Relations coopétitives durant la naissance d'un écosystème : une évaluation de l'impact des conflits sur l'architecture relationnelle

Magali MALHERBE

Université de Caen Normandie

magali.malherbe@unicaen.fr

Résumé :

Ce papier envisage la dynamique de trois types de coopétition (horizontale, verticale et diagonale) durant l'émergence d'un écosystème d'affaires qui n'est pas centré sur la plateforme d'un leader. En nous appuyant à la fois sur les travaux traitant de la coopétition et des écosystèmes d'affaires, nous avons déterminé un cadre conceptuel qui s'articule autour de trois types de conflits inter-organisationnels : les conflits de rôle, les conflits liés à la répartition de la valeur et les conflits liés au contrôle de ressources. Nous avons réalisé une analyse processuelle s'appuyant sur une étude de cas unique documentée avec différentes sources de données : des entretiens, de l'observation directe et des documents. Nous analysons la naissance des services mobiles sans contact. Ils sont à l'origine de l'émergence d'un nouvel écosystème issu de la convergence de plusieurs industries : téléphonie mobile, paiement, transport et autres industries de services, Internet. L'étude de l'émergence des services mobiles sans contact a permis d'appréhender l'impact des différents types de coopétition sur ce processus d'émergence et sur l'architecture relationnelle de l'écosystème naissant, c'est-à-dire les interdépendances entre acteurs et leurs rôles spécifiques. Dans cette dynamique la résolution des conflits de rôle détermine l'existence et les chances de succès de l'écosystème naissant dans la mesure où ces conflits peuvent fortement limiter les avantages recherchés dans une situation de coopétition. Enfin, nous avons identifié différents mécanismes qui permettent de renforcer ou de modifier l'architecture relationnelle.

Mots-clés : approche processuelle, coopétition, étude de cas, écosystème d'affaires, NFC

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INTRODUCTION

Coopetition (the simultaneous pursuit of collaboration and competition) has gained increasing scholarly attention during the past decade. Despite this growing interest, however, the coopetition literature requires further investigation to develop a more robust conceptualization. Thus, some authors suggest under-explored dimensions that should be addressed (e.g., Bengtsson et al., 2010; Bengtsson & Kock, 2014; Golnam, Ritala, & Wegmann, 2014; Rusko, 2012).

Previous studies have identified characteristics that determine the benefits of coopetition. Some of these studies have investigated the outcomes of coopetition in different sectors and have claimed that coopetition is particularly beneficial in high-technology sectors (e.g., Dittrich & Duysters, 2007; Gnyawali & Park, 2009; Mione, 2009), whereas others have focused on contingency factors that affect coopetition. For example, Ritala (2012) identifies three distinct contingencies that determine the success or failure of coopetition: market uncertainty, network externalities and competition intensity. Bengtsson et al. (2010) argue that moderate cooperation and competition are preferable and more dynamic for long-term competitiveness and innovation. Studies also generally distinguish between two types of coopetition: coopetition can occur vertically between buyers and sellers (complementary products) or horizontally between competitors (substitutive products) (Bengtsson et al., 2000). Based on the work of Michael (2007), Rusko (2012) proposes a third type: diagonal coopetition. Diagonal relations widen the market base as networks emerge and grow by building on an existing base of complementarities to generate new outputs (Michael, 2007). Diagonal relations provide opportunities for firms belonging to different industries to cooperate and to produce symbiotic relations to expand existing resource bases. Thus, diagonal coopetition refers to cooperation between firms that produce different products in different supply chains, which means that this type of coopetition occurs between different industries and interest blocks (Rusko, 2012). However, few studies consider the interplay between these different types and their influence on coopetition outcomes. Thus, we attempt

to investigate this latter issue. The shift of research on inter-firm relationships towards the ecosystem level of analysis, which remains unexplored in coopetition studies (Golnam et al., 2014), invites us to develop a better understanding of the complex and cross relationships that firms must manage. Because creating a new market is among the most obvious motives for coopetition (Ritala, 2012), a focus on business ecosystem (BE) emergence seems relevant. More studies are needed to understand how coopetition at one level of analysis affects other levels (Bengtsson & Kock, 2014). By applying a multilevel perspective on coopetition, researchers can appreciate tensions at each level and the influence of coopetition at one level on coopetition at another level. Even if coopetition takes place between two firms (i.e., in a dyadic relation), it impacts other firms and the entire industry (Gnyawali & Park, 2011). Rusko (2012) adds that analysing the direction of coopetition activities is an interesting theme for further research, especially with reference to the question of "whether the coopetition is mainly based on vertical, horizontal or diagonal interactions between firms" (68). To fill this gap, this paper focuses on the following question: (a) which type of coopetition is more critical in the process of business ecosystem emergence?

Our first question also suggests a consideration of coopetition as a dynamic phenomenon. Again, Bengtsson and Kock (2014) note that the dynamics of coopetition interactions remain under-evaluated and that researchers need to "understand patterns of events, activities, and choices that change a relationship, and mechanisms driving these processes" (184). They add that few studies analyse the mechanisms that initiate change in a relationship (e.g., Dahl, 2014) and call for the identification of additional mechanisms. Thus, this paper aims to address this second gap through a complementary question: (b) which mechanisms sustain or change the coopetitive architecture during the emergence of a business ecosystem?

Although three types of coopetition have been characterized, we know little about how they interact and impact the process of BE emergence. Research evidence is needed to better understand how each type prevails during the process and how actors manage coopetition to develop simultaneous coopetitive relationships. In this attempt, we conduct an exemplary case study of coopetition interactions during BE emergence. The case refers to the development of mobile contactless services. For more than a decade, these services have struggled because they imply the convergence of distinct global industries, which is quite difficult to achieve without agreements between historically dominant firms in their respective domains (Ozcan & Santos, 2015). At the beginning of the process, mobile contactless services should be developed at a global level to ensure interoperability between actors and especially between

national systems. However, as the ecosystem emergence slows, substantial variations occur at the local level, reflecting mechanisms that change the coopetitive relationships. Whereas most studies focus on hub-based ecosystems in which a single firm determines the rules of value creation and capture (Baron and Nambisan, 2013), we believe that our case is particularly relevant to address our research questions. Indeed, the development of mobile contactless services has gathered dominant firms, so this BE does not emerge around a single leading firm and provides numerous opportunities to analyse tensions between actors and their evolutions. Our case study examines three levels: organizations, industries, and business ecosystems.

Our findings contribute to both the coopetition literature and the BE approach. First, we provide insights on the evolution of coopetition and its impact on the emergence of a non-hub-based BE. We suggest that this emergence begins with horizontal coopetition and then is driven by vertical coopetition, followed by diagonal coopetition as membership expands. Second, we suggest that role conflicts and their resolution are the major challenge to be overcome. They do not substantially affect the process of emergence and may mitigate it. Third, we propose mechanisms that sustain or change the coopetitive architecture and confirm the critical role of knowledge management in coopetition.

1. THEORETICAL BACKGROUND

1.1. HOW TO CONSIDER COOPETITION IN A BE.

Although researchers do not agree on what coopetition is (Walley, 2007), Bengtsson and Kock (2014) have refined their original conception to assess the recent evolution of firms' business conditions. According to these authors, "coopetition is a paradoxical relationship between two or more actors simultaneously involved in cooperative and competitive interactions, regardless of whether their relationship is horizontal or vertical" (182). This definition suggests two main characteristics that seem particularly relevant to understand coopetition at the ecosystem level. First, it assumes that firms are engaged in multifaceted relations. However, according to Rusko (2012), actors can simultaneously interact through horizontal, vertical, and diagonal relationships. Thus, in our work, we follow the assumption made by Rusko (2012) and consider the simultaneity of three types of coopetition. From a dynamic viewpoint, actors do not necessarily manage the three types of coopetition at the same points in time. With regard to a more basic definition of coopetition (cooperation between competing firms), Rusko (2012) suggests that "the coopetition strategy starts more

likely between competing firms, that is to say, between firms which are horizontally related with each other, than between vertically or diagonally related firms" (2012: 69).

The definition proposed by Bengtsson and Kock (2014) also suggests that actors are engaged not only in dyadic relations but also in multiple coopetition according to the numerous relationships they develop with each other. Dyadic coopetition concerns two actors, whereas multiple coopetition integrates more than two actors. Multiple coopetition favours the realization of radical innovation across an entire industry, whereas dyadic coopetition is more suitable to improve incrementally or to demonstrate the feasibility of a technology (Yami & Nemeh, 2014).

1.2. DIFFERENT SOURCES OF CONFLICTS IN A BE.

By nature, coopetition is a conflictual situation. First, actors face the traditional dilemma between value creation and appropriation (Brandenburger & Nalebuff, 1996; Gnyawali et al., 2012). Actors need to cooperate to produce value conjointly, although they compete to capture most of the value created. Thus, value creation is realized at the global level of the BE, whereas value appropriation stems from the individual firm level, where companies develop their own competitive advantage (Ritala & Hurmelinna-Laukkanen, 2009; Ritala et al., 2013). In the common process approach of coopetition, this dilemma takes place between activities rather than actors (Bengtsson & Kock, 1999). For example, actors cooperate in R&D activities and simultaneously compete in commercial activities. The value created by a BE depends primarily on the ability of its members to develop complementarities (Iansiti and Levien, 2004; Adner and Kapoor, 2010; Adner, 2012). These complementarities generate network effects such that the more complementary innovations that are made, the more valuable the core offer is for actors and the more incentives they have to join the BE. Thus, the value logic constitutes a strong lens that permits an analysis of the mechanisms at work inside a BE (Thomas and Autio, 2012). Finally, the issues of value creation and value capture activities can help to distinguish the roles played by the members of a BE (Iansiti and Levien, 2004).

Another source of conflict in coopetitive relationships is related to a firm's position in the network (Gnyawali & Madhavan, 2001; Bengtsson & Kock, 2014). Actors expect to play a specific role in the coopetitive landscape, although the rules of interaction are set by the entire network. Thus, there is a tension between the individual goals of the organization and the global goal of the cooperation (Bengtsson & Kock, 2000, 2003). The management of this

tension is not restricted to the firm's own objectives because it is also necessary to address all of the discrepant strategies and goals of each partner (Fernandez et al., 2014). The mutual dependencies between actors and their specified roles refer to a specific architecture: the nested structures of co-specialized actors and assets with a determined division of labour (Jacobides et al., 2006). No single architecture exists to organize the relations that lead to different ways to define potential roles and interactions. In a BE, two main roles are distinguished: leader and follower (Adner, 2012). The BE is set by one or a few leaders who determine the global goal of the BE and shape its trajectory of innovation (Gawer & Cusumano, 2014). This collective goal is generally related to the individual strategies of the leader(s). However, the health of the entire system relies on the acceptance of this collective goal by the followers (Iansiti & Levien, 2004; Adner, 2012), who represent the mass of the BE as they sustain a proper level of innovation by developing complementarities. However, the relational architecture of a BE (i.e., the roles played by actors) is not deterministic. Although the leaders define some rules of interaction, the followers can influence or even modify them. Their acceptance of the global goal and their ability to nurture it determine the existence of the BE; thus, leaders should adapt their behaviour (Adner, 2012). When followers identify new opportunities for the BE's value proposition, they may reconfigure the established relations and define new rules of the game (Zahra and Nambisan, 2011).

Other conflicts in coopetitive relationships are related to knowledge and, more generally, to resource management. The potential access to resources stimulates inter-organizational coopetition (Bengtsson et al., 2013), adding value to each organization and sustaining the cooperative relationship between competitors (Carayannis, 1999). To collaborate, actors need to exchange resources. They face the risk of transferring strategic and even confidential information. Protecting one's resources is particularly important as these resources constitute a source of power (Salancik & Pfeffer, 1978) that can be used to influence the emergence of BE. Thus, actors need to balance pooling resources and protecting core competencies (Gnyawali & Park, 2009). This balance should be a positive-sum game: an equal sharing and acquisition of resources to avoid negative interpretation of their behaviour (Ritala & Hurmelinna-Laukkanen, 2009). If this situation becomes opportunistic, it may hamper collaboration (Hamel, 1991). In addition, sharing information plays a critical role in the development of a common vision during the emergence phase (Santos & Eisenhardt, 2009). Actors can use their existing knowledge "to shape perceptions, cognitions and preferences so that individuals accept the status quo because they cannot imagine any alternative" (Hardy,

1996: 8). Moreover, introducing new knowledge from other fields can generate new opportunities for development (Hargadon and Sutton, 1997) that may lead to a global change of the BE's goal. Finally, the knowledge accumulated through experiential learning from both internal and external interactions impact coopetitive relationships (Dahl, 2014). Thus, knowledge and resource management appear to produce strong effects in both sustaining and modifying coopetitive relationships.

2. MEHODOLOGY

Following the recommendations made by Bengtsson et al. (2010) to understand coopetition challenges, we conducted a qualitative case study. Qualitative designs favour the study of change through a process approach (Van de Ven & Poole, 2005).

2.1. RESEARCH DESIGN AND CASE SELECTION

We designed this research as an exploratory case study to provide insights about the impact of multifaceted coopetition on the process of BE emergence. In the early 2000s, the development of mobile contactless services was a great challenge for many actors who envisioned huge revenues as both the mobile phone industry and contactless payment were expected to grow rapidly. Mobile contactless services refer to services performed with a mobile phone that communicates with another device at a limited distance. Based on plastic smart cards, these services are already offered widely for access control, fare collection in transportation, and payment. The beginning of this BE can be traced to 2002, when two semiconductor companies decided to co-develop a technological standard for contactless services. From that point, they progressively involved actors from the mobile phone industry and from complementary industries. However, the system became rapidly complex with many conflicting interests between actors. Consequently, the growth forecasts were revised downwards year after year. When we completed our investigation in 2014, mobile contactless services were still scarce. However, their commercialization was (finally) initiated. Thus, we situate the end of the emergence of mobile contactless services in 2014 because the necessary infrastructure was deployed (e.g., SIM cards, mobile phones, terminals) and the first services were commercially rolled out. We believe that this exemplary case is particularly appropriate to address our research questions for several reasons. First, mobile contactless services are developed by numerous actors that differ in their size, their market segment, and their type (e.g., firms, standard committees, trade associations, research labs, states). More than a

hundred of them participate in the standardization of the required technologies. Moreover, this heterogeneity led to some conflicts that differ in both their motives and their level of relations (horizontal, vertical, and diagonal). These conflicts are particularly striking as the emergent BE integrated several prominent actors in their respective sectors. Thus, these features allow us to analyse a wide range of relationships and their interrelatedness. Finally, as the process occurred over a long period (12 years), it involves many events, activities, and choices that drive the emergence of the BE, facilitating the identification of reproduced mechanisms.

2.2. DATA SOURCES AND ANALYSIS

Process research relies on several sources of data, such as direct observation, archival data, or interviews (Van de Van & Poole, 2005). We combined these different sources to facilitate cross-checks. First, we conducted 35 semi-structured interviews complemented by 13 additional interviews conducted by another researcher. The interviews were completed in real time, but because the process studied was very long, our interviews covered only the period between 2008 and 2014. However, because Van de Ven and Poole (2000) suggest studying the process in real time as early as possible, we restricted the bias related to an ex-post rationalization by considering previous information since 2008. Then, we signed two research contracts in the context of collaborative projects (two and a half years for the first contract and six months for the second). Finally, we gathered more than 500 articles published in peer-reviewed journals (e.g., Card Technology Today, Technology in Society) and specialized ICT press (e.g., Card Technology Magazine, Total Telecom, Card&Payment), which were completed with press releases from the different actors. All documents were summarized to establish a chronology of events and decisions.

We encoded our data to produce a narrative history that helped to illuminate the details of the process (Van de Ven & Poole, 2005). A narrative should sequence a process in time with both a clear beginning and an end, tie the events together through the actors' actions, and provide additional indicators of context (Pentland, 1999). Our aim was twofold. First, we characterized the relationships between BE members to identify changes in these relationships and to sequence the process of BE emergence. Then, we identified events that support change or persistence and their authors to determine the most critical type of coopetition in each sequence (i.e., the type of coopetition that initiates a global change in the BE relational architecture or sustains an established one). Thus, our analysis stems from the identification of the different sources of conflict between actors. Previous research has identified different

types of conflict in inter-individual relationships (e.g., Mele, 2011), but at the inter-organizational level, the existing literature does not provide clear classifications. To avoid a strict reification of the type of conflicts from the individual to the inter-organizational level, we produced a content analysis using an abductive design. With regard to our literature review and the empirical material, descriptive codes were progressively refined. Finally, we defined three abstract codes related to the determination of three types of conflicts in inter-organizational relationships: role conflicts, value-related conflicts, and resource conflicts (Table 1).

Table 1: Type of conflicts in inter-organizational relationships

Type of conflicts	Definition	Related literature
Role conflict	Actors struggle to determine the collective goal of the BE or to modify it with respect to their own individual goals.	Bengtsson & Kock, 2000, 2003 Iansiti & Levien, 2004 Adner, 2012
Value-related conflict	Struggles between actors to perform certain activities along the value chain and to capture their related value.	Gnyawali et al., 2012 Adner & Kapoor, 2010
Resource conflict	Tensions related to the balance between resource sharing and resource protecting.	Gnyawali & Park, 2009 Ritala & Hurmelinna-Laukkanen, 2009

The three types of conflicts are more or less interrelated. Thus, in our analysis, we focus on the most intense conflict to characterize the relationships at a specific point of time and to provide content that supports our processual approach. The creation, the removal, or the modification of conflicts indicate the evolution of the relationships and allowed us to distinguish three sequences in the process of the emergence of the BE. Finally, the mechanisms that impact the coopetitive architecture were analysed through emergent codes. We defined “general” mechanisms that were coupled with concepts from previous research.

In addition, to facilitate the comprehension of the studied phenomena, we produced visual mappings (Langley, 1999) based on hierarchical nested systems (Golnam et al., 2014). This modelling framework consisted of dividing global systems into sub-systems and then capturing relationships between the different entities. Our framework distinguished three hierarchical systems: Industries, Market Segments, and Organizations. The different systems are linked together through two types of relationships reflecting the paradoxical nature of coopetition: cooperation and conflict.

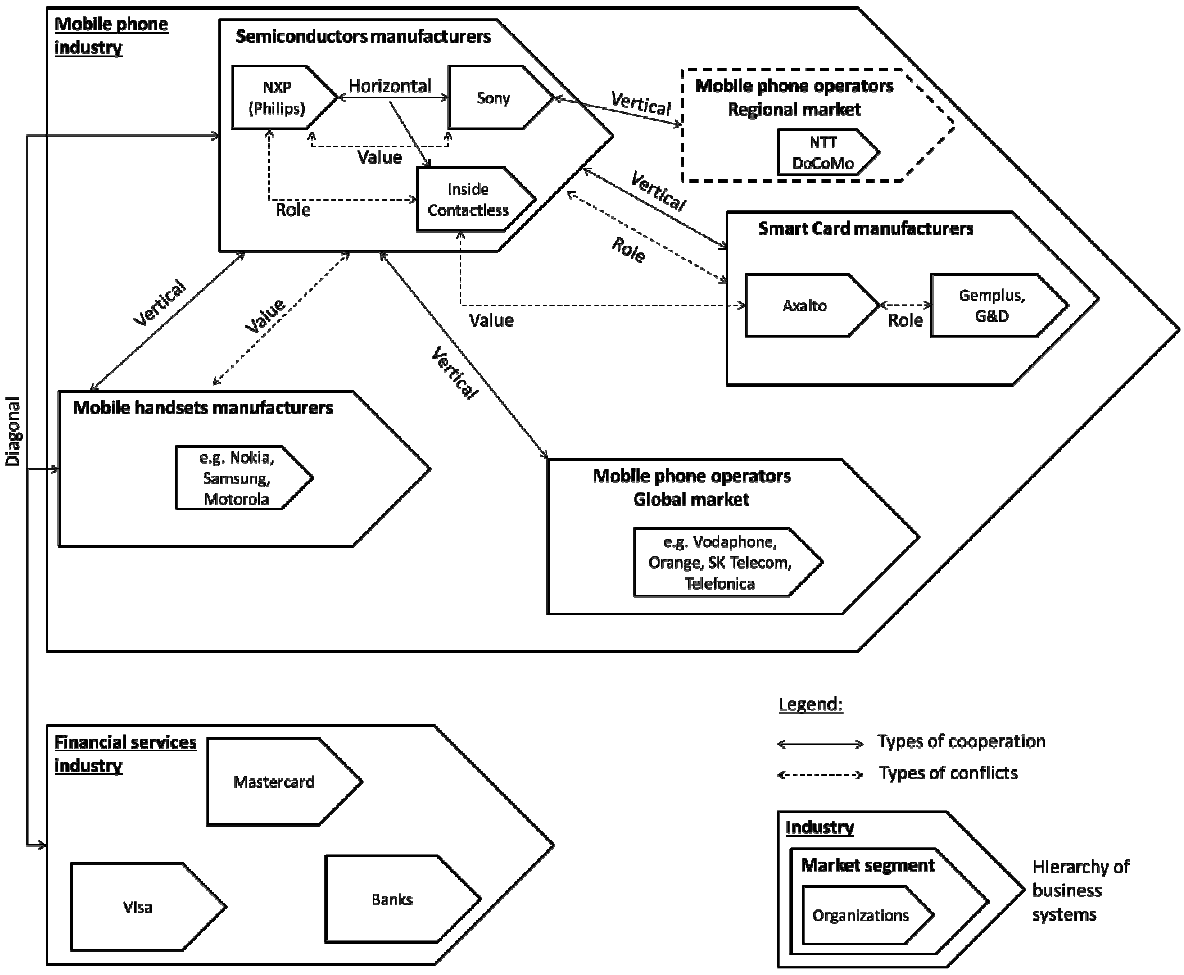
3. CASE STUDY

The emergence of the mobile contactless service BE can be divided into three sequences. The first stage, from 2002 to 2006, was mainly related to the standardization of competing technological solutions used to perform the services. The second stage began in 2006 and ended in 2010. Regardless of whether the technological prerequisites were voluntarily agreed upon, the members of the BE attempted to define a primitive offer and the underlying value chain around two mass services: payment and transportation. At the end of this stage, several conflicts persisted. To overcome these difficulties, the actors attempted to develop new services (i.e., complementarities) between 2010 and 2014. Although the development of services reflected a local dimension, new technological solutions appeared at the global level.

3.1. THE STANDARD DEFINITION.

The final relationships during the first stage are represented in the figure below.

Figure 1: The coopetitive architecture at the end of the first stage



3.1.1. The birth of new coopetitive relationships

The emergence of the mobile contactless service BE began in the early 21st century. Although contactless services using cards were increasingly implemented, two giant semiconductor manufacturers decided to co-develop a new global standard, Near Field Communication (NFC), to perform contactless services. These two giants, Philips (now NXP) and Sony, were already delivering chips with their own proprietary contactless technologies, and they wanted the new standard to be compliant with their existing ones. Horizontal coopetition took place between them. They cooperated for technology development and competed for market share. Philips was already a major supplier of contactless smart cards to several mass transit systems (e.g., the Oyster Card for public transport in London), whereas Sony focused on the regional market in Japan. In 2000, Philips held a market share of approximatively 89% compared with 9% for Sony in the field of contactless smart cards (Paret et al., 2012).

To promote the NFC technology in the mobile phone industry, Philips and Sony needed to involve other players in the development. First, they turned to some historical clients: mobile handset manufacturers and smart card manufacturers[1]. They also approached the clients of these historical clients, including mobile phone operators and financial service players.

> *"As we have initiated the technology, we must work with nearly the whole chain. […] Instead of simply addressing mobile phone manufacturers, we have sought their clients, the operators: Vodafone, Orange…"* (Manager – NXP)

Although the new members of the BE tried to cooperate vertically, two major conflicts occurred. The first conflict was related to the way the NFC component should be connected to the SIM card. A SIM card is divided into eight segments, and in early 2000, three of them were not used. Semiconductor companies believed that they could use two segments for this junction. This solution was supported by most smart card manufacturers, such as Gemplus and Giesecke Devrient (G&D). However, one of them, Axalto, had other plans for the unused segments. Axalto wanted to use two segments to propose an enhanced SIM card to mobile phone operators to boost their sales, and the firm wanted to use only one segment for NFC functionalities. Beginning in 2003, the company filed patents for this solution, which would become the SWP protocol in 2007. The second conflict was related to the storage of the

[1] In early 2000s, smart card manufacturers produced plastic cards for banking, transportation or identity as well as SIM cards for mobile phones. The market was highly concentrated and faced an important expansion in the field of mobile phones. Axalto and Gemplus were the two leading companies in the SIM card market with 24.2% and 21.8% of the worldwide market share, respectively, in 2004.

applications. Semiconductors and mobile handset manufacturers wanted to store the applications in the device, whereas smart card manufacturers agreed to give an important role to the SIM card. The two role conflicts between semiconductor and smart card manufacturers were striking when Philips and Sony co-founded the NFC Forum with Nokia in March 2004. At that time, the Forum, which "was formed to advance the use of Near Field Communication technology by developing specifications, ensuring interoperability among devices and services, and educating the market about NFC technology"[2], integrated mainly electronic device manufacturers (e.g., Sony Ericsson, Hewlett Packard, Samsung, Microsoft), whereas actors from the smart card market were primarily absent.

During that first stage of standard definition, the relationships between the semiconductor manufacturers and the mobile phone operators were mainly cooperative. In 2004, the first trials were rolled out (the United States and Germany in 2004 and France in 2005). They cooperated to test use cases such as payment, transportation, and end user acceptance. Through these trials, Philips and Sony sought to "educate" mobile phone operators and, more generally, the first members involved in the BE: financial institutions, mobile phone operators, and device manufacturers.

> *"During four – five years, as the technology inventor, we did a lot of work to educate the market, to explain what it would be and add, why we should produce mobile phones, why to develop services."* (Senior manager - NXP)

The need for standards for smart card applications had been set by the financial services industry, which cast the first stone in the 1990s with the EMV standard[3]. The industry was already thinking about using contactless credit cards for payment, and mobile phone usage provided continuity. In 2004, Visa and MasterCard saw enormous potential in NFC to expand contactless payment and entered the NFC Forum just a year after its constitution. They quickly tested mobile payments using a chip embedded in the handset to store their applications (i.e., the solution favoured by semiconductor and mobile handset manufacturers). However, they were cautious about allowing mobile phone operators to host their applications in the SIM card. "Since the SIM is owned by the operator, banks would have to rent space on the card. This means the operators would play host to the bank's secret keys, even if the

[2] http://nfc-forum.org/about-us/the-nfc-forum/.
[3] The Europay MasterCard Visa (EMV) standard is an international security standard for smart card payment created in 1995.

operators don't directly control them. That is a hard idea for banks to swallow" (Guido Mangiagalli, head of new channels development, Visa Europe)[4].

When the NFC Forum was created, Sony maintained its position in Japan's domestic market by founding the FeliCa Networks in January 2004. The joint venture included local companies providing mobile contactless services (shares: Sony, 57%; NTT DoCoMo, 38%; East Japan Railway Company, 5%). The Japanese market was very specific because it was governed by two leading companies: Sony, a semiconductor manufacturer, and NTT DoCoMo, the largest mobile phone operator in Japan, which also became a credit card company in 2005. Moreover, SIM cards were uncommon in Japan, and mobile phone operators controlled the features of their customers' handsets. Thus, the system ran without intermediaries.

3.1.2. New relationships scratched

As mobile phone operators accumulated knowledge about the emerging BE, they understood that they could hold a central position in the BE because they owned the SIM cards. However, they could also be completely bypassed by handset makers and financial institutions if the applications were stored in the handset. Thus, in early 2006, the GSMA, which represented the interests of mobile operators worldwide, rolled out a one-year project that aimed to develop a common vision of mobile contactless services and to facilitate standardization. The role conflicts between smart card manufacturers faded when Axalto and Gemplus merged in 2006 and created Gemalto. A third semiconductor manufacturer, Inside Contactless[5], also joined Gemalto in 2006 to co-develop the SWP protocol. The common goal of the BE set by NXP and Sony became increasingly challenged.

Finally, during the first stage of standard definition, Philips and Sony stimulated the BE's emergence. They both controlled specific prior knowledge and important market shares, which led them to define and impose a global goal for the emerging BE while protecting their own existing markets from each other. As they experienced this technology with other actors, the latter accumulated knowledge. Moreover, role conflicts with smart card manufacturers led to the definition of several technological solutions for the storage of data. Thus, mobile phone

[4] Quoted by Balaban D. (2005.01), The Future of the Contactless SIM, *Card Technology*
[5] Inside Contactless was also one of the first members of the NFC Forum.

operators, who were increasingly knowledgeable and who owned a specific resource (the SIM card), were able to initiate change in coopetitive relationships.

The different mechanisms to sustain or change the coopetitive architecture of the BE are summarized in Table 2.

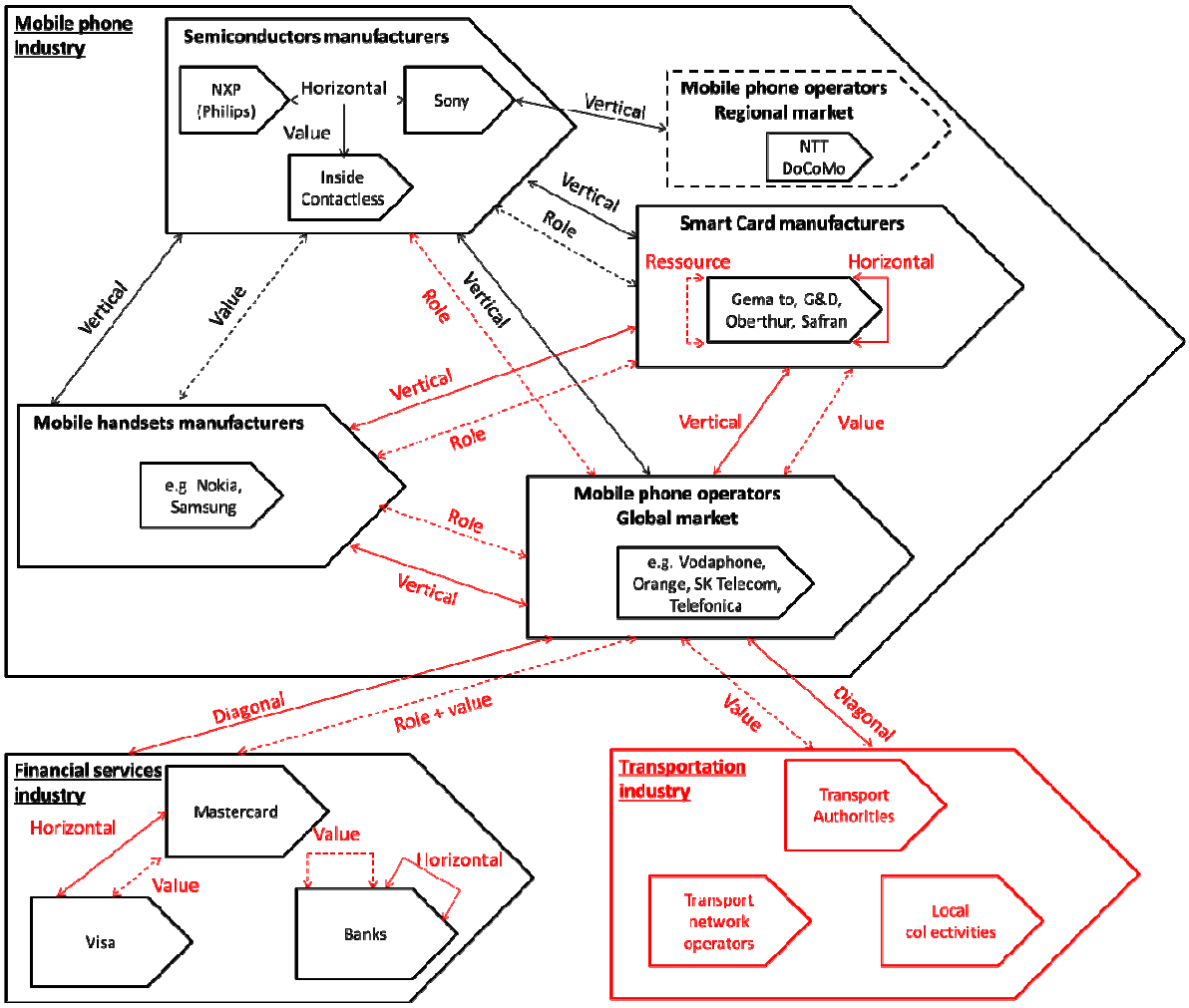
Table 2: Mechanisms impacting the coopetitive architecture during the stage of standard definition

	Sustaining coopetitive architecture		**Changing coopetitive architecture**	
	Mechanisms	**Empirical evidence**	**Mechanisms**	**Empirical evidence**
Horizontal coopetition	Resource control and knowledge retention	Philips and Sony maintained their existent market share in the field of contactless transactions by protecting their knowledge over customers' preferences and locally pushing their proprietary standard	Non-observed	
Vertical coopetition	Knowledge diffusion across the BE (educating new entrants) Grouping around the same collective goal	Philips and Sony created the NFC Forum with device manufacturers to diffuse the preferences they set to perform mobile contactless services. Moreover, they initiated trials	Accumulating knowledge Controlling a strategic point of the value chain Grouping around the same competing collective goal	During the first stage, the mobile phone operators accumulated knowledge of the goal set by Philips and Sony and the competing goal proposed by the smart card manufacturers. In addition, because they owned the SIM card, they had direct access to the end users. Thus, they were able to push the competing collective goal that initiated change in the competitive relational architecture.
Diagonal coopetition	Grouping around the same collective goal	Because the financial institutions feared that the mobile phone operators had access to their services, they used the solution proposed by Philips, Sony and the mobile phone manufacturers to try mobile banking.	Non-observed	

3.2. THE CONSTRUCTION OF AN INITIAL OFFER (2006-2010)

The final relationships during the second stage are represented in the figure below.

Figure 2: The coopetitive architecture at the end of the second stage



3.2.1. A new era of vertical and diagonal coopetition

The new era of relationships that was initiated in 2006 was officially established in early 2007 by the mobile phone operators through the GSMA. At the end of the one-year project, they published documents supporting the use of the SIM card to store NFC applications (i.e., the SWP protocol).

> *"The mobile phone with a hardware-based secure identity token [the SIM card] can provide the ideal environment for NFC applications. […] The purpose of this document is to share the MNO [the mobile phone operators] view on the mobile NFC market opportunities."* (GSMA, Mobile NFC services, 2007.02)

After the mobile phone operators pushed their preferred technological solution, they generated vertical coopetition with both semiconductor manufacturers and smart card manufacturers. They joined these groups to promote SIM based-mobile contactless services and widely diffused the new common goal of the BE through standardization bodies, trade associations, conferences, trials, and work groups. The choice of the technological solution proposed by smart card manufacturers generated value-related conflict with them. Beyond their agreement, several positions in the value chain could be addressed by different actors. Thus, they competed to perform related activities to capture the most value, and their cooperation weakened. In addition, their choice was not the one expected by the semiconductor manufacturers, which generated role conflicts between them. In the previous phase, semiconductor manufacturers were the leaders because they shaped the emergence process. However, they were now constrained to relying on mobile phone operators' decisions.

> *"Sometimes you remain the leader and set the rules, which we thought we were until we take a reverse around 2006 on the SWP. […] Actors in the value chain do not intend to be taught by NXP what to do."* (Senior manager – NXP)

At the forefront of this new leading position, mobile phone operators faced two problems that slowed the emergence and initiated new coopetition with two actors. First, they developed role conflicts with mobile phone manufacturers who also disagreed with the promoted technological solution. Like the semiconductor manufacturers, these actors were now less able to occupy a leading position in the BE. However, they could block mobile phone operators; without devices, the latter could not launch services.

> *"Mobile phone operators and mobile phone manufacturers had tensions about the SIM card. Nokia did not want the SIM to be a secured element and wanted to launch their devices with their own safeguards."* (Senior manager-NXP)

Beyond being constrained to follow mobile phone operators, NXP and Sony needed to support them to address the problem and to facilitate the adoption of the new offer. Indeed, their historical partnership with mobile phone manufacturers increased their ability to convince them to produce the desired mobile phone. Thus, in mid-2007, NXP set up a joint venture named Moversa with Sony to produce chips for contactless mobile phones. "Mobile phone operators and handset manufacturers pushed for the joint venture. The biggest benefit

was for mobile phone manufacturers such as Nokia, Motorola, and Samsung who did not want to make one handset model for the UK (and another for Hong Kong)" (Ted Osamura, general manager, FeliCa business division, Sony)[6]. In addition, the influence of semiconductor manufacturers on mobile phone manufacturers was supported because the latter wanted to consolidate their existing relationships.

Furthermore, mobile phone operators engaged in diagonal coopetition with the financial services industry. They maintained that their solution provided the highest level of security in the transaction, which is a feature that is particularly important for financial services. Although the financial services did not deny this fact, they were a bit afraid.

> *"There was lobbying between telecom operators and companies, which were designing the SIM element, so that applications were embedded into the SIM. However, actors who were designing bank applications, such as Visa and MasterCard, feared that telecom operators would take a percentage of each transaction. So, we needed to find an agreement."* (Engineer-NXP)

Mobile phone operators had to soften the collective goal they had defined. They would initially charge a fee per transaction, but they were required to seek monthly or annual fees for services. "It had to bring together two huge and separate groups: mobile operators and financial services" (Jonathan Collins, ABI senior analyst)[7].

Beyond the lens of the mobile phone operators, coopetition became increasingly multifaceted across the whole BE. When mobile phone operators selected the technological solution proposed by smart card manufacturers to store applications, a struggle was initiated between the smart card manufacturers and mobile device manufacturers. In 2007, the struggle was reinforced as the storage of the user interface still raised opposition between handsets and SIM cards. Moreover, the two solutions (handsets and SIM cards) raised questions about complementary technological standards. On the one hand, the handset solution was backed by Java technology, which is relatively open, already running, and well known by developers. On the other hand, the smart card manufacturers needed to develop a new technology for SIM cards to encourage them to evolve from simple user authentication to a service platform. Thus, the situation was quite paradoxical: the primary technological option that seemed to be the most accurate (the SIM card) relied on a secondary technology that was in its infancy.

[6] Quoted by Balaban D. (2007.04), Sony Seeks To Break Out Of Japan With FeliCa, *Card Technology*
[7] Quoted by Morris A. (2007.07), Near field communications: Near and far, *Total Telecom Magazine.*

In sum, two opposing "camps" faced each other, gathering different vertical and diagonal coopetitors. The first camp supported handset solutions (semiconductors, mobile handset, financial services industry), whereas the second camp preferred SIM card solutions (smart card manufacturers, mobile phone operators). To facilitate the commercial reality of mobile contactless services, the semiconductor manufacturers were obliged to soften their position and to support SIM card solutions.

3.2.2. The development of horizontal coopetition.

We have observed three different types of horizontal coopetition. First, horizontal coopetition between NXP and Sony was still in place. However, contrary to the previous period when Sony was protecting its local Japan market, the cooperation deepened. For the first time, Sony broke its lock on the Japanese contactless market. Another reason for the venture between NXP and Sony was to open their respective markets to each other: "We exchanged keys. The key to Europe—we got it. NXP got the key to the Asia market" (Ted Osamura, general manager, FeliCa business division, Sony)[8].

The conflicts between smart card manufacturers increased. This highly concentrated market was well positioned to perform mobile contactless services after the GSMA's decision. On the one hand, they cooperated to push the SIM solution. In 2008, the SIMalliance association created the NFC working group: "With representation from all major SIM card manufacturers, the Group aims to be the catalyst to strengthen the central role of the SIM in the NFC ecosystem" (SIMalliance, press release). On the other hand, they competed fiercely to gain a technological lead in the complementary technologies. Gemalto, which had developed the SWP protocol, also took advantage of the complementary technologies and wanted to protect them, refusing to exchange knowledge during projects. Moreover, in early 2009, Gemato maintained its leading position in the smart card market by commercializing a solution (NFC chip and SIM cards) with Inside Contactless following the recommendation of the GSMA. Thus, the conflicts mainly concerned resource sharing.

Internally, the financial services industry did not escape the complex coopetitive relationships of the BE. On the one hand, financial institutions (primarily Visa and MasterCard) competed to maintain their positions; on the other hand, banks wanted to enhance their market shares by developing a competitive advantage around the development of NFC-based services. "Visa isn't likely to offer a prominent place in its user interface menus for a MasterCard-branded

[8] Quoted by Balaban D. (2007.04), Sony Seeks To Break Out Of Japan With FeliCa, *Card Technology*.

payment service, and banks may want premier placement for their logos above that of the payment brands" (Balaban, Card Technology, 2007).

The different mechanisms that maintained or changed the coopetitive architecture during the construction of the initial offer are summarized in Table 3.

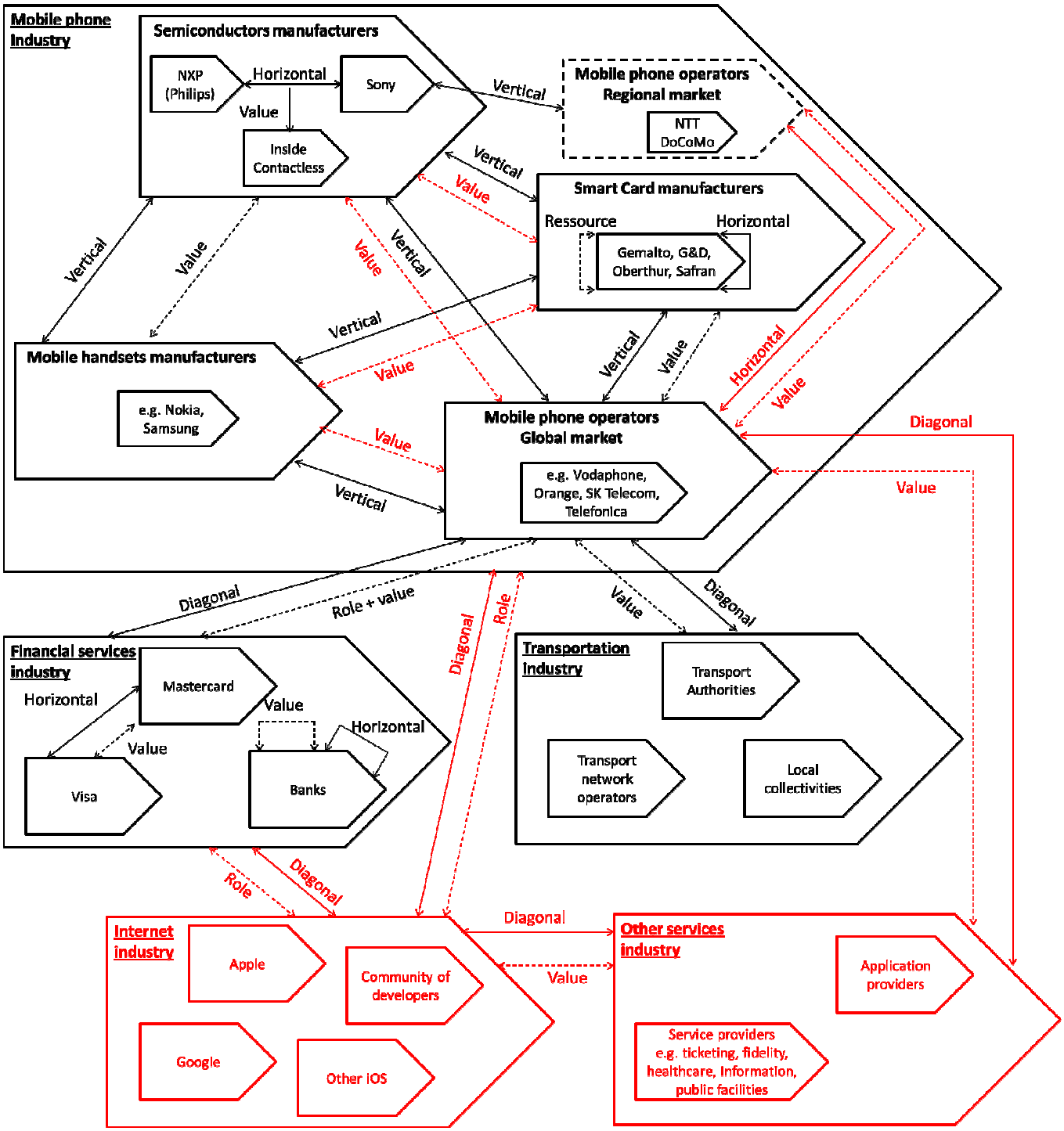
Table 3: Mechanisms impacting the coopetitive architecture during the stage of initial offer construction

	Sustaining coopetitive architecture		**Changing coopetitive architecture**	
	Mechanisms	**Empirical evidence**	**Mechanisms**	**Empirical evidence**
Horizontal coopetition	Knowledge retention	Gemato refused to exchange knowledge during collaborative projects with other smart card manufacturers to protect their technological lead in the field of mobile contactless services.	Non-observed	
Vertical coopetition	Knowledge diffusion across the BE (educating) Group consolidation Fostering the global emergence at the expense of individual interest	To ensure the broad adoption of the new collective goal, the mobile phone operators multiplied their participation in collective activities such as standardization, trials, and communication. The mobile phone manufacturers who shared the vision of the semiconductor manufacturers pursued co-development with them To foster the commercialization of mobile contactless services, the semiconductor manufacturers tried to convince other actors to follow the global goal set by mobile phone operators	Control over a strategic point of the value chain Group consolidation	To block the mobile phone operators' goal, mobile phone manufacturers had done little to commercialize NFC-based devices Gemato and Inside Contactless reinforced their collaboration by commercializing a joint solution.
Diagonal coopetition	Non-observed		Control over a strategic point of the value chain	As financial institutions had a direct access to end users, they forced mobile phone operators to soften their vision

3.3. THE DEVELOPMENT OF COMPLEMENTARITIES

The final relationships during the third stage are represented in the figure below.

Figure 3: The coopetitive architecture at the end of the third stage



[Note: The figure omits the representation of government and local authorities. They played an increasing role during that third stage of emergence, but their actions were restricted to the local level.]

3.3.1. On the road to success.

In 2010, mobile phone operators and mobile handset manufacturers developed agreements to propose mobile contactless services. In December 2010, an expected actor entered the BE. Since the development of smartphones in 2008, the members of mobile contactless services expected that the adoption of the NFC technology by Google and Apple would help to unblock the situation. Thus, Google launched the latest version of the Android operating system (Android 2.3 Gingerbread) that included NFC functionalities for the first time. Later, Google joined the NFC Forum (2011) and then the board of directors (2013)[9]. All conditions for mobile contactless services to become a real success seemed to finally be in place, suggesting the end of the struggle and the support of a giant from the Internet industry.

In addition, the development of the mobile Internet favoured the development of complementary services. Mobile phone operators considered the potential of other services (e.g., couponing, information, healthcare, access control, advertising) in addition to payment and transportation. NFC was "going to add an entirely new universe of services, enabling the mobile phone to link the online world with the physical world" (Mung Ki Woo, vice president of electronic payments and transactions, Orange)[10]. However, their role in the development of services declined. The developer community became the driver to propose a wide range of new services that had not previously been envisioned.

As Sony did during the previous stage, NTT DoCoMo, the largest Japan mobile phone operator, opened its regional market to access the global mobile contactless services market in 2011. It drew on its experience with the FeliCa mobile service to help drive the global interoperability of mobile contactless services while modifying its infrastructure to be compliant with the rest of the world market.

3.3.2. Are conflicts really a thing of the past?

Although the technical prerequisites had been brought together, it would still take a few years before the services moved significantly beyond the experimental stage. Mobile phone operators had to cope with new challenges. The wide range of new services was related to several business models that had been a new sticking point. “There are several parties to each transaction, and everyone needs to get their slice of the cake" (Wilcox, senior analyst Juniper

[9] Apple joined the NFC Forum after our period of analysis in 2015.
[10] Quoted by Rubenstein R. (2010.09), Near field communications: Playing tag, *Total Telecom.*

Research)[11]. For mobile phone operators, the development of mobile contactless services represented a new way to expand their offers and generate new revenues. Whereas payment and transportation constituted the major part of potential revenues, other services were side benefits. In addition, the real value added to payment and transportation was located before and after the transactions (e.g., recommendations, account status).

Numerous key projects were rolled out worldwide and provided part of the answer to the business model problem. Actors started to think locally to find solutions for specific regional needs. Some examples characterized by banding movements between mobile phone operators were particularly significant. In 2010, the U.S. mobile phone operators AT&T, Verizon Wireless, and T-Mobile USA formed a joint venture named Isis. A year later, Telia, Tele2, Telenor, and 3 (the four main mobile phone operators in Sweden) also formed a joint venture to provide mobile payment services based upon a unique platform. Since 2010, the French mobile phone operators had been running a joint commercial pilot in the city of Nice, providing payment, transportation, loyalty and information services. This was followed by governmental funds that aimed to develop a national infrastructure for mobile contactless services by 2012. This last example also stressed the new role of government created by the local dimension and the development of services. Thus, the success of mobile contactless services depended on necessary cooperation between service providers, governments, and standardizing bodies. The governments were not directly competing with the other members of the BE, but as they maintained the goal of one group of members (e.g., funding, coordination), they were in conflict with the other groups.

As new service providers experimented with the services and accumulated knowledge, they realized that the relational architecture related to the technological choices made by mobile phone operators with many intermediaries was too complex. Thus, they considered new technological solutions that did not rely on SIM cards and their owners, the mobile phone operators. The new entrants from the Internet industry (Google, Apple) entered the BE with their specific knowledge and provided expected alternatives. They posed little threat to mobile phone operators and financial institutions because their technological solutions (e.g., Bluetooth Low Energy, Host Card Emulation) were totally disintermediated (i.e., they could perform mobile payment without them).

[11] Quoted by Rubenstein R. (2010.09), Near field communications: Playing tag, *Total Telecom.*

> *"The interest of Apple and Google is to reduce the importance and the dominance of mobile phone operators. Someone who buys an iPhone is not a customer of Orange, they are a customer of Apple."* (CEO-application provider)

The "war" was reinforced in mid-2011 when Google launched Google Wallet. To face the competition, mobile phone operators also launched their own wallets locally (e.g., Orange Cash in France). However, they were forced to soften their position by recognizing the benefits of the systems based on the cloud and supporting them as well as the SIM solution.

> *"The SIM SE and HCE approaches to NFC payments should not be viewed as mutually exclusive. There are many overlaps in the capabilities required to support each of them. […] Combining the approaches may allow solutions to be optimized for different markets while reusing the existing infrastructure that has already been developed."* (HCE and SIM Secure Element: It's not black and white, Discussion paper)

Smart card manufacturers were also threatened by the Internet industry. With the development of mobile contactless services, they tended to enhance the value of the SIM card by adding new technologies. However, the competing technological solutions also reduced the use of the SIM cards. From this perspective, they were relegated to the place of a simple component that could be produced without great expertise.

> *"In the world of Google or Apple, the SIM is hyper-basic. It is the minimum necessary to use the network. This SIM can be easily competed by Asian manufacturers who produce more cheaply."* (CEO-application provider)

This third stage is mainly driven by diagonal coopetition. Some mechanisms lead to an easing of the collective goal, whereas others favour the coexistence of several collective goals (Table 4).

Table 4: Mechanisms impacting the coopetitive architecture during the stage of complementarity development

	Sustaining coopetitive architecture		**Changing coopetitive architecture**	
	Mechanisms	**Empirical evidence**	**Mechanisms**	**Empirical evidence**
Horizontal coopetition	Non-observed		Non-observed	
Vertical coopetition	Grouping	According to the difficulties of launching services at a global level, actors from different market segments rally on local objectives	Non-observed	
Diagonal	Fostering the	To facilitate the	Introduction of	The Internet industry pushed its

coopetition	global emergence at the expense of individual interest	commercialization of mobile contactless services, mobile phone operators promote both SIM and cloud solutions	knowledge from other fields Knowledge accumulation Grouping	own preferences in the BE to challenge the common goal. As the service providers experienced the common goal, they perceived its complexity and rallied to other alternatives.

4. DISCUSSION AND CONCLUSION

Our work contributes to a better understanding of the emergence of a BE that is not hub-based. When the leadership is not settled a priori, the members must cope with multifaceted coopetition that reflects three types of inter-organizational conflicts: role conflicts, value-related conflicts, and resource conflicts. We note that overly complex coopetitive relationships mitigate the expected benefits of the coopetition in the emergence of a non-hub-based BE. The many interdependencies enhance the sources of conflict and ultimately slow or even block the process. Moreover, as long as an initial offer has not been implemented, a rapid increase of membership expands the interdependencies, enhancing the risk of failures in the value chain when the new members do not adopt the offer (Adner, 2012). Thus, our contribution is threefold. First, we determined the interplay between the three types of coopetition (vertical, horizontal, and diagonal) in the emergence of a non-hub-based BE and their critical roles. Second, we highlighted the importance of inter-organizational role conflict management to facilitate the success of the emergence. Third, we proposed mechanisms that can be used by managers to maintain or change the coopetitive architecture.

4.1. THE INTERPLAY OF TYPES OF COOPETITION DURING BE EMERGENCE

During the emergence of a BE, the type of coopetition that drives the process evolves according to the challenges to be faced. This evolution reflects the gradual expansion of the members of the BE. The sequencing of the critical types of coopetition and their related challenges are summarized in Table 5.

Table 5: The evolution of the most critical type of coopetition during the emergence of a BE

Stages	Standard definition	Initial offer construction	Complementarities development
Most critical types of coopetition	Horizontal coopetition	Vertical and diagonal coopetition	Diagonal coopetition
Main challenges for actors	Laying the foundations of the cooperation - Defining a collective goal - Involving new members	Reaching an agreement between members - Favouring the adoption of the value chain	Sensing opportunities: - Introducing knowledge from other fields - Focusing on local market

Initially, the emergence of the BE is driven by few actors who share a common goal and who are in conflict to capture value. They initiate horizontal coopetition between them to conjointly define a new global standard. Thus, we support the role of horizontal coopetition between giant companies to set standards (e.g., Gnyawali & Park, 2011). We also support the following assumption made by Rusko (2012: 69): "The coopetition strategy starts more likely between […] firms which are horizontally related". Moreover, the initial horizontal coopetition plays a critical role as the pioneering coopetitors need to lay the foundations for the cooperation by defining and sharing a common goal to support the arrival of new members in the BE and to develop the new offer. Thus, the pioneers need to protect their core resources in the horizontal coopetition while diffusing knowledge across the BE through vertical and diagonal coopetition to "educate" the new entrants to maintain their global goal. However, as the actors become more knowledgeable and control a strategic point of the value chain, discrepant new goals are shaped. However, the development of new goals is not unlimited. Few global goals (two, in our case) co-exist. Some actors support the initial goal, whereas others share the new ones. Moreover, the connections are not simply between groups of actors from the same market segment. Within a market segment, actors can support one goal while others support another goal. Within the same group, the actors share the same collective goal and face value-related conflicts. However, the opposition between groups that do not share the same collective goal relies on role conflicts. Thus, the coopetition initiated by a few leading firms encourages subsequent coopetition among other firms, which results in group-to-group competition (Gnyawali & Park, 2011). Finally, the accumulation of knowledge of vertical coopetitors coupled with the grouping phenomenon initiates change in the coopetitive landscape. As the new entrants enhance their comprehension of the emergent phenomena, they identify new opportunities for development that may lead to a reconfiguration of the established relationships (Zahra & Nambisan, 2011).

The change in the coopetitive architecture is followed by new concerns for the BE's members. As the standard is agreed upon, actors attempt to shape an initial offer. Vertical coopetition and diagonal coopetition become critical because a multifaceted agreement is necessary to construct the primary offer and to commercialize it and avoid the risk of non-adoption of the value chain (Adner, 2012). Although the previously initiated groups are consolidated, we observe two behaviours in the opposite camp. On the one hand, some actors soften their position to favour the adoption of the value chain by appropriating the new collective goal. On the other hand, some actors reinforce the role conflicts to force a change in

the unsupported goal. Their capability to force a new change in the coopetitive architecture is based on their control of a strategic point of the value chain. In our case study, this second behaviour was observed in vertical coopetition as well as in diagonal coopetition.

The persistence of role conflicts initiated a new era in BE emergence as actors envisioned the development of complementarities and turned their actions towards a local level to bypass conflicts. The high level of interdependence among players in a nascent market generates a vicious cycle of resource allocation deferment that can be escaped by developing a local architecture (Ozcan & Santos, 2015). The development of a local architecture is related to the expansion of diagonal coopetition. These local architectures also contribute to reducing value-related conflicts through the definition of idiosyncratic business models. The health of a BE is likely to be affected by the fit of its business model(s) with technological and cultural evolution (Tellier, 2015). Moreover, the lack of agreement permits the introduction of new technological standards that challenge the collective goal. Coupled with the introduction of new knowledge from other fields, new diagonal relationships may modify the relational architecture of the BE with great risks for previous members. These risks are all the more important when agreement on the initial offer has not been reached (i.e., role conflicts persist). Thus, diagonal coopetition is the most critical type when the BE attempts to develop complementarities. The new entrants shape opportunities based on their existing knowledge and the new knowledge they accumulate (Zahra & Nambisan, 2012) and initiate change in the coopetitive architecture.

4.2. THE CRITICAL IMBALANCE RELATED TO ROLE CONFLICTS

We suggest that the distinction between different types of conflicts rather than coopetition permits us to understand the change in the coopetitive architecture and the outcomes of the emergence of the BE. Based on the challenges actors must address and the mechanisms that affect the coopetitive architecture, our case study illustrates similarities between vertical coopetition and diagonal coopetition. However, this statement does not challenge the evolution of types of coopetition as presented above.

Thus, role conflicts appear to be the most relevant type of conflict in the emergence of a non-hub-based BE. Role conflicts are crucial because they are related to the definition and the acceptance of a common goal that drives the actions of the members. Our case study shows that excessively strong role conflicts may eliminate the benefits of coopetition because they create barriers to cooperation that ultimately may lead to the commercial failure of the BE.

The persistence of the same role conflicts during emergence leads to unstable rules of the game and a permanent reconsideration of the position of actors along the value chain. Thus, role conflicts are a key source of change in the coopetitive architecture. This imbalance between cooperation and competition negatively impacts the dynamism of coopetitive interaction by slowing meaningful exchanges and reaping the benefits of coopetition (Bengtsson et al., 2010).

The striking point is reinforced when actors face conflicts at different levels (i.e., horizontal, vertical or diagonal coopetition). Thus, to understand the dynamic of coopetitive interaction, we need to consider the simultaneity of different levels of conflicts and their cumulative effects on the balance between cooperation and competition.

4.3. THE MECHANISMS THAT IMPACT COOPETITIVE ARCHITECTURE

The investigation of our second research question allows us to propose some mechanisms that affect coopetitive architecture and that may help managers to cope with an emergent BE given their own individual objectives. Although our aim was to reveal some "generic" mechanisms, we also linked these mechanisms to more precise mechanisms that have previously been empirically observed. The synthesis of the mechanisms is proposed in the table below.

Table 6: The mechanisms sustaining or changing the coopetitive architecture during the emergence of a BE

Impact over the coopetitive architecture	Mechanisms	Level of observation	Cross references
Change	Knowledge accumulation	Vertical coopetition Diagonal coopetition	Knowledge accumulation through experiential learning impact coopetitive relationships (Dahl, 2014) A deep understanding of the BE facilitates the identification and the seize of opportunities (Zahra & Nambisan, 2012)
	Control over a strategic point of the value chain	Vertical coopetition Diagonal coopetition	A direct access to end users enhance the influence over standard definition (Malherbe & Simon, 2015)
	Knowledge introduction from other fields	Diagonal coopetition	The introduction of new knowledge can generate new opportunities (Hargadon & Sutton, 1997) Enforcing incoming flows of knowledge can generate a deviation of a technological path (Malherbe & Simon, 2015)
	Grouping	Vertical coopetition Diagonal coopetition	Group-to-group competition (Gnyawali & Park, 2011) Connecting actors through formal structures (Ritala et al., 2012) Gathering and attracting members (Dhanaraj & Parkhe, 2006)
Sustain	Resource control and knowledge retention	Horizontal coopetition	Keeping complementary technologies proprietary in addition to openly shared and standardized ones (Ritala et al., 2013)
	Knowledge diffusion and	Vertical coopetition	Sharing information helps the development of a

	education	Diagonal coopetition	common vision during the phases of emergence (Santo & Eisenhardt, 2009) Defining and maintaining a common vision (Ritala et al., 2009) Promoting solutions through collective activities (e.g., consortium, conferences) (Ritala et al., 2013) Crafting a common vision (Ritala et al., 2013)
	Grouping	Vertical coopetition Diagonal coopetition	Connecting actors through formal structures (Ritala et al., 2012) Gathering and attracting members (Dhanaraj & Parkhe, 2006)
	Fostering global emergence at the expense of individual interest	Vertical coopetition Diagonal coopetition	

Some empirically identified mechanisms are related to resources and knowledge management, confirming their critical role in coopetition issues (Chin et al., 2008; Ritala & Hurmelinna-Laukkanen, 2013). In particular, the maintenance of information asymmetry favours the persistence of coopetitive architecture. When this asymmetry is reduced, change can be initiated. Another key mechanism involves the capacity of the actors to control a strategic point of the value chain. This control is all the more important when the point of control is near the end users, enhancing the capacity of actors to influence the collective goal of the BE. Grouping actions are also highly significant during the emergence of a BE in the presence of many discrepant goals promoted by dominant actors. These actions reduce the diversity of goals and strengthen the actors. Thus, they can both maintain and change the coopetitive architecture. They do not exclusively refer to formal structures (e.g., forum, associations), but they are more generally related to the desire of actors to promote the same collective goal for the BE.

Appropriating these mechanisms can help managers to evaluate the position of their company when entering a non-hub-based BE and to detect their possible development based on their own features and those of others. However, our work should be replicated to verify the consistency of the identified mechanisms and their effective role in the process of BE emergence. Moreover, we have chosen a case study with a highly complex coopetitive architecture and many dominant actors to examine the interplay between different levels of coopetition (organizations, market segments, industries). Previous studies of non-hub-based BE presented less turbulent relationships in the emergence phase (see, for example, the analysis of the pinball BE proposed by Tellier, 2015). This fact reinforces the call for more investigation to validate our managerial contribution and, in particular, to determine whether the multiplication of coopetitive relationships affects the use of the mechanisms observed.

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