Value-creation-capture-equilibrium in new product development alliances: A matter of coopetition, expert power, and alliance importance

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1 Introduction

Firms form alliances to access external resources for their new product development (NPD) (Das, 2014; Lee, Park, Yoon, & Park, 2010; Santamaría, Nieto, & Barge-Gil, 2009; Schleimer & Faems, 2016). However, many NPD alliances experience imbalances between firms' inputs to value creation and abilities to capture value (Ritala & Hurmelinna-Laukkanen, 2009; Das & Rahman, 2010; Fonti, Maoret, & Whitbred, 2017), which might exist due to differences in the firms' abilities and motivation (Chen, Kuo-Hsien, & Tsai, 2007; Kalaignanam, Shankar, & Varadarajan, 2007). For instance, alliance partners are sometimes tempted to behave opportunistically, such as by reducing their inputs into value creation or by maximizing their value capture (Hamel, 1991; Das & Teng, 2000; Fredrich, Bouncken, & Kraus, 2019). Furthermore, while alliance partners might equally contribute to value creation, some partners might be more proficient and motivated in capturing the added innovation value (Clauss & Bouncken, 2019; Hoffmann, Lavie, Reuer, & Shipilov, 2018). Especially from a relational view (Das & Teng, 2000; Dyer & Singh, 1998; Dyer, Singh, & Hesterly, 2018), alliances with a sufficient symmetry in value creation and capture are more likely to reach their long-term goals, while asymmetry could lead to potential opportunism and relationship failure (Das & Rahman, 2010). The concept of the *value-creation-capture-equilibrium* (VCCE) between firms in alliances describes firms' relative inputs and efforts to the value creation in dyadic NPD alliances, as well as the alliance partners' relative abilities in capturing a portion of that value in the pursuit of *private* and *common* benefits (Bouncken, Fredrich, Kraus, & Ritala, 2019; Khanna, Gulati, & Nohria, 1998). The high uncertainties of inputs and outputs of NPD alliances bring challenges to the VCCE (Hoffmann et al., 2018; Jacobides, Knudsen, & Augier, 2006; Lavie & Rosenkopf, 2006). A perfect VCCE exists when firms have equally (i.e. to the same

extent) contributed to value creation and involve equal abilities to capture the value created from a particular NPD alliance (Bouncken et al., 2019). Yet, little is known on how firms can balance value creation and capture in alliances (Lavie & Rosenkopf, 2006; Ozmel, Yavuz, Reuer, & Zenger, 2017).

Our paper aims to explain how firms can achieve an equilibrium in the relative value creation and value capture. Inter-firm relationships experience a variance of inputs, outputs, and learning over the course of the alliance (Das & Teng, 2002; Das & Kumar, 2007; Dyer et al., 2018). Combining the relational view with the literature on innovation alliances (Clauss & Bouncken, 2019; Rai, 2016; Tyler & Caner, 2016; Wagner & Goossen, 2018; Wu, Luo, Slotegraaf, & Aspara, 2015), we model three important determinants that might influence the VCCE. The first is the *coopetition intensity* between the alliance partners (i.e. simultaneous competition and collaboration), the second is the *expert power* of the alliance partner, and the third is the focal firm's *relative importance* of the particular NPD alliance. All three conditions can facilitate imbalances and learning opportunities related to a relational view of dyadic alliances (Das & Teng, 2000; Dyer & Singh, 1998; Dyer et al., 2018).

Our model thus considers three conditions to VCCE. The first considers dynamics that have to be balanced by competition in alliances (Cassiman, Di Guardo, & Valentini, 2009; Gnyawali & Park, 2011). The competition in collaboration sets of potential bargaining and tensions (Brandenburger & Nalebuff, 1996; Bengtsson & Kock, 2000) that need to be considered as drivers and barriers to VCCE (Tidström, 2014). On the upside, coopetition tensions drive the search for new solutions using the strength of partners (Tidström, 2014), while on the downside, coopetition tensions go along with opportunism risks and protection (Gnyawali & Ryan Charleton, 2018). Considering the two effects, greater levels of coopetition intensity will promote a more balanced VCCE in NPD alliances. Second, the *expert power* of the focal firm's NPD partner brings expertise and power that might improve creational

processes, but also comes with dangers of power asymmetries (Clauss & Bouncken, 2019; Sahadev, 2005). Expert power refers to the power source's access to knowledge and skills desired by the power target (French Jr. & Raven, 1959). When the other firm has high expertise, it might contribute valuable external resources. Expert power partners can kick-off a huge array of learning dynamics that might bind partners but also provide opportunities for imbalances (Dyer et al., 2018; Dyer, Singh, & Kale, 2008). Still, an expert partner might also have improved abilities to "outsmart" the other actors. In NPD alliances, expert power partners have high levels of knowledge about the problem space under consideration, e.g. market or technological expertise that may provide further informational advantages and benefits (Maloni & Benton, 2000; Stern, Dukerich, & Zajac, 2014). On the one hand, we expect that focal firms are likely to seek balanced VCCE in their NPD alliances with partners possessing high levels of expert power given these high stakes. On the other hand, we also expect that partners with high expert power might intensify coopetition tensions and lead to alliance instability (Das & Teng, 2000; Dyer et al., 2018; Dyer et al., 2008), resulting in less balanced NPD alliances. In our study, we thus anticipate that expert power will exhibit a positive direct effect and a negative moderating effect on the relationship between coopetition intensity and VCCE. Investments in relation-specific assets contribute towards relational rents (Dyer et al., 2018; Dyer et al., 2008), and gradually affect the *relative importance* of the focal NPD alliance (i.e. the relative financial importance of the alliance within overall sales of the focal firm). The relative importance triggers further attention to the alliance and also motivates the focal firm to establish a long-term relationship. Thus, we expect that the importance of the NPD alliance will increase the focal firm's efforts to balance its VCCE. Again, we expect that this balance-seeking is disrupted when coopetition intensity increases and the focal firm attributes more relative importance to the NPD alliance. Here, either of the firms might become more interested in individual gains or restrict their value creation inputs, thereby negatively influencing the VCCE.

We test our model using a survey study of N=471 high-tech firms pursuing dyadic NPD alliances. NPD alliances rely on the partnering firms' R&D capacities, but also complementarities in the areas of intellectual property, technology, sourcing, and marketing (Pullen, Weerd-Nederhof, Groen, & Fisscher, 2012). Thus, NPD alliances in our study potentially involve collaboration at multiple stages of the product innovation process (Ahmed & Shepherd, 2010).

Our results show that increasing intensities of coopetition relate to greater VCCE. We find that expert power has a positive moderating effect on the coopetition-VCCE relationship which is in contrast to our hypothesized negative moderation. Aligned with our theorizing, greater relative importance of the NPD alliance to the focal firm has a positive direct effect on the VCCE. This relative importance also exhibits a negative moderating effect on the coopetition-VCCE relationship.

Overall, our study brings the concept and conditions of VCCE to the relational view of alliances (Das & Teng, 2000; 2018; Dyer et al., 2008). Focusing on relative value creation and relative value capture separately, we were able to further disentangle the underlying mechanisms and reveal nuanced, yet important differences that inform research on value creation and capture in alliances (Lavie, 2006a; Ozmel et al., 2017), and particularly under coopetition (Arslan, 2018; Bouncken, Fredrich, & Kraus, 2020; Fonti et al., 2017; Hoffmann et al., 2018; Ritala & Hurmelinna-Laukkanen, 2009). We show that coopetition – itself a balance between collaboration and competition – is a convergence force to value creation and capture, highlighting the specificity of coopetition as argued by coopetition scholars (Czakon & Rogalski, 2014; Granata, Lasch, Le Roy, & Dana, 2017; Le Roy & Czakon, 2015). Furthermore, reflecting the high stakes and related mutual monitoring, we support that positive tensions of expert power facilitate the balanced value creation and capture in highly coopetitive NPD alliances (Czakon, 2009; Fernandez, Le Roy, & Gnyawali, 2014; Gnyawali & Park, 2011). We

also clarify negative tensions related to the competition-dominated behavior in coopetition (Asgari, Tandon, Singh, & Mitchell, 2018; Arslan, 2018; Cui, Yang, & Vertinsky, 2018; Tidström, 2014) by demonstrating how high alliance importance (as perceived by the focal firm), coupled with high coopetition intensity, will result in unbalanced value creation and capture in dyadic NPD alliances.

2 Conceptual background

2.1 New product development alliances

Alliances refer to a wide range of interfirm relationships, most of them including strategic purposes (Osborn & Hagedoorn, 1997). According to Kale and Singh (2009), a strategic alliance is "a purposive relationship between two or more independent firms that involves the exchange, sharing, or co-development of resources or capabilities to achieve mutually relevant benefits" (p. 46). The relational view of alliances and its revisited dynamic relational view delivers a fundamental theoretical background for the study of NPD alliances (Dyer & Hatch, 2006; Gulati, Lavie, & Singh, 2009; Weber, Bauke, & Raibulet, 2016). The long-term relationships among firms constitute *relational rents* from relation-specific assets, knowledge-sharing routines, complementary resources and capabilities, and its effective governance (Dyer & Hatch, 2006; Dyer & Singh, 1998). The long-term or repeated ties and social interactions among firms can breed further complementarities (Weber et al., 2016). Such inter-firm advantages are highly important to innovation alliances.

Innovation alliances (Harryson, Dudkowski, & Stern, 2008) cover a variety of R&D (Lin, Wu, Chang, Wang, & Lee, 2012; Sampson, 2007), NPD (Millson, Raj, & Wilemon, 1996), co-development (Emden, Calantone, & Droge, 2006), and technology alliances (Faems, De Visser, Andries, & Van Looy, 2010). In this study, we refer to NPD alliances that incorporate any stage of the NPD process from concept development to market launch. Such alliances build on inter-

firm complementarities in R&D capacities, intellectual property, technologies, sourcing and marketing capacities (Pullen et al., 2012). By doing so, NPD alliances provide firms access to the external knowledge environment (Arora & Gambardella, 1990), and help to combine network resources with internal resources to create competitive advantages (Gulati, 1998). Depending on the type of knowledge that firms are seeking to acquire, they enter different types of alliances (Koza & Lewin, 1998). Upstream alliances are formed for the purpose of exploring for new opportunities, to share and acquire tacit knowledge. On the contrary, downstream alliances are rather chosen to exploit an existing capability (Rothaermel & Deeds, 2004). Large and well-established firms will combine their manufacturing capabilities, regulatory know-how, market knowledge and access, but also services (Clauss, Bouncken, & Tangpong, 2019).

NPD alliances can also be formed to reduce the time, risks and costs of NPD (Mowery, 1988; Kogut, 1989). NPD alliances especially bring complementarities as outset in the relational view. Large companies often try to reduce the risks and costs of innovation by allying with competent partners, even rivals (Duysters & de Man, 2003; Gnyawali & Park, 2011). NPD alliances have become important to firms' innovation performance (Santamaría et al., 2009). However, they also expose firms to high risks of (unintended) knowledge spill-overs or the unintended capture of innovation-related value by the other firm (Fonti et al., 2017; Roper, Vahter, & Love, 2013; Van de Vrande, De Jong, Vanhaverbeke, & De Rochemont, 2009). Therefore, NPD alliances can have positive, negative, and non-linear influences on firm performance (Nieto & Santamaría, 2007), making them a high-stakes context, subject to a variety of tensions and related expectations of distributive justice from the relationship (Luo, 2007). Given these features of NPD alliances, it is important to analyze how and under what conditions firms perceive their innovation-related value creation and value capture in balance.

2.2 Value-creation-capture-equilibrium in NPD alliances

Value, generally, is defined as the eventual willingness-to-pay by the end customers (Brandenburger & Nalebuff, 1996; Garcia-Castro & Aguilera, 2015). Firms engage in alliances when they expect their ability to create value above what would exist in the absence of a partnership (Das & Teng, 2000; Madhok & Tallman, 1998). Firms seek to improve performance by relational rents that come from complementarities and long-term collaboration among firms, as outset in the relational view (Dyer et al., 2018; Dyer et al., 2008). Value creation related to new products, technologies, and services faces high uncertainties and requires significant problem-solving expertise during its development and market processes (Bodas Freitas & Fontana, 2017; Evanschitzky, Eisend, Calantone, & Jiang, 2012). Given such uncertain context for the relationship, firms in dyadic NPD alliances tend to consider the question of "what's in it for me?", when they evaluate the value capture potential and related inter-partner bargaining (Ritala & Hurmelinna-Laukkanen, 2009).

Firms differ in their abilities to pursue novelty (Gavetti, Greve, Levinthal, & Ocasio, 2012), in their relative inputs for creating value in innovation alliances (Bouncken et al., 2019; Capaldo & Messeni Petruzzelli, 2011; Faems et al., 2010), in their learning capabilities and knowledge complementarities (Dyer et al., 2018; Dyer et al., 2008), and in capturing value from alliances (Lavie, 2009). NPD alliances thus bear difficulties in describing, bounding, evaluating, and controlling focal inputs and processes and thus might enable free-riding and the unintended capture of value by the other party (Gulati & Singh, 1998). The concept of distributive justice (Luo, 2007; Ariño & Ring, 2010) relies on an equity logic (Luo, 2007): in a relationship following this logic, "each gets their own" in the sense that the rewards are distributed following principles of fairness. This fairness might help to create relational rents and complementarities, even if (or because) alliances undergo dynamic processes (Dyer et al., 2018; Dyer et al., 2008). Following this equity logic and connecting it to the dynamic relational view, firms not only care about absolute value creation and absolute value capture. Firms also

will pay close attention to how balanced their relative inputs in value creation are as well as how balanced their relative value capture is within the alliance (Fernandez et al., 2014; Lavie, Haunschild, & Khanna, 2012; Lavie, Lechner, & Singh, 2007). Being sensitive to imbalances but also trying to leverage them, firms constantly evaluate, adapt, and negotiate inputs to value creation and carefully monitor their relative value capture (Khanna et al., 1998; Lavie, 2009; Zeng & Chen, 2003). Coming from a relational view lens, we expect that certain relational determinants (which we will discuss and hypothesize in the next section) will determine balanced value creation and capture structures in alliances. In particular, a balanced relationship involves similar inputs to different aspects of value creation, as well as similar opportunities for each party to capture value from that alliance. Especially with high-stakes NPD alliances, such an "equilibrium" can be beneficial given its abilities to ensure equitable share of value created, as well as maintaining low free-riding risks.

We measure the balance in the relative value creation and capture in dyadic NPD alliances as a dependent variable by perceived common benefits labeled as VCCE (Bouncken et al., 2019; Khanna et al., 1998). This measure combines the perceived balance of firms' relative inputs into value creation and the balance of related value capture abilities. For example, focal firms can perceive equal value capture and equal value inputs, indicating a perfectly balanced situation. Imbalance or failed VCCE between firms occurs when the firms have invested relatively less/more into the value creation and captured relatively more/less than the partner. Perceived balance or imbalance has implications for firms' resource commitments, motivation, and subsequent innovation performance (e.g. Hamel, 1991; Lavie, 2006a; Bouncken et al., 2019). Yet, the purpose of this research is not to investigate how these mechanisms affect the absolute value creation and capture or other performance outcomes, but rather the factors that lead to a VCCE in the first place. Following the general logic of the relational view, we model

how VCCE is influenced by coopetition intensity, partner's expert power, and the relative importance of the dyadic NPD alliance to the focal firm's reasoning (see Figure 1).

Figure 1
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3 Hypotheses

The relational view that considers inter-partner dynamics and stabilization in alliances guides our theorizing. Alliances undergo social processes that include learning and that determine the creation of value in alliances (Dyer & Hatch, 2006; Dyer & Singh, 1998). Knowledge exchanges and learning processes create relational rents and can breed further complementarities (Weber et al., 2016). On the one hand, high stability in repeated ties can reduce performance (Goerzen, 2007; Sampson, 2007), because of "blindness", escalating commitments (Szulanski, Cappetta, & Jensen, 2004), and redundant knowledge (Goerzen, 2007), so that innovative solutions are less likely (Jeffries & Reed, 2000). On the other hand, coopetition intensity in the alliance might resolve such inertia that is especially detrimental to innovation alliances. Coopetition intensity relates to the extent the partners both collaborate and compete with each other (Bengtsson & Kock, 2000; Bouncken & Kraus, 2013; Le Roy & Czakon, 2015). Given that the competitive position between alliance partners enables more serious opportunistic moves (Ritala & Hurmelinna-Laukkanen, 2009), coopetition intensity in itself becomes a "mutual hostage" in the alliance, leading to seeking an equity logic in alliances. In addition, high expert power by a partner might reduce the blindness and keep the focal firm alert. Expert power of the alliance partner can be considered as a credible commitment to the value creation and capture aspects of the alliance, at least in the sense of the partner's ability to contribute to both aspects (Clauss & Bouncken, 2019; Wang, 2011). With such partners, firms should seek balanced relationships whenever possible as this serves both parties' interests in

keeping a high-contribution partner involved, while still accommodating a fair balance of value creation and capture.

The high relative importance of the alliance might also reduce blindness, but create escalating commitments, or greed (Szulanski et al., 2004). The relative importance of the alliance to the focal firm reflects partner-specific investments that are high in relation to the overall resources of the firm. When the alliance is relatively important to the focal firm, a greater VCCE will ensure that the prospects of the NPD alliance are set for long-term success and, consequently, the likelihood of alliance failure is reduced (Bouncken et al., 2019; Das & Rahman, 2010). We further develop these arguments in the following sections and hypothesize the role of each determinant for greater VCCE in NPD alliances.

3.1 Coopetition intensity and value-creation-capture-equilibrium

The best-fitting partner for an NPD alliance can oftentimes be a direct competitor (Gnyawali & Park, 2011). Collaboration between competitors (i.e., coopetition) offers a combination of similar and complementary resources that facilitate product innovation (Bouncken, Fredrich, Ritala, & Kraus, 2018). In coopetition strategies, firms collaborate to create value, while they compete to capture the value created jointly (Ritala & Hurmelinna-Laukkanen, 2009). As a consequence, value creation and value capture have been recognized as a major source of tensions in coopetition (Fernandez et al., 2014). We define tension as "two co-existing contradictory forces with conflicting goals" (Fang, Chang, & Peng, 2011, p. 774) that are inherently connected to coopetition itself. For instance, coopetitors must decide how much information they need to share to ensure value creation and to avoid spillovers (Estrada, Faems, & de Faria, 2016; Fernandez & Chiambaretto, 2016) while considering self-interest and bargaining power (Tidström, 2014). In coopetition, firms could be tempted to intensify their value capture at the expense of their partner. These tensions in the value capture might

encourage firms to invest less effort and resources in the innovation value creation process. As a result, coopetition would lead to an imbalanced situation (i.e., low VCCE) and turn into win-lose strategies for product innovation (Arranz & De Arroyabe, 2008; Nieto & Santamaría, 2007).

However, coopetition strategies have been found as a major facilitator for product innovation (Bouncken et al., 2018; Estrada et al., 2016; Navío-Marco, Bujidos-Casado, & Rodrigo-Moya, 2019). Specifically, coopetition relies on overlaps between competing firms that ease learning and knowledge creation among these firms, breeding and exploiting complementarities for innovation (Bouncken & Fredrich, 2012; Dyer & Singh, 1998; Dyer et al., 2018; Dyer et al., 2008; Ritala, 2012; Wu et al., 2015). Thus, coopetition introduces significant opportunities for complementarities and innovation besides its risks (Gnyawali & Park, 2011). The joint pursuit of innovation might generate interdependencies and relational rents that enable partnering firms to move beyond their former barriers, and lead to pursuing of win-win approaches in value creation, as well as managing related inter-firm tensions (Dyer & Singh, 1998; Dyer et al., 2018; Dyer et al., 2008; Fernandez et al., 2014; Ritala & Tidström, 2014). In this regard, the balance of competition and collaboration is important to maintaining stable alliance relationships (Das & Teng, 2000), and relatedly, such balance-seeking might also stabilize value creation and value capture interests in (coopetitive) NPD alliances. Ongoing expectations of additional benefits facilitate firms' commitment towards the relationship, including extensions of the "pie" (Jap, 2001).

While uncertainty is high in NPD alliances, we assume that firms perceive the collaborative but also, when present, competitive dimensions of their alliance. Focal firms will anticipate that the competition dimension is likely to restrict some of the potential value capture advantages, given that there might be overlapping competitive interests. Still, firms might be well aware of the complementarities of coopetition and utilize those to create value (Dyer &

Singh, 1998; Dyer et al., 2018; Dyer et al., 2008; Ritala & Tidström, 2014). Firms are more suspicious when they collaborate with a competitor than with a non-competitor, and they will keep the competitor under higher monitoring (as an opportunistic behavior can be more damaging for the firm). Therefore, we expect that coopetition intensity, which refers to collaborative and competitive dimensions (Granata et al., 2017), makes firms more sensitive to each other's inputs and outcomes, and this will lead them to be more attentive to keeping inputs to value creation and the capturing of value at a balance between the firms. Furthermore, NPD alliances often entail uncertainties that permit opportunism and hamper the monitoring of inputs and outputs. The risk adversity of firms might encourage them to strive towards an inter-firm equilibrium of value creation investments and the relative value captured from those investments (Dyer & Singh, 1998; Dyer et al., 2018; Dyer et al., 2008). In the end, innovation might become less uncertain when competitors with similar knowledge about technologies and markets leverage their abilities and push them through greater pooled legitimacy into the market (Gnyawali & Park, 2011; Ritala & Hurmelinna-Laukkanen, 2009).

In summary, we expect that the potential of high risks and high returns related to coopetition intensity leads towards a greater "equilibrium" in the NPD alliance, in the form of a VCCE. As discussed before, a "perfect/complete" VCCE exists when firms equally contribute to value creation and equally capture the associated value. In a coopetitive setting, both partners may benefit from the relationship by realizing a fair share of their mutual value creation; and closely monitor that their captured value is (at least) proportionate to their inputs. Indeed, coopetition creates converging forces, mutual trust, and bonding between firms (Das & Teng, 2001; Nielsen & Nielsen, 2009), but this will only maintain if both firms perceive a win-win scenario. In sum, we hypothesize:

Hypothesis 1: *Increasing levels of coopetition intensity in a dyadic NPD alliance relate to a greater VCCE between firms.*

3.2 Direct and moderating influence of the partner's expert power

Different sources of power will influence alliances, especially firms' abilities and motivations related to value creation and value capture (Clauss & Bouncken, 2019; Johnsen & Lacoste, 2016; Ozmel et al., 2017). In NPD alliances, expert power has a strong impact on value creation and value capture (Clauss et al., 2019). Expert power is considered as the power source's admission to the knowledge and skills needed by the power target (French Jr. & Raven, 1959). Expert power partners devise market reputation or technological expertise (Maloni & Benton, 2000; Stern et al., 2014). Expert power might reduce the risks of blindness. For instance, Stuart, Hoang, and Hybels (1999) indicate that start-ups can increase success if their partners have a strong reputation that reflects positively on their own. Furthermore, the expertise of a partner can help build legitimacy and market power in the markets where the developed innovations are introduced (Ansari, Garud, & Kumaraswamy, 2016).

We argue that learning, complementarities, and so value creation in NPD alliances increases when one or both partners have high expertise and abilities or when they can use ties to powerful, reputable partners (Dyer & Singh, 1998; Dyer et al., 2018; Dyer et al., 2008; Maloni & Benton, 2000). In the NPD alliance context, where complementary knowledge and capabilities play a major role, expert partners certainly contribute to value creation. At the same time, however, expert power partners might also have more abilities to influence value creation and capture into their direction. For these reasons, we expect that collaboration with an expert power partner will influence the VCCE in NPD alliances. In particular, a collaboration with an expert partner will make firms more sensitive to changes in value creation inputs and value capture. Firms will seek to invest equally in value creation and/or equally capture the value in order not to put the firms' investments at risk.

Hypothesis 2a: *Increasing levels of expert power of the partnering firm in a dyadic NPD alliance relate to a greater VCCE between firms.*

The cooperative dimension of coopetition motivates joint value creation, whereas the competitive dimension of coopetition is connected with value capture towards private benefits (Arslan, 2018; Cui et al., 2018; Ritala & Hurmelinna-Laukkanen, 2009). In this regard, higher coopetition intensity brings positive and negative coopetition tensions (Tidström, 2014). These behaviors will be subject to the expert power of partners. The positive side of coopetition tensions drives the search for new solutions using the strength of partners. Expert power will then enable firms to develop technology that is more novel or solutions that are more market-oriented. Yet, on the negative side, coopetition tensions relate to opportunism risks and protection.

From the standpoint of coopetition, we expect that the expert power of the firm's partner will lead to lower VCCE for several reasons. First, the incompleteness of contracts and the dynamics that follow alliance formation allow for bargaining of the more powerful firm (Asgari et al., 2018; Reuer, Zollo, & Singh, 2002). Strong expert power might induce bargaining power allowing to (re-)negotiate the terms of their alliance contracts, to skew clauses to their benefit, and to directly influence the alliance outcomes (Lavie, 2007; Ozmel et al., 2017). Therefore, under high coopetition intensity, an expert power partner might use the associated advantages, leading to unbalanced value creation and capture. Second, when firms have greater expert power, they will be able to better understand how to make more use out of their value creation activities and how to reap more benefits of their value capture behavior. To detect and possibly guard these threats, the less powerful firm might monitor the other. However, such firms might have difficulties in understanding the abilities of the more powerful partner in reaping more value or in limiting the value creation inputs.

Overall, while expert power potentially increases innovation externalities and enables more balanced relative value creation and capture in dyadic relationships (as hypothesized previously), it also intensifies competitive value creation-capture tensions that reduce the dyadic VCCE. Therefore, we hypothesize:

> ***Hypothesis 2b:*** *Increasing levels of expert power of the partnering firm in a dyadic NPD alliance will negatively moderate the positive relationship between coopetition intensity and the VCCE between firms.*

3.3 Direct and moderating influence of relative alliance importance

In the relational view (Dyer & Singh, 1998; Dyer et al., 2018; Dyer et al., 2008), the overall quality of any alliance depends on how much the partners invest and how important the alliance is for the involved firms (Hofman, Halman, & Song, 2017; Lavie, 2009). We argue that the *relative importance* of the particular NPD alliance to the focal firm is a significant factor affecting the desire to attain greater VCCE. The relative importance becomes visible in the achieved sales of the alliance with respect to the overall sales of the firm in the last year (Bouncken & Fredrich, 2016a). This relative importance might manifest itself through the level of the overall relational social capital and resources – such as management support, capabilities, tools, alliance forms or knowledge strategies (e.g., levels of knowledge creation and sharing) – the focal firm has invested in the collaboration (Chin, Chan, & Lam, 2008). Knudsen (2007) finds in a study of 632 firms from seven European countries that the more knowledge you share (i.e., invest in a collaboration with competitors), the higher the overall innovation performance. It has also been shown that the greater the relative importance of the alliance, the more firms aim to absorb knowledge from their partners (Bouncken & Fredrich, 2016b). In this sense, the higher relational learning and monitoring takes place for alliances perceived as important, reflecting higher stakes, which we expect to lead to greater VCCE in NPD alliances.

Furthermore, the importance of a particular alliance is also related to the *attention* the focal firm allocates to the alliance. In general, attention allocation explains where firms focus their strategies and managerial oversight and also how closely they evaluate the fairness in the alliance (Ocasio, 1997). Increased attention of a particular alliance means that there is less space for surprises and opportunism, and more intense and frequent communication will exist between alliance partners. Furthermore, more attention also means more monitoring. We expect that the more attention the focal firm attributes to the NPD alliance, the more likely it is that relative value creation inputs and relative value capture levels are fairly distributed across the alliance partners. We therefore hypothesize:

Hypothesis 3a: *Increasing levels of the relative importance that the focal firm attributes to a dyadic NPD alliance relate to a greater VCCE between firms.*

Still, there are relational risks associated with the relative importance of an NPD alliance under high coopetition intensity suggesting strong financial interdependence with a close competitor. When coopetition intensity is high, the relative importance that the focal firm attributes to a dyadic NPD alliance might become problematic in terms of maintaining a balanced alliance relationship. When value capture interests collide among partners, it becomes increasingly difficult to maintain the VCCE (Fernandez et al., 2014; Ritala & Tidström, 2014). Firms might become more interested in realizing unilateral gains, attempting to capture a disproportionate share of the benefits (Gulati et al., 2009). Therefore, we expect that for relatively more important NPD alliances (from the focal firm's perspective) with high coopetition intensity, the VCCE among partners will be less balanced.

Hypothesis 3b: *Increasing levels of the relative importance that the focal firm attributes to a dyadic NPD alliance will negatively moderate the positive relationship between coopetition intensity and the VCCE between firms.*

4 Methods

4.1 Sample

We focus on a broad range of highly innovative industries represented by firms at any of eight independent, international trade fairs hosted in Germany during 2014-2017. Overall 53,305 international exhibitors classified as service providers (e.g. SIC code 7371) and manufacturers of electronics (e.g. SIC code 3679) and medical devices (e.g. SIC code 3841) participated in these trade fairs. We reduced common method variance (CMV) by following recommendations of Podsakoff, MacKenzie, Lee, and Podsakoff (2003): We used multiple sources from eight different trade fairs over a total period of three years. We applied the Brislin-method (1980) of blind back-and-forth translations and minor adjustments after pre-testing the questionnaires. We further ensured respondent anonymity and reduced item complexity. Following a key-informant approach, we invited a random subsample of almost 11,000 firm representatives from the top and middle management to fill out a paper-and-pencil questionnaire on *one particular alliance* that they were most knowledgeable about.

We gathered a total of N=3,133 raw questionnaires, yielding a response rate of 29%. After researching missing secondary data, we applied some primary data purification filters to find the best setting for our research aim, such as: excluding unknowledgeable respondents to ensure high-quality responses; excluding equity-based alliances to reduce interdependence and ensure independent decisions regarding the VCCE in the alliance (i.e. the sample includes only non-equity alliances); excluding all multi-partner alliances to reduce complexity in our perceived dependent measure; excluding non-R&D alliances with no primary innovation purposes to ensure a minimum level of value creation as an integral part of our dependent dyadic measure; and finally, excluding cases with missing values on model-implied control variables. We

checked for meaningful missing data patterns and found no violation of the missing-completely-at-random assumption (MCAR-test by Little, 1988: χ^2=506.68, df=503, p=.45). Regarding sample size and power analysis, we follow recommendations of a minimum of 300 cases for confirmatory factor analysis (CFA) with non-normal MCAR data. Furthermore, a simple rule of thumb suggests a minimum of five cases per parameter. Our most complex models achieve an N/p-ratio of 4.9 (Schermelleh-Engel, Moosbrugger, & Müller, 2003).

Our purified final sample consists of N=471 dyadic non-equity NPD alliances (15% of the raw cases). Our raw sample (6% of the overall population) shows no significant deviations from firm characteristics reported at the trade fairs' online sites (with p>.05 for countries of origin, firm sizes, and firm ages). Despite a representative raw sample of N=3,133 international exhibitors, a subsample of N=471 non-equity dyadic NPD alliances may differ significantly. We logistically regressed a binary selection variable on a set of model-implied variables yielding an insignificant overall subsample selection (Wald-χ^2=128.24, df=134, p=.62). In comparison to the systematically excluded alliances, responding firms of dyadic non-equity NPD alliances perceive less coopetition intensity (Wald-χ^2=5.01, df=1, p=.03), much greater product innovativeness (Wald-χ^2=33.12, df=1, p<.001), and less relative (financial) importance of the focal dyadic non-equity NPD alliance (Wald-χ^2=4.41, df=1, p=.04).

Responding firms of the final sample come from 44 different countries (with 152 unique country dyads of all N=471 NPD alliances), employed an average of 1,116 staff (median=56; 86% SMEs), were founded in 1979 (median=1988) and invested 15% (median=10%) of their €217 million (median=€9 million) annual firm sales in research and development (R&D). On average, the focal NPD alliance was established 7.3 years ago (median=5.0 years) and generated 16% (median=10%) of annual firm sales in the past fiscal year from 31% (median=20%) of overlapping markets.

4.2 Measures

4.2.1 Dependent variable

Relative value–creation–capture–equilibrium (VCCE). The dependent variable measures the balance among alliance partners' value creation inputs, as well as abilities to capture value (Bouncken et al., 2019). The logic of this conceptualization builds on previous alliance and innovation literature related to simultaneous value creation and value capture in alliances (Lavie, 2006a; Ozmel et al., 2017; Ritala & Hurmelinna-Laukkanen, 2009). The scale measures common benefits in alliances as an equal realization of both value creation inputs as well as value capture abilities in a dyadic relationship (Bouncken et al., 2019). In this regard, we asked respondents to evaluate (1) "Whose relative input/effort for these values is stronger?" and (2) "Who is better in capturing the value?", relating to three items of Lee and Colarelli O'Connor (2003)'s product innovativeness scale (c.f. Table A1: composite reliability CR=.86, convergent validity by average variance extracted AVE=.68). Using this scale as basis ensured that the context of the items was related to value creation and value capture from innovation in dyadic NPD alliances. Respondents replied on six categorical 3-point scales indicating 'we', 'equally', or 'our partner'. We adopt a measure of *symmetric common benefits* by calculating a count variable ranging from 0 (=maximum asymmetry) to 6 (=maximum symmetry) if all six items selected as 'equally' (Bouncken et al., 2019). This count variable reflects responding firms' perceived equality in bilateral bargaining situations under competition (Fehr & Schmidt, 1999), and more broadly the distributive justice (Luo, 2007) in both value creation and value capture. Since we hypothesized several determinants that push firms in NPD alliances to establish an "equity logic" and symmetric behavior in both value creation and capture, we feel that our dependent count variable is a good proxy for an overall balanced dyadic NPD alliance. The standardized measure of VCCE shows desirable psychometric properties (median=.10, S=–.49, K=–1.05, with skewness S<|±2| and kurtosis K<|±7|, West, Finch, & Curran, 1995). In the

robustness section, we used counts of '*relative value creation equilibrium*' and '*relative value capture equilibrium*' (each ranging from 0 to 3) separately in addition to their sum (=VCCE) to gain further insights.

4.2.2 Explanatory variables

Coopetition intensity. Perceived coopetition intensity (CR=.78, AVE=.54) reflects growing levels of simultaneous competition and collaboration within the NPD alliance under study (Bouncken & Kraus, 2013). A measure of *market overlap* (as represented by the percentage of firm A's sales generated from firm B's operating markets) shows external validity with firm A's (=the focal firm) perceived coopetition intensity (Spearman rho=.27, $p<.001$) and serves as an instrument for endogeneity testing.

Partner's expert power. Power is a multi-dimensional construct and plays a key role in strategic decision-making (Finkelstein, 1992). Experts gain authority and legitimacy through specialized skills, competencies and scarce knowledge that contributes to socio-technical problem-solving which cannot be easily imitated by other groups (Reed, 1996). We use a scale by Maloni and Benton (2000) to assess the partners' expert power, as indicated by the perception that the partner firm possesses information or expertise that is valued by the responding (i.e., focal) firm (CR=.77, AVE=.53).

Relative alliance importance. We measure the focal firm's perception of the relative overall importance of the alliance partner as indicated by the percentage of sales generated from business relationships with the partner over the past fiscal year. A log-standardized transformation of raw percentages exhibits great symmetry (min=–2.08, max=1.99, median=.03, S=–.13, K=–.69). This measure reflects the financial dependence of responding firms on their NPD alliance partner. Still, factors such as relative firm sizes, past alliance experiences, and partner substitutability further contribute to dependence in strategic alliances

(Faems et al., 2010). Table A1 of the appendix contains the operationalization of constructs, including all Likert-type items and the assessment of common local and global fit criteria. Results indicate sufficient to excellent measurement quality (Hair, Black, Babin, Anderson, & Tatham, 2010).

4.2.3 Control variables

We control for relationship-specific characteristics that may reflect the bargaining dynamics within the alliance. We include the level of *product innovativeness* (CR=.86, AVE=.68) our dependent measure refers to (Lee & Colarelli O'Connor, 2003). *Firm size* expresses structural determinants of innovation-related value creation and capture (Chandy & Tellis, 2000). We further control for several factors affecting the firms' business expertise. *Firm age* may reflect accumulated business experiences and improve efficiency through learning-by-doing routines, information-seeking routines, or negotiating partner-specific tasks (Zollo, Reuer, & Singh, 2002). Particularly *relative firm sizes* and *relative firm ages* (=firm B/firm A) account for partner-specific (dis-)advantages. We used *relationship duration* in months since both partners started doing business with each other to account for partner-specific experiences and different *relationship stages* that affect accumulated total value generated within the alliance (Jap & Ganesan, 2000). *R&D intensity* may reflect a firm's potential to create new value within NPD alliances and often serves as an objective proxy for its absorptive capacity (Cohen & Levinthal, 1990). *Geographical distance* in kilometers accounts for differences in face-to-face communication and ease of knowledge acquisition between alliance partners (Ganesan, Malter, & Rindfleisch, 2005). All count variables and ratios were log-standardized to adjust for their natural skewness. We add binary *year dummies* (with 2014 as baseline model), an industry dummy for *medical devices*, a dummy for *international alliances*, and multiple linkages at different *stages of the innovation process* (Ahmed & Shepherd, 2010). Lastly, we control for

alliance-specific contracts (CR=.95, AVE=.86; Liu, Li, & Zhang, 2010) and *trust* (CR=.90, AVE=.75; Zaheer, McEvily, & Perrone, 1998) that may determine value creation–capture dynamics in NPD alliances (Oxley & Sampson, 2004).

4.3 Analyses

We choose covariance-based structural equation modeling (CB-SEM) with the latent moderated structural (LMS) equations method implemented in Mplus 8.3 over PLS-SEM because it suits best our research objective of rigorous theory testing using latent variables (Antonakis, Bendahan, Jacquart, & Lalive, 2010; Rönkkö, McIntosh, Antonakis, & Edwards, 2016). We use scaled log-likelihood ratio tests to evaluate the improvement of the global model fit under maximum likelihood robust (MLR) estimations of nested models (Muthén & Muthén, 1998–2019). Table 1 reveals all estimated bivariate correlations in our final sample after running a CFA.

Table 1
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5 Results

5.1 Hypothesis testing

Table 2 provides results based on MLR estimations for nested models starting with control variables and the main hypothesis 1 (Model A). We find support for coopetition intensity leading to a greater VCCE (H1: β=.15, *p*=.002). Model B and Model C introduce expert power and relative alliance importance as additional contingencies separately, with Model D testing both contingencies simultaneously. We find no evidence of the partner's expert power affecting the VCCE directly, rejecting hypothesis 2a (β=.02, *p*=.72). Nested Model B slightly improves Model A ($\Delta\chi^2_{MLR}$=4.70, Δdf=2, *p*=.095), with the partner's expert power positively moderating the influence of coopetition intensity on the VCCE instead of the (not supported) hypothesized

negative influence in hypothesis 2b (β=.10, *p*=.03). We see this specifically for high levels of product innovativeness (see robustness tests). Nested Model C strongly improves Model A (*p*=.003) and yields the best comparative global model fit as indicated by the lowest sample-size adjusted Bayesian information criterion (BIC). Relative alliance importance directly improves the VCCE in H3a (β=.10, *p*=.04). Additionally, growing levels of relative alliance importance diminish the positive influence of coopetition intensity on the VCCE, supporting H3b (β=–.11, *p*=.014). Finally, nested Model D demonstrates the robustness of all postulated relationships yielding a very significant improvement over Model A (*p*=.002). Most conclusions remain consistent throughout Models A to D.

Table 2

In dealing with endogeneity (Antonakis et al., 2010), we applied an instrumental variables approach with three instruments for each postulated main hypothesis throughout all models of table 2 (Semadeni, Withers, & Trevis Certo, 2014). For example, in Model D, the relative success of the NPD alliance (β=–.11, *p*=.014), market overlap (β=.24, *p*=.000), and the number of past alliances with competitors (β=.37, *p*=.000) strongly explain coopetition intensity (R^2_{COOP}=20.2%, F-value=39.40). Next, the overall number of past alliances (β=.17, *p*=.001), the relative success of the NPD alliance (β=.20, *p*=.000), and responding firms' (country-level) global competitiveness index in the past year (β=.18, *p*=.001) all facilitate the selection of expert power partners (R^2_{EXPOW}=9.9%, F-value=17.10). Lastly, the relative success of the NPD alliance (β=.25, *p*=.000), market overlap (β=.16, *p*=.001), and Globe's (2004) cultural dimension of performance orientation practices (as the sum of both country-level scores, β=–.16, *p*=.000) explain relative alliance importance (R^2_{RELIMP}=11.4%, F-value=20.03).

Notably, each set of instruments yields "strong" relevance (e.g., the threshold for three instruments F>12.83, Stock, Wright, & Yogo, 2002). An insignificant scaled Basmann

overidentification test suggests truly exogenous instruments (i.e. all six covariances of instruments with residual of the VCCE: $\Phi \leq |.08|$, $p \geq .27$; global test with 98 parameters specified for model D: $\Delta\chi^2_{MLR}=5.43$, $\Delta df=6$, $p=.49$). An endogeneity test conducted by estimating three additional residual covariances between the instrumented variables and the dependent variable yields an insignificant global improvement of Model D ($\Delta\chi^2_{MLR}=5.06$, $\Delta df=3$, $p=.17$), yet a slightly significant residual covariance for partner's expert power (H2a: $\beta_{IV}=.29$, $p=.06$ with residual's $\Phi=-.29$, $p=.06$; Durbin-Wu-Hausman-test: z-score=1.79, $p=.07$). The less efficient instrumental variable approach renders H1 ($\beta_{IV}=.06$, $p=.50$ with residual's $\Phi=.10$, $p=.36$; DWH-test: z-score=.86, $p=.39$) and H3a insignificant ($\beta_{IV}=-.03$, $p=.81$ with residual's $\Phi=.15$, $p=.30$; DWH-test: z-score=.96, $p=.34$).

Model E further estimates two remaining latent higher-order interactions between the three postulated variables to avoid spurious significances from model specification error and check for sensitivity of main hypothesis 1 to simultaneous shifts on both moderators ($\beta_{COOP\times EXPOW\times RELIMP}=.01$, $p=.86$). Only the two postulated two-way interactions yield significance, yet in opposite directions. The Models F and G provide insights by separating relative value-creation-equilibrium from relative value-capture-equilibrium. International alliances reveal significantly more unbalanced relative value creation. R&D expenses may further secure unbalanced relative value capture. Not surprisingly, governance mechanisms are particularly pronounced in balancing relative value capture. The postulated negative two-way interaction of coopetition intensity and relative alliance importance is robust for balanced relative value creation *and* capture, whereas expert power partners positively interact with coopetition intensity for relative value capture only. Figure 2 illustrates regions of significance using estimates of Model E for the average marginal effect (i.e. first derivatives in equation 1 of coopetition intensity on the VCCE (y-axis) for all empirical combinations of partner's expert power (x-axis) and responding firm's relative alliance importance (z-axis).

$$\frac{d(VCCE)}{d(COOP)} = .08 + .15^{*} \times EXPOW + -.14^{*} \times RELIMP + .01 \times EXPOW \times RELIMP \qquad (1)$$

The profile in the middle left combines the information of the upper 3-D graphs and shows regions of significance at 5%. Significantly negative/positive regions (–/+) emerge for lower and upper bounds of the 95% confidence interval being negative/positive. Sign changes between lower and upper bounds indicate insignificant regions (n.s.). Additionally, the graph in the middle right shows the mean levels of the VCCE. The two analogous profiles at the bottom further decipher the marginal coopetition effect for balanced relative value creation (on the left) and balanced relative value capture (on the right).

Figure 2

In brief, coopetition intensity will significantly decrease the balance of relative value creation in financially important NPD alliances (>+1.2 corresponds with past alliance sales >40% of annual firm sales) with non-experts. On the flip side, coopetition intensity will facilitate balanced relative value capture in less dependent NPD alliances (<+0.6 corresponds with past alliance sales <20% of annual firm sales) with expert power partners. Table 3 summarizes all tested hypotheses.

Table 3

5.2 Robustness

First, despite an insignificant influence of the questionnaire's language on the VCCE, scalar measurement invariance as a precondition to examining latent variables is violated. We, therefore, checked the sensitivity of results by language-based standardization of all independent Likert-type items and re-estimation of the final Model D, which yielded consistent hypothesis results. Next, we evaluated a potential single-source bias by comparing consulting (22%) vs. non-consulting respondents (72%, with 6% unknown) and found no meaningful

differences (Atuahene-Gima, Slater, & Olson, 2005). In dealing with unobservable sources of CMV, we constrained all self-informed information to equally load on an uncorrelated confirmatory common method factor yielding an insignificant improvement of scaled global model fit (e.g. model E: all unstd. λ=.05, p=.21, $\Delta\chi^2_{MLR}$=.39, Δdf=1, p=.53) with robust hypothesis results.

We also checked the robustness of hypothesis results for linear variations of the level of product innovativeness that shows no direct influence on the VCCE (e.g., Model E: β=–.08, p=.19). Only one of five interactive extensions of postulated relationships yields significance on the VCCE (H2b: $\beta_{COOP\times EXPOW}$=.14, p=.06, $\beta_{INNO\times COOP\times EXPOW}$=–.16, p=.009; $\Delta\chi^2_{MLR}$=10.20, Δdf=5, p=.07). The very significant three-way interaction partially supports our initially negatively postulated H2b for very high levels of product innovativeness.

Despite potential time-invariance of the independent constructs under study, cross-sectional data limits testing of the causal ordering of variables apart from theoretical considerations, implying potential reverse causality or causal feedback (Muthén, Muthén, & Asparouhov, 2016). Yet, future performance measures may hint at the relative importance of variables and suggest a causally mediated structure. We were able to collect a subsample of second respondents that were knowledgeable of the focal NPD alliance a year later (N=137) and calculated the focal alliance's sales performance (N=87). Of all model variables, only the medical device industry (Spearman's rho=.22, p=.04) and balanced relative value *capture* (not relative value *creation*) (Spearman's rho=.18, p=.09) yield weak predictive validity of future alliance sales growth. Thus, the lack of significance for coopetition intensity and expert power suggests balanced relative value *capture* as a mediating mechanism (and dependent variable within the cross-sectional data) for lagged alliance performance.

6 Discussion

6.1 Theoretical implications

Our study is embedded in the relational view (Dyer & Singh, 1998; Dyer et al., 2018; Dyer et al., 2008). We consider the relational view in the context of NPD alliances where complementarities and positive externalities between partnering firms are key (Cui et al., 2018; Schleimer & Faems, 2016; Wagner & Goossen, 2018). To increase complementarities, reduce blindness, ignorance of external information, especially weak signals (Szulanski et al., 2004), firms need to be motivated to learn and to integrate their unequal capabilities to value creation. Still, for long-term dynamic relational rents, firms should aspire a VCCE despite the unequal abilities to capturing value from the joint innovation efforts (Asgari et al., 2018; Ashraf, Pinkse, Ahmadsimab, Ul-Haq, & Badar, 2019; Bouncken et al., 2018; Clauss & Bouncken, 2019; Fonti et al., 2017; Jakobsen, Lauvås, & Steinmo, 2019). Alliances with significant instabilities and opportunism are known to lead to suboptimal results with less dynamic rent opportunities (Das & Teng, 2001; Hamel, 1991). Our study assumes that analyzing how NPD alliances can reach sufficient balance in value creation and capture is a relevant concern. Connecting the relational view with research on NPD alliances, we analyzed three contingencies that might affect the VCCE from a focal firm's perspective: (1) coopetition intensity, (2) the alliance partner's expert power, and (3) the relative importance of the NPD alliance to the focal firm.

Our empirical study finds that coopetition intensity is positively related to a greater VCCE in NPD alliances. In addition, financially more important NPD alliances (from the focal firm perspective) directly increase the VCCE. Also, when coopetition intensity increases, the VCCE becomes less likely in relatively more important NPD alliances, confirming our expectation of a negative moderation effect. Unpredictably, the partner's expert power has no direct effect on the VCCE. Further, against our expectations, the partner's level of expert power enhances the positive effect of coopetition on the VCCE, suggesting a positive moderating effect.

In essence, our findings indicate that coopetition intensity – or simultaneous competition and collaboration between alliance partners – drives firms towards a VCCE. Coopetition brings a convergence force related to value creation and capture as indicated by coopetition scholars (Czakon & Rogalski, 2014; Gnyawali, He, & Madhavan, 2006; Gnyawali & Park, 2011; Granata et al., 2017; Le Roy & Czakon, 2015). However, in line with the previous findings and suggestions, coopetition relationships involve high risk and high rewards characteristics (Bouncken & Kraus, 2013; Ritala & Hurmelinna-Laukkanen, 2009). The two findings related to the role of expert power of partners and the relative importance of the NPD alliance to the focal firm provided contradictory results in this regard. Perceived expert power of the partner seems to reinforce the tendency of reaching a balanced relative value creation and capture in highly coopetitive NPD alliances, reflecting the high stakes and related mutual monitoring that takes place when competitors collaborate (Czakon, 2009; Fernandez et al., 2014; Gnyawali & Park, 2011). This balancing force hints to a specific coopetition advantage which leads to win-win scenarios (Lado, Boyd, & Hanlon, 1997), and which further increases when the partnering firm has high expert power. However, when the focal firm attributes (too) high importance to the NPD alliance, coopetition intensity reduces the VCCE. These relationships are particularly critical for the firm and might exhibit value creation-capture asymmetry because of a felt need among focal firms to limit dependency on direct competitors (Fredrich et al., 2019), or because of other dynamics related to high coopetition tensions (Fernandez et al., 2014; Tidström, 2014).

Our results contribute to theory in the following way: First, at key, our findings contribute to the value creation and value capture challenge in alliances that involve coopetition (Bouncken et al., 2018; Cassiman et al., 2009; Gnyawali & Park, 2011; Rai, 2016; Hoffmann et al., 2018; Garcia-Castro & Aguilera, 2015; Lavie, 2007, 2009; Madhok & Tallman, 1998; Rai, 2016; Ritala & Hurmelinna-Laukkanen, 2009). Given the view of coopetition leading to a balanced value creation-capture scenario, we support the notion of positive externalities for

innovation between firms (Roper, Du, & Love, 2008; Roper et al., 2013), which are also drivers of dynamic complementarities among them (Dyer et al., 2018; Dyer et al., 2008). Complementarities that reduce inertia are related to the positive side of tensions and learning opportunities which have been discussed in coopetition research (Bouncken et al., 2018; Fernandez & Chiambaretto, 2016; Jap, 2001; Tidström, 2014).

Second, in more detail, we contribute insights on the balance of relative value creation and relative value capture that extends and builds on previous research on value creation-capture imbalances (Bouncken et al., 2019; Gesing, Antons, Piening, Rese, & Salge, 2015; Gnyawali & Park, 2011; Hoffmann et al., 2018) in light of the dynamic relational view (Dyer et al., 2018; Dyer et al., 2008). We deliver empirical evidence that enriches the mostly conceptual and case study research in the innovation and coopetition literature on value creation and capture (Gnyawali & Park, 2011; Ritala & Tidström, 2014). Our concept of VCCE extends the ideas of value creation-capture tensions in coopetition and more broadly NPD and innovation alliance research (Ozmel et al., 2017; Ritala & Hurmelinna-Laukkanen, 2009).

Third, our findings provide empirical evidence of how coopetition can drive firms towards more equilibrium in value creation and capture in the product innovation context. Aligned with the equity logic of distributive justice (Luo, 2007), firms are likely to be particularly sensitive to the value creation and capture in coopetition, and closely monitor the balance in such settings. We also found (against our initial expectation) that collaborating with expert power partners further increases the likelihood of a greater (i.e., more balanced) VCCE when coopetition intensity is high. This supports the notion that a partner's expert power can foster knowledge and value creation for the focal firm (Clauss & Bouncken, 2019; Clauss et al., 2019). Due to the expertise, there is potentially more value to be shared, and relatedly more possibilities to find a balance. However, firms should not be overly relying on coopetition because when they are too interested in unilateral firm-level advantages, it might negatively

influence the aspired VCCE. An imbalance might reduce the absolute value created or captured and explain the negative influence of coopetition on innovation as revealed in some previous studies (Cassiman et al., 2009; Nieto & Santamaría, 2007). Similarly, coopetition in our data creates a less balanced VCCE when the relative importance of the NPD alliance to the focal firm is high.

6.2 Managerial implications

Our results provide a basis for suggesting several managerial and practical implications. First, we generally motivate firms to explore collaborative complementarities and positive externalities by pursuing product innovation with coopetition partners. As our results show, coopetition-intensive relationships tend to exhibit highly balanced and "fair" configurations of value creation and capture. Therefore, firms might find their closest competitors as suitable alliance partners for NPD (Gnyawali & Park, 2011), where it is deemed important to have sufficiently balanced inputs from the alliance partners, and also similar capabilities to capture the value. Naturally, firms have also other criteria for selecting competitors as partners (see e.g. Alves & Meneses, 2015; Kraus, Meier, Niemand, Bouncken, & Ritala, 2018). In any case, our results advocate the fact that competitors might be preferred as partners where value creation and capture are equally distributed.

Several more specific implications arise from this notion and more generally from our findings. First, firms understand their own actual and future market position for the new product, but it is also necessary to find approximates and measures of partner's actual and future market position. Here, the classical question of fit also applies but should be extended to the explicit consideration of "non-fit" for risky fields in which opportunism risks are extremely high when collaborating with a competitor. For instance, fit and coopetition tensions need to be considered from the perspective of firm-specific and their partner's level of expertise. Expertise relates to the technology, skill, but also market expertise of the partners. The evaluation matrix

has to cover several actual and future dimensions of fit and non-fit. In addition, firms also need careful evaluation of their motives and the relative (financial) dependence of their respective alliance partners. Important innovation projects might be carried out with external partners, but when there is significant coopetition between the firms, managers might expect problems concerning the instabilities of the VCCE (Das & Teng, 2000; Khanna et al., 1998). Thus, alliance and alliance portfolio managers would benefit from an extended matrix of fit and non-fit concerning the expertise and capability differences among partners, the relative importance of the particular alliances, as well as an evaluation of competitive overlaps and tensions in the alliance portfolio.

Second, as the NPD alliance operates over time, firms need to monitor the balance of inputs and outputs continuously. While we did not use longitudinal data for our study, we can formulate some practical suggestions that relate to future development. Firms should develop criteria about their contributions to and expected results from the NPD alliance and identify consequential actions that will occur if inputs and outputs are not balanced. Firms with a significant alliance experience might have particularly good ideas about what criteria and solution strategies are appropriate (Lee, Hoetker, & Qualls, 2015). Especially in the light of maintaining a more balanced VCCE, firms should agree upon criteria relevant to this balance and the actions to be taken if balance levels judged as reasonable are not achieved.

Third, because coopetition requires simultaneous collaboration and competition, managers should not forget about the existence of competitive tensions and lure themselves into a perception biased by mere collaboration. To resolve potential competitive tensions, managers should actively develop relationship-, task-, and value distribution-related conflict resolution mechanisms and matrixes. Furthermore, when firms have unequal expertise, their conflict resolution mechanisms might be dominated by the partner with greater expert power. Previous research has shown that relationship-, task-, and distribution-based conflicts create biases and

are often hard to separate (Simons & Peterson, 2000). Unfortunately, they can escalate and create "lose-lose" spirals. Thus, firms must identify conflicts – including those prompted by perceived relative value creation-capture imbalances – as soon as they occur, then analyze their bases and quickly apply conflict resolution mechanisms (Behfar, Peterson, Mannix, & Trochim, 2008). This managerial response becomes particularly important in the sensitive context of coopetition-based alliances.

6.3 Limitations and directions for future research

Our research sets additional questions for future research, which partially link to the limitations of our study and the research design. First, our cross-sectional data does not allow us to examine how various determinants lead to the emergence or reduction of a VCCE in NPD alliances over time. Thus, future qualitative and quantitative studies might analyze long-term effects and developments. Considering the high difficulties in gathering longitudinal perceptual measures, future studies might focus on small-N designs for longitudinal data and look into configurations of fewer determinants over time (e.g. via longitudinal fuzzy-set qualitative comparative analysis or necessary condition analysis; Dul, 2016).

Second, we did not examine how the VCCE influences a variety of outcomes and consequences of the relationship for the focal firm or the alliance as a whole. During robustness testing we found that partner's expert power under high coopetition intensity may turn negative and induce a more imbalanced VCCE for highest levels of innovation value (via a significantly negative 3-way interaction), partially supporting our initial arguments for hypothesis 2b. In this regard, future studies might examine not only innovation-related value creation but also could explore the net value captured from mutually created value by multiple actors (Ozmel et al., 2017), for instance.

Third, the different stages of the product innovation process might come with specific balance or imbalance dynamics that future studies might explore (Bouncken et al., 2018).

Furthermore, a key limitation of our study is the one-sided evaluation of dyadic relationships. Yet, the value of a two-sided evaluation is less pronounced for perceptual data. Limited information and information asymmetries (e.g. partner's hidden characteristics) drive managerial decisions under uncertainty – and particularly under competition.

At last, when expert power partners are involved, firms might find it important to guard against the value capture of external parties by using isolating mechanisms (Lavie, 2006b). Isolating mechanisms describe means and governance forms, e.g. intellectual property rights that secure the value of a firm's assets (Hipp & Bouncken, 2009). Future studies might examine isolation and governance mechanisms that influence the VCCE over time.

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Appendix

Table A1. Confirmatory factor analysis

N=471 non-equity NPD alliances *Construct label and item wording*	Std. loading	T-value (MLR)
Global fit from MLR: χ^2=121.73, df=95, P=.034, SCF for MLR=1.034, CFI=.991, TLI=.990, RMSEA=.024, SRMR=.045, free parameters=40, $LogL_{H0}$=–7,941.60 (SCF=1.535), $LogL_{H1}$=–7,878.65 (SCF=1.183).		
Contracts (α=.95, CR=.95, AVE=.86, FL=.06).		
Source: Liu et al. (2010).		
1. Our collaboration is regulated through a comprehensive and clearly worded contract.	.90[a]	63.44
2. The contract with this partner describes in detail every aspect that we think is of interest.	.96	115.28
3. We and our partner fixed all the collaboration related details in a contract.	.92	57.42
Trust (α=.90, CR=.90, AVE=.75, FL=.29).		
Source: Zaheer et al. (1998).		
1. Our partner keeps promises made to our firm.	.85[a]	37.65
2. Our partner is always trustworthy.	.92	50.12
3. Our partner has always been evenhanded in its negotiations with us.	.83	30.82
Expert power of partner (α=.77, CR=.77, AVE=.53, FL=.41).		
Source: Maloni and Benton (2000).		
1. Our partner is an expert in its industry.	.73[a]	18.77
2. Our partner retains business expertise that makes them likely to suggest the proper thing to do.	.74	16.40
3. We respect the judgment of representatives of our partner.	.71	11.52
Coopetition intensity (α=.77, CR=.78, AVE=.54, FL=.02).		
Source: Bouncken and Kraus (2013).		
1. Our partner is also our competitor, with whom we pursue a common goal.	.85[a]	22.07
2. We are in close competition with our partner.	.74	19.70
3. We collaborate with this competitor to achieve a common goal.	.60	13.90
Product innovativeness (α=.86, CR=.86, AVE=.68, FL=.07).		
Source: Lee and Colarelli O'Connor (2003).		
How much value does the relationship generate in the following fields? (1=no value, 5=very much)		
A1. Innovations incorporating technology which is new to customers.	.88[a]	33.60
A2. Innovations offering benefits new to the customers.	.87	37.07
A3. Innovations that introduce many completely new features to the market.	.71	21.12
For each item of the product innovativeness scale we additionally ask categorically (i.e., index of the firm's relative *value–creation–capture–equilibrium VCCE* for calculation of dependent variables):		
'ours/we', 'equal/ly', 'partner's input/partner'		
B1/2/3. Whose relative input/effort for these values is stronger?		
C1/2/3. Who is better in capturing the value?		

Notes: MLR=maximum likelihood robust estimation, df=degrees of freedom, SCF=scaling correction factor, CFI=comparative fit index, TLI=Tucker-Lewis index, RMSEA=root mean square error of approximation, SRMR=standardized root mean square residual, LogL=log likelihood, α=Cronbach's alpha, CR=composite reliability, AVE=average variance extracted, FL=Fornell-Larcker ratio.

[a] Initial loading fixed to 1 to set the scale of the construct.

Table 1. Bivariate correlation matrix

Measures	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. Value–creation–capture–equilibrium	1.00	–.08†	.19***	.03	.11*	.04	.11*	–.14**	.05	.02	.02	.06	.03	.00	–.01	–.01	–.10†
2. Product innovativeness	–.12**	.68	–.04	.21***	.03	.03	–.06	.24***	.18***	–.07	–.11*	.04	–.00	–.05	.06	.04	.17**
3. Coopetition intensity	.22***	–.06	.54	–.01	.06	–.06	.90***	–.03	–.11*	–.00	.01	.12*	.01	.00	.02	–.02	.03
4. Expert power of partner	.03	.27***	–.02	.53	.05	.01	–.01	.23***	.54***	–.01	.11*	.01	.06	.04	–.01	.01	.04
5. Coopetition intensity × expert power	.08†	–.03	.14**	–.12*	.36[a]	.01	.02	–.04	–.02	–.02	.04	.02	.01	–.03	–.02	–.03	–.01
6. Log firm A's relative alliance importance	.02	.03	–.06	.04	.03	1.00	–.11*	.13**	–.00	.06	.14**	–.29***	.17***	–.22***	.13*	.11*	.03
7. Coopetition intensity × A's importance	.12**	–.07	.91***	–.01	.12*	–.20***	.54	–.01	–.11*	–.00	–.03	.10*	–.02	.01	.03	–.05	.03
8. Contracts	–.16***	.31***	–.03	.29***	–.04	.11*	–.04	.86	.21***	.02	–.08†	.10*	.04	–.01	–.06†	.10†	.16**
9. Trust	.09†	.24***	–.17***	.63***	–.12**	–.01	–.16***	.30***	.75	–.01	–.00	.01	.01	.02	.00	.03	.02
10. Relationship stage	.01	–.08†	.01	.03	–.02	.06	.01	.02	.05	1.00	.38***	.03	.07	.14**	.09	–.05	.00
11. Log relationship duration	.02	–.12*	.00	.12**	.02	.15**	–.04	–.11*	–.01	.36***	1.00	.10*	.07	.28***	.11†	.01	–.06
12. Log size of firm A	.05	–.00	.14**	–.03	.01	–.31***	.14**	.10*	–.06	.05	.11*	1.00	–.28***	.41***	–.15*	.11*	.00
13. Relative size	.03	–.00	.01	.10*	–.00	.18***	–.03	.03	.03	.06	.07	–.27***	1.00	–.14**	.13*	.03	–.10
14. Log age of firm A	.01	–.05	–.01	.01	.02	–.26***	.02	.00	.02	.13**	.26***	.46***	–.15**	1.00	–.46***	.01	–.16**
15. Relative age	–.03	.10†	.01	.02	–.03	.19**	.02	–.04	–.01	.06	.07	–.26***	.21***	–.55***	1.00	.03	.21**
16. Log geographical distance	–.03	.07	–.01	–.03	–.02	.14**	–.05	.12*	–.03	–.06	.02	.08	.02	–.07	.05	1.00	–.14*
17. Log R&D intensity of firm A	–.11†	.19***	.02	.06	–.01	.08	–.01	.18***	.04	.00	–.08	–.05	–.05	–.19***	.21**	–.10†	1.00
18. International partner (binary)	–.07	.07	–.08	–.03	.04	.16***	–.12**	.09†	–.05	–.03	.05	.01	.02	–.05	–.02	.77***	–.06
19. Stage 1: Concept development (bin)	.01	.24***	–.05	.10*	–.01	.00	–.05	.07	.09*	–.13**	–.10*	–.03	–.05	–.03	.05	–.14**	.05
20. Stage 2: Concept evaluation (bin)	–.06	.18***	–.08†	.11*	–.01	–.01	–.10*	.12**	.09†	–.08†	–.07	–.04	.02	–.01	.10	–.15**	.09†
21. Stage 3: Planning & specification (bin)	.04	.12**	–.04	.07	–.00	–.07	–.02	.09†	.03	.00	–.03	–.03	.10*	.01	.03	–.14**	.04
22. Stage 4: Product development (bin)	–.03	.12**	–.08†	.03	–.00	.06	–.08†	.05	.03	.07	.06	–.04	.10*	.01	.01	.01	–.01
23. Stage 5: Testing & evaluation (bin)	–.04	.16***	–.03	.19***	.02	.06	–.04	.10*	.09†	.03	–01	–.09*	.09†	–.03	.00	.01	.14*
24. Stage 6: Market launch (bin)	–.10*	.07	–.01	.07	.04	.11*	–.03	.09*	.03	–.00	.02	.00	.08†	–.06	–.02	.03	–.07

Notes: N=471; diagonals represent average variances extracted, above are parametric zero-order Pearson correlations, below non-parametric Spearman correlations.
[a] Squared product term reliability (Aguinis, 1995, p. 1146). † p<.10, * p<.05, ** p<.01, *** p<.001.

Table 2. Hypotheses results

Path on the *relative value–creation–capture–equilibrium* in N=471 non-equity NPD alliances	**Model A** H1	**Model B** +H2	**Model C** +H3	**Model D** all	**Model E** +3 residual covariances +2- & 3-way	**Model F** Balanced rel. value creation only	**Model G** Balanced rel. value capture only
Product innovativeness	–.06(.053)	–.06(.053)	–.06(.052)	–.07(.052)	–.08(.061)	–.08(.060)	–.06(.059)
Log firm A's size	.10†(.052)	.10†(.052)	.12*(.052)	.12*(.052)	.12*(.055)	.13*(.054)	.08(.055)
Log firm A's age	–.10(.064)	–.09(.064)	–.07(.062)	–.07(.063)	–.07(.064)	–.02(.064)	–.10(.065)
Relative size	.06(.049)	.05(.049)	.04(.048)	.04(.048)	.03(.049)	.04(.048)	.01(.048)
Relative age	–.04(.075)	–.04(.074)	–.03(.071)	–.03(.071)	–.02(.069)	–.00(.064)	–.02(.069)
Log geographical distance	.04(.066)	.05(.066)	.03(.064)	.04(.064)	.02(.066)	.04(.062)	–.00(.064)
International alliance	–.05(.055)	–.06(.055)	–.07(.053)	–.07(.053)	–.06(.055)	–.11*(.056)	.01(.055)
Relationship stage	.02(.047)	.02(.046)	.02(.046)	.02(.046)	.01(.046)	.04(.049)	–.01(.048)
Log relationship duration	.02(.053)	.01(.053)	–.02(.053)	–.03(.054)	–.05(.060)	–.08(.060)	.01(.058)
Log firm A's R&D intensity	–.09(.060)	–.09(.060)	–.09(.059)	–.09(.059)	–.10(.060)	–.05(.064)	–.13*(.058)
Year 2015	.13(.103)	.13(.101)	.13(.104)	.13(.102)	.26(.212)	.09(.215)	.35(.217)
Year 2016	.16†(.095)	.17†(.093)	.18†(.096)	.18†(.095)	.36†(.200)	.16(.202)	.46*(.207)
Year 2017	.08(.081)	.09(.080)	.09(.082)	.09(.081)	.23(.236)	.09(.237)	.30(.237)
Medical devices industry	–.18***(.047)	–.19***(.047)	–.17***(.048)	–.17***(.047)	–.18***(.047)	–.11*(.048)	–.19***(.048)
Stage 1: Concept development	.06(.053)	.06(.053)	.05(.052)	.05(.052)	.04(.053)	.06(.052)	.01(.059)
Stage 2: Concept evaluation	–.07(.060)	–.07(.059)	–.08(.060)	–.08(.059)	–.07(.059)	–.12*(.057)	–.00(.065)
Stage 3: Planning & specification	.07(.057)	.07(.057)	.09(.057)	.09(.057)	.09(.058)	.11†(.057)	.04(.058)
Stage 4: Product development	.00(.046)	–.00(.046)	.00(.045)	.00(.046)	–.01(.047)	.00(.047)	–.02(.048)
Stage 5: Testing & evaluation	.03(.052)	.03(.052)	.03(.051)	.02(.052)	.02(.052)	–.04(.054)	.08(.052)
Stage 6: Market launch	–.11*(.048)	–.12*(.048)	–.12*(.048)	–.13**(.048)	–.12**(.048)	–.10*(.049)	–.11*(.047)
Contracts	–.12*(.048)	–.11*(.049)	–.13*(.048)	–.12*(.048)	–.14**(.054)	–.08(.055)	–.16**(.054)
Trust	.09*(.046)	.09†(.048)	.09*(.046)	.08†(.047)	.10†(.079)	.03(.059)	.14*(.058)
H1: Coopetition intensity	.15**(.047)	.14**(.046)	.14**(.046)	.14**(.045)	.08(.111)	–.02(.110)	.16(.116)
H2a: Firm B's expert power		.02(.059)		.03(.057)	.39†(.216)	.30(.210)	.37†(.209)
H2b: Coopetition × expert power		.10*(.049)		.10*(.047)	.15*(.076)	.06(.075)	.20*(.077)
H3a: Firm A's alliance importance			.10*(.048)	.10*(.047)	–.04(.148)	.05(.150)	–.11(.153)
H3b: Coopetition × importance			–.11*(.046)	–.11*(.045)	–.14*(.054)	–.11*(.049)	–.12*(.059)
Expert power × importance					.06(.069)	.00(.072)	.10(.068)
Coopetition × expert power × importance					.01(.064)	.06(.062)	–.04(.069)
Sample-size adjusted BIC	33,113.05	33,114.63	33,108.17	33,109.92	33,119.08	33,136.27	33,123.20
LogL (no. of free parameters)	–16,425.36 (88)	–16,423.17 (90)	–16,419.94 (90)	–16,417.83 (92)	–16,414.96 (97)	–16,423.56 (97)	–16,417.02 (97)
Scaling correction factor for MLR	1.279	1.271	1.271	1.263	1.244	1.237	1.244
Scaled chi-square difference TRd (Δdf):		χ^2(2)=4.70	χ^2(2)=11.46	χ^2(4)=16.49	χ^2(5)=6.37		
P-value for scaled difference:		*p*=.095	*p*=.003	*p*=.002	*p*=.272		

Notes: *** P < .001, * P < .05, † P < .10. df = degrees of freedom, MLR standard errors in parenthesis.

Table 3. Summary of hypothesis testing

No.	Hypothesis	Boundary conditions
H1+	Coopetition intensity *fosters* a more balanced value-creation-capture-equilibrium (VCCE).	Conditional support (for the value-capture-equilibrium with an expert power partner & low relative alliance importance).
H2a+	Partner's expert power *fosters* the VCCE.	Conditional support (for the value-capture-equilibrium under high coopetition intensity).
H2b–	Partner's expert power *negatively* moderates the *positive* association between coopetition intensity and the VCCE.	Reject (and *positively* support for the value-capture-equilibrium).
H3a+	Focal firm's relative alliance importance *fosters* the VCCE.	Conditional support (under low coopetition intensity).
H3b–	Focal firm's relative alliance importance *negatively* moderates the *positive* association between coopetition intensity and the VCCE.	Strong support.

Figure 1. Research model

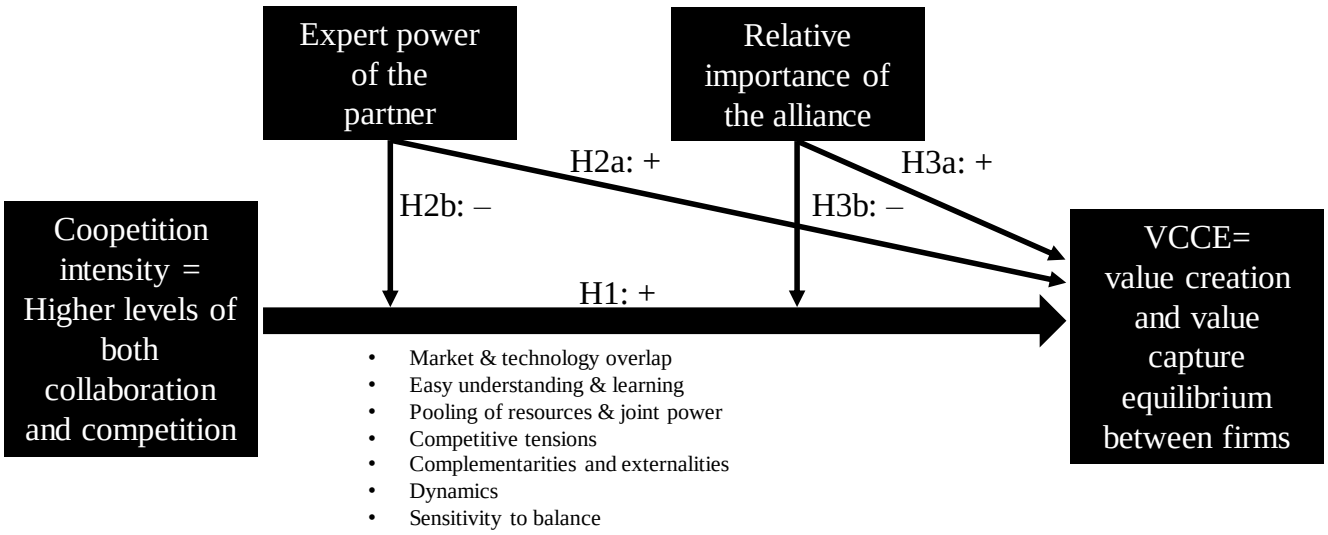
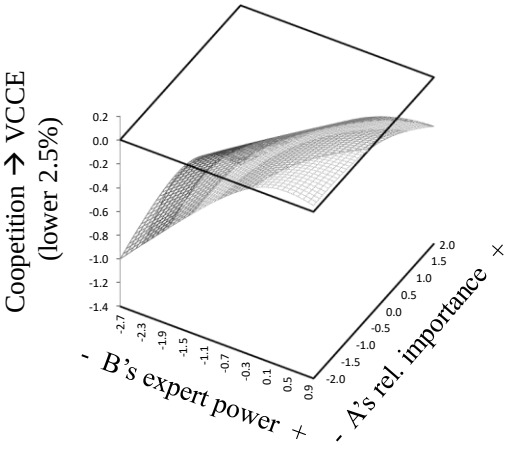
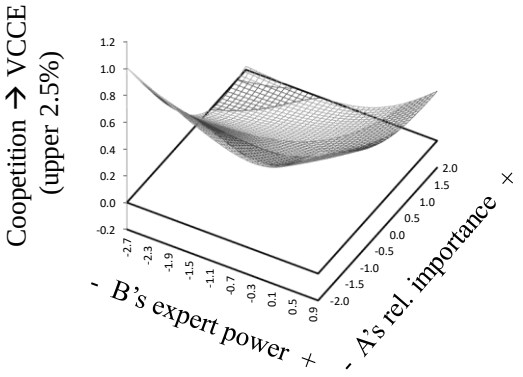
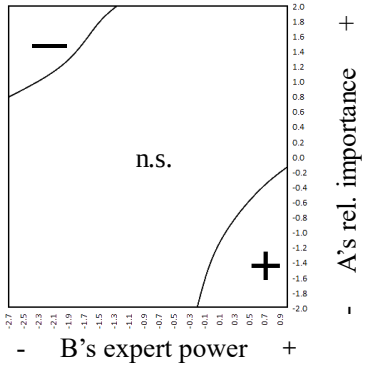


Figure 2. 3-way interaction of the marginal effect of coopetition intensity on the value–creation–capture–equilibrium VCCE under varying expert power and relative alliance importance

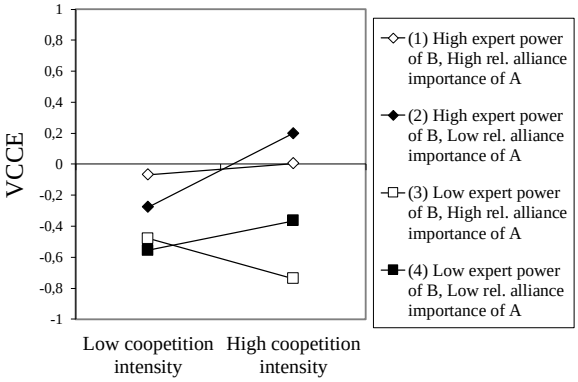




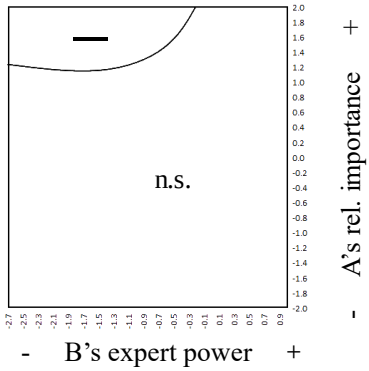
Combined lower & upper bounds of coopetition → VCCE (model E)



Mean levels of VCCE (model E)



Combined lower & upper bounds of coopetition → VCreateE (model F)



Combined lower & upper bounds of coopetition → VCaptureE (model G)