea? An example in practice. Br. J. Manag. 23, 532–560. http://dx.doi.org/10.1111/j.1467-8551.2011.00781.x.
Poole, M.S., Van de Ven, A.H., 1989. Using paradox to build management and organization theories. Acad. Manag. Rev. 14, 562–578. http://dx.doi.org/10.5465/AMR.1989.4308389.
Quintana-García, C., Benavides-Velasco, C.A., 2004. Cooperation, competition, and innovative capability: a panel data of European dedicated biotechnology firms. Technovation 24, 927–938. http://dx.doi.org/10.1016/S0166-4972(03)00060-9.
Raza-Ullah, T., Bengtsson, M., Kock, S., 2014. The coopetition paradox and tension in coopetition at multiple levels. Ind. Mark. Manag. 43, 189–198. http://dx.doi.org/10.1016/j.indmarman.2013.11.001.
Ritala, P., 2012. Coopetition strategy - when is it Successful? Empirical evidence on innovation and market performance. Br. J. Manag. 23, 307–324. http://dx.doi.org/10.1111/j.1467-8551.2011.00741.x.
Ritala, P., Hurmelinna-Laukkanen, P., 2013. Incremental and radical innovation in coopetition-the role of absorptive capacity and appropriability. J. Prod. Innov. Manag. 30, 154–169. http://dx.doi.org/10.1111/j.1540-5885.2012.00956.x.
Ritala, P., Hurmelinna-Laukkanen, P., 2009. What's in it for me? Creating and appropriating value in innovation-related coopetition. Technovation 29, 819–828. http://dx.doi.org/10.1016/j.technovation.2009.07.002.
Ritala, P., Kraus, S., Bouncken, R.B., 2016. Introduction to coopetition and innovation: contemporary topics and future research opportunities. Int. J. Technol. Manag. 71, 1. http://dx.doi.org/10.1504/IJTM.2016.077985.
Ritala, P., Sainio, L.-M., 2014. Coopetition for radical innovation: technology, market and business-model perspectives. Technol. Anal. Strateg. Manag. 26, 155–169.
Ritala, P., Tidström, A., 2014. Untangling the value-creation and value-appropriation elements of coopetition strategy: a longitudinal analysis on the firm and relational levels. Scand. J. Manag. http://dx.doi.org/10.1016/j.scaman.2014.05.002.
Santamaria, Llu, Surroca, J., 2011. Matching the goals and impacts of R&D collaboration. Eur. Manag. Rev. 8, 95–109. http://dx.doi.org/10.1111/j.1740-4762.2011.01012.x.
Seran, T., Pellegrin-Boucher, E., Gurau, C., 2016. The management of coopetitive tensions within multi-unit organizations. Ind. Mark. Manag. 53, 31–41. http://dx.doi.org/10.1016/j.indmarman.2015.11.009.
Teece, D., Pisano, G., 1994. The dynamic capabilities of firms: an introduction. Ind. Corp. Chang. 3, 537–556. http://dx.doi.org/10.1093/icc/3.3.537-a.
Teece, D., Pisano, G., Schuen, A., 1997. Dynamic capabilities and strategic management. Strateg. Manag. J. 18, 509–533.
Teece, D.J., 2007. Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. Strateg. Manag. J. 1350, 1319–1350. http://dx.doi.org/10.1002/smj.
Tidström, A., 2014. Managing tensions in coopetition. Ind. Mark. Manag. 43, 261–271. http://dx.doi.org/10.1016/j.indmarman.2013.12.001.
Tomlinson, P.R., 2010. Co-operative ties and innovation: some new evidence for UK manufacturing. Res. Policy 39, 762–775.
Un, C.A., Cuervo-Cazurra, A., Asakawa, K., 2010. R&D collaborations and product innovation. J. Prod. Innov. Manag 27, 673–689. http://dx.doi.org/10.1111/j.1540-5885.2010.00744.x.
Yami, S., Nemeh, A., 2014. Organizing coopetition for innovation: the case of wireless telecommunication sector in Europe. Ind. Mark. Manag. 43, 250–260. http://dx.doi.org/10.1016/j.indmarman.2013.11.006.
Yin, R.K., 2013. Case Study Research: Design and Methods. SAGE Publications.

Please cite this article in press as: Fernandez, A.-S., et al., Implementing the right project structure to achieve coopetitive innovation projects, Long Range Planning (2017), http://dx.doi.org/10.1016/j.lrp.2017.07.009