Review of Managerial Science
https://doi.org/10.1007/s11846-023-00676-3

ORIGINAL PAPER

Micro-coopetition: conceptualizing and operationalizing coopetitive managerial decision-making over time—a game theoretic approach

Andrea Gelei[1] · **Imre Dobos**[2]

Received: 3 December 2022 / Accepted: 25 May 2023

Abstract
The purpose of the paper is to provide a conceptualization and an aligned game-theoretic operationalization of the dynamic coopetitive managerial decision-making process. The proposed two-step sequential game uses existing game theoretical constructs but combines them in a unique way. One of its important positive features is its capacity to make the performance implications of all potential coopetitive decisions in a relationship episode explicit, together with the interplay among them. The lack of such a feature has been recognized as a severe limitation of extant literature, hampering further theoretical and methodological development. The proposed solution gives insights into how moment-by-moment managerial decisions unfold over time and possibly result in disequilibrium states, generating tension. Managerial attributes play a key role in effectively managing such moments, it is suggested. Based on the proposed operationalization, behavioral experiments can be designed through which future empirical research can develop appropriate data sets and test the widely hypothesized roles of these attributes, which can result in more reliable and generalizable research results. Besides the theoretical and empirical value of the proposed conceptualization and operationalization, the paper is of value to decision makers, as it makes the internal complexity of the coopetitive strategizing and its inherent interdependencies explicit, providing practical insights into this complex phenomenon.

Keywords Coopetition · Strategy-as-practice · Decision making · Behavioral attributes · Game theoretic operationalization

✉ Andrea Gelei
andrea.gelei@uni-corvinus.hu

Imre Dobos
dobos.imre@gtk.bme.hu

[1] Department of Supply Chain Management, Corvinus University of Budapest, Budapest, Fővám Tér 8., 1093, Hungary

[2] Department of Economics, Budapest University of Technology and Economics, Budapest, Műegyetem Rkp. 3., 1111, Hungary

Published online: 21 June 2023

JEL Classification L19 · L21 · M21 · C79

1 Introduction

Increasing number of articles reflects the importance of coopetition (Gernsheimer et al. 2021; Meena et al. 2023). However, many studies point out that understanding is hampered by both theoretical and methodological limitations (Bengtsson et al. 2016b). Specifically, we have limited understanding of coopetitive dynamics (Devece et al. 2019; Bouncken et al. 2020a,b; Klimas et al. 2022; Crick and Crick 2021b), of its 'dark side' (Bengtsson et al. 2016a,b; Gnyawali et al. 2016; Crick an Crick 2021b; Virtanen and Kock 2022), and its micro-foundations (Marcel et al. 2011; Gnyawali et al. 2016; Crick et al. 2020) that could provide explanation for the underlying mechanisms of coopetitive strategy formulation (Gnyawali and Ryan Charleton 2018; Klimas et al. 2022; Wang and Chen 2022) and its contradictory performance implications (Bouncken and Kraus 2013; Le Roy and Czackon 2016; Gnyawali et al. 2016; Raza-Ullah 2020). Additionally, we need novel research methods (Bengtsson et al. 2016b) and more quantitative studies with large scale data for greater reliability and generalizability (Crick et al. 2020).

In line with these, the paper discusses coopetitive dynamics from a conceptual and methodological approach. It understands coopetition as a relational strategy between competitors (Bengtsson and Kock 2014; Gnyawali et al. 2016) that is necessarily paradoxical since it relies on divergent interests (Bengtsson and Kock 2000). This implies that tension is a fundamental feature of any coopetitive relationship (Crick 2019; Raza-Ullah and Kostis 2020). How it is managed by the decision makers seems to have direct consequences on the performance of both the relationship and its constituent firms (Chiambaretto et al. 2019; Czakon et al. 2020a). The behavioral approach to coopetition (Crick 2020; Czakon et al. 2020a, b) posits a causal relationship between individual managers' attributes and their coopetitive behavior, i.e. how they manage tension. However, due to superficial conceptualization and operationalization of coopetitive decisions and their performance implications (Rai 2016), extant literature cannot decouple the empirical analysis of the cognitive and the behavioral attributes of managers, even though Czakon et al. (2020a) found that these are distinct constructs. If performance implications remain perceptual (Letcher et al. 2021), this might lead to *ex post* rationalization (Marcel et al. 2011) and make the analysis of behavioral attributes biased. Thus, the objective of the paper is to develop a conceptualization for the coopetitive decision-making process and propose an operationalization capable to overcome these limitations.

Based on the strategy-as-practice-approach (Jarzabkowski 2005) and the concept of micro-competition (Jarzabkowski and Bednarek 2018) we conceptualize coopetition as a dynamic process (Klimas and Czakon 2022) of interlinked strategic decisions that are made by individuals. Aligned with this, we present an operationalization uniquely combining existing game theoretical constructs. An important positive feature of this is its capacity to show all potential performance implications of coopetitive strategizing and reflect their interdependencies (Weigelt and MacMillan 1988). Thus, the proposed operationalization provides a solution for the methodological challenge mentioned, since it makes the decision problem's cognitive representation straightforward. It is illustrated by a numerical example highlighting how decision-moments loaded with tension develop over time, how the inherently contradictory logic of coopetition manifests itself (Bengtsson and Kock 2014; Raza-Ullah et al. 2020) and can result in a win–win, but also in a win-lose situation, or even lead to decreased performance for both parties. We argue that based on the proposed conceptualization and operationalization, behavioral experiments can be designed to develop rich datasets for further empirical studies making the analysis of the hypothesized role of managerial attributes less biased, more reliable, and generalizable. The paper provides a discussion on these attributes as well. Besides the theoretical and methodological added value of the paper, it adds value for practitioners by modelling the coopetitive strategy formulation process and providing direct insight into its complexity and structural interdependencies.

2 Setting the scene—limitations of the coopetition literature

An increasing number of papers call for research that delves deeper into the dynamics of coopetition and analyses how and why it unfolds over time (Bengtsson et al. 2016b; Letcher et al. 2021; Dagnino et al. 2021). This is particularly important for understanding the 'dark side' of coopetition (Bengtsson et al. 2016a; Gnyawali et al. 2016; Virtanen and Kock 2022), and how it can result in a win–win (Brandenburger and Nalebuff 1995, 1996), but also in a win-lose situation (Le Roy and Czackon 2016), or even lead to decreased performance for both participants (Gnyawali et al. 2016; Raza-Ullah 2020). One driver of these contradictory results is the paradoxical nature of coopetition, and how it is dealt with (Smiljic et al. 2022; Bengtsson and Raza-Ullah 2022).

Coopetition is inherently paradoxical. Competitors might cooperate because pooling and combining resources offers the possibility of higher joint value creation. Still, they remain competitors having the overall objective to outperform each-other (Gnyawali and Park 2011; Ritala and Hurmelinna-Laukkanen 2009; Dahl 2014; Bouncken et al. 2020a). In the long run, they seek a better competitive position (Porter 1985; Le Roy and Czackon 2016) or competitive advantage over the other (Gnyawali et al. 2016). Thus, coopetition is based on diametrically opposite assumptions (Bengtsson and Kock 2000; Ritala and Tidström 2014; Bouncken et al. 2015). The nature of this paradox implies that tension is an inherent feature of any coopetitive relationship (Bengtsson et al. 2016c; Fredrich et al. 2019; Chai et al. 2019; Crick 2019; Raza-Ullah and Kostis 2020). It is the perceived relational strain of decision-makers (Letcher et al. 2021) in a critical decision-moment when a friction arises (Gnyawali and Ryan Charleton 2016), a cognitive challenge of managers involved in coopetition (Chen et al. 2019; Raza-Ullah et al. 2018). Tension might have positive and negative implications on coopetitive behavior and thus on performance (Chiambaretto et al. 2019). Tension (Gnyawali et al. 2016) might lead to free riding (Das and Teng 2000), and opportunistic behavior (Raza-Ullah et al. 2014; Tidström 2014). Once a partner makes an unexpected, opportunistic action, the counterpart might also react to this in a similar way leading to sub-optimization

(Zeng and Chen 2003). Managing coopetition is mainly interpreted as managing its inherent tension (Chiambaretto et al. 2019; Czakon et al. 2020a). Still, “we know little concerning the nature and materialization of this paradox” (Raza-Ullah et al. 2014: 189), and we lack a developed theory of how coopetition and related tension manifest themselves, and how these factors affect outcomes (Gnyawali and Ryan Charleton 2018).

The behavioral approach to coopetition (Crick 2020; Czakon et al. 2020a, b) posits a causal relationship between individual managers' behavioral attributes and their coopetitive behavior, i.e. how they manage tension. Nevertheless, existing research rarely analyses these idiosyncratic attributes (Marcel et al. 2011; Czakon et al. 2020a,b). One of the reason for this is that coopetition has not only behavioral but also rational antecedents (Lewis 2000; Levinthal et al. 2011; Narayanan et al. 2011; Bengtsson et al. 2016b,c). Some authors argue that this is what ultimately drives coopetition (Gnyawali and Ryan Charleton 2018; Czakon et al. 2020b). Using large-scale statistical data, Czakon et al. (2020a) have empirically tested both antecedents and found that they are conceptually and empirically distinct. This means that analyzing the behavioral consequences of coopetition is problematic whenever performance implications of coopetitive decisions are ambiguous, which is usually the case (Rai 2016).

Several papers have criticized the established practice of coopetitive performance measurement and have identified shortcomings that severely limit the research on coopetition (Olk 2002; Müller 2010; Pateli and Lioukas 2012; Bengtsson et al. 2016a, b). The critique discusses measurement problems associated to both value creation and capture. The total value created is conceived as the sum of individual firm-level values generated by a cooperative interaction (Ritala and Hurmelinna-Laukkanen 2009; Bouncken et al. 2020a). While the total value generated is a relationship-level (dyadic) concept, value capture is a firm-level construct indicating a firm's return that stems from a competitive interaction (Lavie 2006; Bouncken et al. 2020a). It reflects the proportion of the total value created that a firm can individually appropriate (Ritala and Hurmelinna-Laukkanen 2009). The most important concern in relation to measuring value creation is that some measures capture value appropriation. Several papers have operationalized value generation through financial indices, like higher share prices (Kale et al. 2002; Gulati and Wang 2003). However, these are firm-specific measures capturing some aspects of the value captured, not value creation, which is a relation-level, aggregated construct. Additionally, firm-specific measures cannot automatically indicate value appropriation either, since suitable measures should indicate the individual share of the overall value created by the partners (Ritala and Hurmelinna-Laukkanen 2009). Firm-specific financial measures, such as a higher share price, indicate hardly comparable values, although value capture is—by definition—a relative one.

In the present case of superficial conceptualization and inadequate measurement of coopetition outcomes, *ex post* rationalization of coopetitive decisions might be prevalent (Marcel et al. 2011) and perceptions concerning these implications will drive actual behavior (Lant and Baum 1995; Czakon et al. 2020b; Virtanen and Kock 2022). A severe problem with these perceptions is that actors might have different perceptions about potential and/or appropriate outcomes that adds further complexity to studying coopetitive behavior and its antecedents (Letcher et al. 2021).

In conclusion, the current operationalization of measuring the performance implications of cooperation is an obstacle to further developments and makes it difficult to understand the mechanisms of an effective coopetitive decision-making process. The next section presents a conceptualization of this process that provide the opportunity to develop an operationalization capable to explicitly show all potential performance implications of coopetitive decisions over time (in both absolute and relative terms) and their interplay. Without this, the analysis of behavioral attributes of the decision makers cannot result in reliable results, nor will it be able to capture those critical decision situations—or moments—in which tension arises and the prerequisites of effectively managing the coopetitive paradox are embedded.

3 Proposing a process-based and dynamic conceptualization of coopetition

As mentioned, the paper understands coopetition as a specific relational strategy between competitors (Bengtsson and Kock 2014; Gnyawali et al. 2016; Dahl et al. 2016) that is carried out by their representatives in a dynamic process. This is in line with the strategic management literature; specifically, with the strategy-as-practice approach (Jarzabkowski 2005; Whittington 2006) which interprets strategy formulation as a "socially accomplished activity" (Jarzabkowski et al. 2007: 4) while at the same time emphasizing that strategy is formulated by individuals, who are mainly executives from the top levels of an organization (Mariani 2007; Gnyawali and Park 2011).

Jarzabkowski and Bednarek (2018) developed the concept of micro-competition that evolves over time along several interactions related to different strategic issues, like a new product offering, or a pricing decision.[1] These are issues that make up the focus of everyday competitive practices, where specific decisions are formulated. Decision-makers in any such strategic interaction have two alternatives: to make a cooperative or a competitive decision. Thus, any coopetitive interaction in a relationship can lead to four potential decision situations with different sets of managerial decisions: (1) both decision-makers in the dyad chose to compete on a specific strategic issue, (2) both cooperate; or (3) one of the partners (decision maker *A*) decides on a competitive, while the other (decision maker *B*) on a cooperative move or (4) vice versa. Performance outcomes of these situations might vary. Thus, they represent the smallest analytical levels where the root cause of coopetitive performance (Rai 2016), tension and thus that of coopetitive dynamics (Bengtsson et al. 2016b, 2016c; Jarzabkowski and Bednarek 2018) shall be looked for (see Fig. 1).

[1] Although Jarzabkowski and Bednarek (2018) analyse a broader phenomenon compared to our dyadic focus, the development of the reinsurance market, they argue that even this broader phenomenon is shaped by the everyday decisions of the managers involved.

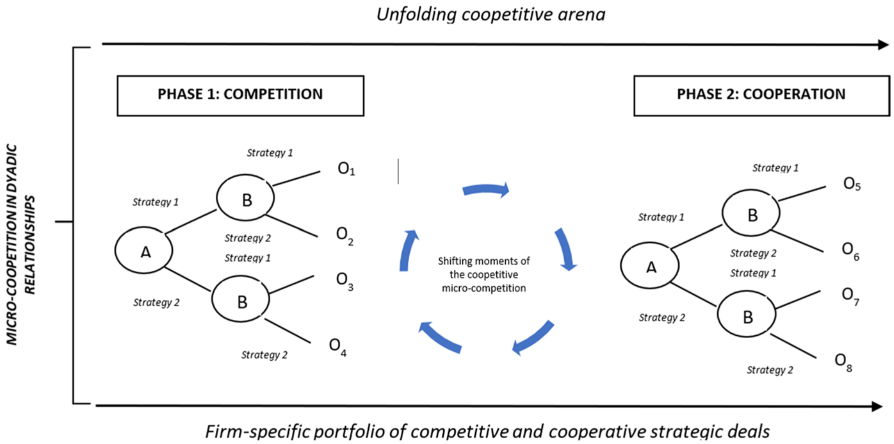

Fig. 1 Relevant analytical levels of coopetitive strategizing and their relationships (based on Jarzabkowski and Bednarek 2018:814) (*A* and *B* are the two decision-makers, Strategy 1 represents a competitive while Strategy 2 a cooperative decision; supposing sequential decisions where *A* is the first mover; O_1…. O_8 represent outcomes of specific decision situations)

Strategy formulation has a temporal dimension. Coopetition is more a process than a discrete situation (Bouncken et al. 2015). Interactions between counterparts evolve over time, thus time is an “inherent feature” (Holmlund 2004: 33) and a significant aspect of studying coopetition (Tidström 2008; Yami et al. 2010; Dahl et al. 2016). Jarzabkowski and Bednarek (2018) found that individual decisions of managers are neither competitive nor cooperative per se. They found highly dynamic and hard-to-predict behavior over time and explained this by the interplay between subsequent interactions. Each interaction potentially involves both relational and rivalrous moments, and actual behaviors change “in the moment-by-moment unfolding of their actions” (Jarzabkowski and Bednarek 2018: 819).

Specific decision situations of a coopetitive interaction might lead to different outcomes for the players, both in absolute and relative terms. These different outcomes and the interplay between outcomes of other potential decision pairs is expected to influence actual decisions (Lewis 2000; Narayanan et al. 2011). Thus, all decision situations shall be evaluated from the perspective of both players, and not only at a given point in time, but over several interactions.

Game theory provides appropriate terms and solutions for modelling potential performance implications of the dynamic managerial decision-making process conceptualized in Fig. 1. Coopetition has always been closely linked to game theory (Devece et al. 2019; Meena et al. 2023). Even the seminal work of Brandenburger and Nalebuff (1995) on coopetition uses it to illustrate how actual decision pairs can have different, even negative, performance outcomes depending on factors such as one party’s expectations regarding the other actor’s behavior. Weigelt and MacMillan (1988) have argued that an important advantage of modelling strategic decision-making processes using game theoretical constructs is the fact that these decisions are made with respect to the interdependencies of the payoffs to both decision makers. Surprisingly, though, the analysis of coopetitive decision-making still fails to utilize the full potential of the tools game theory provides. This might be because game theory research mainly focuses on equilibrium and is less prepared for modelling the complex and dynamic interactions of the real world that are often in a disequilibrium state (Chen et al. 1992).

4 Operationalizing the dynamic coopetitive strategizing process using game theoretical constructs

This section discusses the limitations of existing game-theoretical approaches to operationalizing coopetitive decision-making and proposes a new one that is in line with the concept of micro-coopetition. As a next step, the section provides a numerical example that will be used for mapping coopetitive dynamics and paradoxical tension.

4.1 Coopetitive decisions in game theory—limitations and opportunities

A game theoretical approach to coopetitive decision-making is useful because it helps to overcome a severe limitation of existing research, namely the incompleteness of information about potential performance implications. This can considerably hamper managers' efforts at selecting appropriate strategies (Chen and MacMillann 1992). The same limitation hinders research into the role of different managerial attributes in coopetitive behavior, how they come with related tension, and its inherently paradox nature.

Any coopetition includes a minimum of one cooperative and another competitive interaction (Brandenburger and Nalebuff 1995, 1996; Bengtsson and Kock 2000). Based on Holmlund (2004), we call the analytical level of such two interlinked interactions as a coopetitive episode. Several papers with a game theoretical background capture coopetition at this episode level, through two separate games (De Ngo and Okura 2008; Ritala and Hurmelinna-Laukkanen 2009). The competitive interaction is captured with a zero-sum game, while the cooperative with a positive-sum game. However, these games (for example the Stag hunt or the Prisoners' dilemma) have specific, pre-designed structures, and payoff functions. Performance outcomes of real-life strategic interactions are much more diverse than these and might have highly different sets of potential outcomes. Thus, we argue that these traditional two-step game designs cannot capture all relevant performance implications of real-life coopetitive strategic scenarios, not even at an episode level. Therefore, they cannot model related complexity and dynamics either.

Another stream of research within game theory suggests that both elements of this paradoxical phenomenon should be analyzed within a single game (Carfì 2015). Here, a competitive behavior (decision) is captured by choosing the Nash equilibrium, while the cooperative behavior by the best Pareto optimum of the game. Choosing the Pareto optimum in a game represents cooperative behavior since it results in the highest total, relationship-level value creation (common value creation

Table 1 Game 1

	Player *B*	
Strategies	1	2
Player *A*		
1	2,4	*7,2*
2	**5,3**	3,1

or utility). Choosing the Nash equilibrium of a game is the benchmark of the competitive behavior because if a decision-maker decides to behave differently, his/her individual utility will certainly be lower (affecting his/her relative value capture as well). We note that a game may have several Pareto optima. The best Pareto optimum of the game is the Pareto optimum for which the total utility of the two players is the greatest. We illustrate these with a numerical example, using *Game 1* (see Table 1). It is a one-step game with two players (relationship partners) representing a specific strategic issue with two strategic alternatives. The payoff values (performance implications) for both decision alternatives of Player *A* and introduced the literature calling for future research are as follows:

The Nash equilibrium of this game is 5,3 with strategy (2,1) representing competitive behaviors on both sides. Let us now consider the Pareto optimums of *Game 1* that represents cooperation. It has three Pareto optima from which *strategy (1,2) provides the highest relationship-level outcome, and represent the best Pareto optimum*:

- utilities 2,4, i.e. strategy (1,1) with common utility, that is relation-level value creation 6;
- *utilities 7,2, i.e. strategy (1,2) with common utility 9;*
- utilities 5,3 strategy (2,1) with common utility 8 units.

After this short game theoretical introduction, we propose a new solution for operationalizing the dyadic coopetitive decision-making over time. To simplify discussion but keep the relevant features of coopetitive dynamics that are inherent in horizontal coopetition, we first present our proposed solution at the level of a coopetitive episode. In line with the dynamic conceptualization of coopetitive strategizing (see Fig. 1), this time horizon can be extended with additional interactions, both cooperative and competitive. The proposed operationalization is as follows:

1. A coopetitive episode is modelled with a so-called two-step sequential game. The game is sequential because the two games represent the two strategic interactions and are assumed to follow each other in time, sequentially. Each game stands for a strategic interaction where both players have two strategic decision alternatives: to cooperate or compete.
2. Literature on coopetitive performance focuses on value creation and capture. Value in general is understood as the rent-earning capacity of assets (Madhok and Tallman 1998) and is generally represented in game theory by transferable utilities, the payoff functions of the games. Performance implications of all the

aligned decision situations in the proposed two-step sequential game reflect all the potential interdependencies of the payoff functions, at both interaction and episode levels. These payoff functions are not easy to specify since they depend on several factors. However, they can be estimated, and these estimates used for further analysis. We also note that from a behavioral perspective the critical issue is that these values are known to the decision-makers before a specific strategic decision must be made, and not their specific values.

3. Competitive behavior of a decision-maker in a game (interaction) is benchmarked by the Nash equilibrium, while the cooperative by the best Pareto optimum. Thus, a game is considered as competitive, in case both players pursue the Nash equilibrium in their decisions, or cooperative, if the same players seek the best Pareto optimum of the game (Gibbons 1997). Theoretically, each interaction could be interpreted as intentionally either cooperative or competitive, but the development of the coopetitive episode will be determined by the moment-by-moment decisions of the player as Jarzabkowski and Bednarek (2018) have conceptualized.
4. We model a coopetitive episode in horizontal relationships. Partners might pursue both competitive and cooperative behaviors at the interaction level. However, at the relationship level they are assumed to follow individual rationality pursuing maximal utility, aiming to achieve a better competitive position over the other. The two interactions of a coopetitive episode, modelled by the two-step sequential game with their known payoff values, make it possible to calculate the so-called episode level coopetition composed solution matrix, by summing up the respective payoff values of the two separate games. The matrix explicitly shows the performance implications of any potential decision pairs of the two strategic interactions in the episode. It indicates them in absolute terms; however, relative values (value capture) can also easily be calculated. Thus, the performance implications of all potential decision pairs—and their interplay—become explicit. Decision-makers can consider these implications and interplays at both the level of a specific strategic interaction and at an episode level, from the perspective of both the value created and captured. Since these complex performance implications are no more biased, the role of behavioral attributes can be reliably analyzed.

4.2 Illustrating the proposed operationalization

The above proposed operationalization is used in a numerical example. It shows how complex, ambiguous, and dynamic these decisions might be. We follow the paper by Crick and Crick (2021a) discussing two concrete strategic interactions of a coopetitive episode in the context of internationalization. They argue that a low level of export intensity amplifies rivalry, while increasing it lowers it. Similarly, a narrow geographical scope of the export increases the intensity of competition between partners, while broadening this scope will reduce it. Thus, the decisions to set the level of export intensity and the geographical scope of the export (reduce or increase them) represent two strategic interactions.[2] Our numerical example is hypothetical,

[2] For simplicity, we assume that the payoff functions of the two games do not depend on each other that is typical, when the two interactions of a coopetitive episode represent one 'customer close' interaction

Table 2 Game 2

	Player *B*	
Strategies	1	2
Player *A*		
1	3,4	6,5
2	2,3	**5,7**

Table 3 The episode-level coopetition composed solution matrix of the two-step sequential game

		Player *B*			
		[1,1]	[1,2]	[2,1]	[2,2]
Player *A*	[1,1]	5,8	8,9	10,6	13,7
	[1,2]	4,7	7,11	10,5	<u>12,9</u>
	[2,1]	8,7	*11,8*	5,5	9,6
	[2,2]	7,6	**10,10**	5,4	8,8

since we do not have information on a specific relationship considering these strategic decisions. Thus, we have specified the payoff functions randomly. For simplicity, we use the payoff values of *Game 1* as a starting point. This game represents the first, an intentionally competitive interaction of the coopetitive episode concerning export intensity where *A* is the first mover. As discussed above, the Nash equilibrium of the game is given by the strategy pair (2,1), which means a pair of utilities 5,3 for player *A* and *B*, respectively (Table 1). At an interaction level, the competitive behavior of the players would generate 8 utilities (values) in total, a 37.5% relative value capture for player *A* and 62.5% for *B*.

Table 2 presents the second, the intentionally cooperative strategic interaction of the episode concerning the geographical scope of the export. Cooperative behavior is captured by the best Pareto optimum of the game. Thus, the utility values are summed up and the highest is chosen, which is the outcome of the strategic decision pair of (2,2). The relationship-level performance outcome of this cooperative strategy pair is 12 utilities in total, and the value capture of player *A* is 41.7%, while it is 58.3% for *B*.

The Nash equilibrium of this second game would be the strategy pair (1,2), which would mean a pair of utilities 6,5 for the two players, 11 utilities generated in total, with a 54.5% value capture for *A*, and 45.5% for *B*. Clearly, different decision pairs result in different relationship-level value creation but also in different relative value captures for both players.

The sum of the respective payoff values of all the potential strategic decision pairs of the two games (in Tables 1 and 2) defines the episode-level coopetition composed

Footnote 2 (continued)
(e.g. marketing campaign for a higher market share), and another that is 'customer far' (e.g. joint utilisation of production facilities).

Table 4 Potential relationship- and firm-level values created and captured in the episode—the three distinguished states of the two-step sequential game

	Relationship-level total value creation at episode level	Value captured by player A at episode level	Value captured by player B at episode level
The coopetitive state of the episode	20	10 (50%)	10 (50%)
The Nash equilibrium of the episode	19	11 (57.9%)	8 (42.1%)
The best Pareto optimum of the episode	21	12 (57.1%)	9 (42.9%)

solution matrix (Table 3) indicating all potential performance implications of the episode.

Both decision makers have two alternatives in each interaction making up the episode: to cooperate or compete. Thus, the matrix includes four possible alternatives. These are indicated in brackets. For example, decision pairs ([1,1], [1,2]) in Table 3 show that if player *A* would choose Strategy 1 in both interactions, while player *B* would follow Strategy 1 in the first, and Strategy 2 in the second interaction, player *A* would have achieved 8 episode-level individual utilities, while player *B* 9 utilities. This would represent a total value creation of 17 utilities for the relationship on episode level leading to 47% value capture for player *A* (8/17) and 53% for *B*.

The first interaction is originally meant to be a competitive, and the second a cooperative game. Thus decision-makers are expected to follow the Nash equilibrium in the first interaction by choosing (2,1) strategy pair, and the best Pareto optimum in the second interaction by choosing (2,2). The state resulting from these two strategy pairs, is called the coopetitive state of the two-step sequential game. It indicates the combined performance implication of the two specific decision-pairs made as originally expected. As the matrix shows, they would result in **20 utilities** in total, and a 50–50% value capture for both players at an episode level.

It is easy to determine the *best Pareto optimum* of the two-step sequential game in the matrix: 12,9. It has a total utility of 21; underlined in Table 3. It is achieved when players cooperate in both games. Finally, we determine the *Nash equilibrium* of the matrix that is achieved by two subsequent competitive decisions of both players following strategies ([2,1] [1,2]) with a total value of 19 created. Table 4 summarizes the potential performance implications for the three above-discussed distinguished states of the coopetitive episode, in both absolute (value created) and relative (value captured) terms.

5 Unfolding coopetitive dynamics, understanding moments of tension and how it can effectively be resolved

Using our numerical example, this section illustrates the dynamic nature of coopetitive strategizing and shows how and why critical decision-situations may evolve over time. Then, we introduce the methodology of a behavioral experiment that can be used for modelling dynamics and test the hypothesized role of their drivers.

5.1 Mapping dynamics in a coopetitive episode and identifying moments of paradoxical tension

We observe that the coopetitive state of the two-step sequential game in our example represents a balanced position for the players. However, we note that *A* could achieve both a higher overall value capture (11 utilities) and a better relative position (57.9%) pursuing the Nash equilibrium of the episode, the strategy pair [(2,1),(1,2)]. However, this would result in a lower value generation for player *B* and a much worse position relative to *A,* compared to the coopetitive state. Total, relationship-level value generated in the episode would also decrease by 1 utility.

The best Pareto optimum of the episode can be achieved by the [(1,2),(2,2)] strategies representing cooperative behaviors on both sides. The result would be an increase in the total value generated (21 utilities) compared to the previously discussed states. Additionally, it would result in the highest overall value capture (12 utilities) for *A*, and still a better relative position compared to the coopetitive state: 57.1%. However, compared to the coopetitive state, this would lead to less value generated and captured for *B*.

As Brandenburger and Nalebuff (1996) highlight, coopetition between alliance partners is rational only when it leads to better performance than they could have achieved without collaborative endeavors. This means that the goal should be to give players a higher utility compared to the Nash equilibrium of the matrix. In the case of competitive state, this failed for player *A* because he/she lost 1 utility, while player *B* won 2 utilities. If players reach the best Pareto optimum in the matrix, a similar problem occurs.

Additionally, not only absolute values might influence coopetitive decisions since partners are competitors who strive for a better competitive position (Porter 1985; Le Roy and Czackon 2016). As we see, different decision pairs of the two subsequent games result in different overall, relationship level value generation, but also in different firm level value capture and competitive positions.

The two cooperative interactions could lead to the highest overall value creation, but a better position for *A* over *B* (see Table 4). To achieve this, would necessitate to follow the best Pareto optimum of Game *1*, which is the strategy pair (1,2), and to choose strategy pair (2,2) in Game *2*! However, we can suppose that player *B* might realize the potential negative consequences of these subsequent decision-pairs at an episode level, since these strategies would result for *B* in a loss of 1 utility in absolute terms and a less favorable competitive position (only 42.9% value capture instead of 50%).

How specifically player *B* would react to a cooperative move of *A* in Game *1*? We cannot know for sure since it might be influenced by several factors. However, we have knowledge of how potential reactions of *B* would affect performance both on individual and relationship level, and both in absolute and relative terms (see Table 3).

Let us suppose that player *A* decided on a cooperative move in Game *1* and chose Strategy 1. Player *B* might react to this by either following Strategy 1 or 2 in the same Game. In case he/she would decide on Strategy 2, the payoff values would be 7,2 compared to Strategy 1 with 2,4. Strategy 2 would demonstrate a strong willingness of player *B* to cooperate since it leads to the best Pareto optimum of Game *1* with the highest overall value creation on relationship level, but also with the lowest value generation for *B* and his/her worst interaction-level position (22.2%). Let us suppose that *B* has the inclination to cooperate in Game *1*, leading to a (1,2) strategy pair. How would decisions in Game *2* affect the episode level performance implications? Table 5 summarizes them.

After *B* has decided to follow the cooperative effort of *A* in Game *1*, he/she shall continue to follow this approach in Game *2,* if we suppose the players to be rational decision-makers. This would result in the highest relationship-level value creation (**<u>21</u>**), his/her highest individual value creation (**<u>9</u>**), also to his/her best relative value capture (**<u>42.9%</u>**) and so in his/her best relative position at the end of the episode (Fig. 2).

What happens, when player *B* does not follow the cooperative decision of player *A* in Game *1?* Instead, he/she decides to follow Strategy *1*. Table 6 summarizes all potential performance implications of this decision.

An important performance implication of the (1,1) strategy pair in Game *1* is the fact that the relative positions of the players at the end of the episode are the opposite compared to the positions of the decision pair (1,2) of Game *1*; regardless of what strategies the parties decide to play in Game *2*! In case of the cooperative strategy pair of (1,2) in Game *1*, *A* will always be in a better position than *B*. In case of the strategy pair (1,1) of Game *1,* we see reverse positions. Irrespective of the strategy pairs chosen in Game *2*, by the end of the episode *B* will always be in a better position, will have a higher overall value capture than *A*.

If *B* wants to achieve his/her best position over *A*, he/she would prefer the strategy pair (2,1) in Game *2*., with a ***<u>63.6%</u>*** value capture. However, this is not the highest value generated at an episode level for *B*! A (2,1) strategy pair in Game *2* would result in ***<u>7 utilities</u>*** for *B,* the lowest level value generation for him/her, but also for *A* (4), and the relationship (11). In case *B* is interested in the value created and less in his/her position, he/she would prefer the strategy pair (2,2) in Game *2* that would result in 11 utilities for him/her, 7 utilities for *A*, altogether 18 utilities at a relationship level.

However, not *B* is the first mover! How would *A* decide after *B* has chosen Strategy 1 in Game *1*? Supposing rational decision makers, the strategy pair (1,2) would be preferred by *A*. It would result in 8 utilities for him/her, 17

Table 5 Performance implications of all potential decision pairs of Game *2* (in Table 2) supposing players play the strategy pair (1,2) in Game *1* (in Table 1)

Players	*A*	*B*	*A*	*B*	*A*	*B*	*A*	*B*
Decided strategy pair of Game 1: (1,2)	**(1,2)**		**(1,2)**		**(1,2)**		**(1,2)**	
Performance implication of this **strategy pair (1,2) in Game *1*** *for the players*	7	2	7	2	7	2	7	2
Potential strategy pairs of Game *2*	**(1,1)**		**(1,2)**		**(2,1)**		**(2,2)**	
Performance implications of specific **strategy pairs in Game *2*** *for the players*:	3	4	6	5	2	3	5	7
Episode level value created *for players* as a result of **aligned strategies in the two Games**	10	6	13	7	9	5	12	**9**
Relationship level **value creation of the episode**	16		20		14		**21**	
Value capture *of players* at the end of the **episode**	***62.5%***	37.5%	***65%***	35%	***64.3%***	35.7%	***57.1%***	**42.9%**

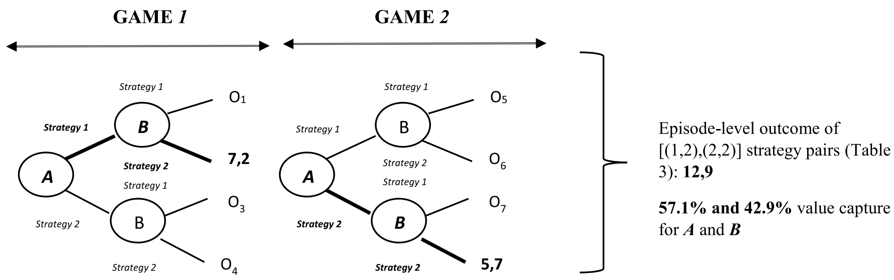

Fig. 2 Performance implications of the [(1,2),(2,2)] strategy pair of the coopetitive episode for both players (in absolute and relative terms)

utilities on relationship-level, which means 47.1% value capture for *A*. This is the highest individual level value generation and the best position for *A*. Thus, we can suppose that *A* will decide on Strategy 1 in Game *2*! How can *B* react to this? If he/she decides on Strategy 1 in Game *2*, the relationship-level value creation would be 13 utilities, his/her individual value creation 8 utilities, and the value captured by *B* 61.5%. Strategy 2 for *B* in Game *2* would result in a higher individual value generation (9 utilities), a much higher relationship-level value generation (17 utilities), but a lower-level value capture for *B* (52.9%). Given that *A* has decided on Strategy 1 in Game *2* (Figs. 3 and 4).

The above discussed potential decision situations illustrate the highly dynamic character of the coopetitive strategy formulation process. Coopetitive performance is embedded in specific strategy pairs and is fundamentally influenced by how these pairs follow each other. The cooperative move of player *A* in Game *1* presents an important junction point for *B*. He/she can decide to join the cooperative endeavor of player *A* in Game *1* or not, with significantly different performance consequences for both players. This dilemma reveals the paradox nature of coopetition since these two decisions represent the contradicting logic of value creation and capture. In case *B* decides to cooperate in Game *1*, players might achieve the highest overall value creation on episode level; however, he/she will lose competitive position over *A*. On the contrary, in case *B* decides to compete in Game *1*, he/she will be better off than *A* and might even achieve higher absolute value capture on episode level. The price for this is a lower relationship-level value generation, though.

So, the dilemma facing *B* is fraught with tension. It is a critical moment when *B* might launch a vicious cycle with deteriorating effects on performance. Behavioral attributes of the decision-makers might play a significant role in such situations. This simple example backs the statement of Peng et al. (2018) emphasizing that coopetitive tension might be the result of the inherently contradicting forces (the conflict between value generation and capture), but also the consequence of managerial attempts to resolve it.

Table 6 Performance implications of all potential decision pairs of Game *2* supposing players play the strategy pair (1,1) in Game 1

Players	*A*	*B*	*A*	*B*	*A*	*B*	*A*	*B*
Decided strategy pair of Game *1*	**(1,1)**		**(1,1)**		**(1,1)**		**(1,1)**	
Performance implication of the **strategy pair (1,1) in Game *1*** *for the players*	2	4	2	4	2	4	2	4
Potential strategy pairs of Game *2*	**(1,1)**		**(1,2)**		**(2,1)**		**(2,2)**	
Performance implications of **strategy pairs in Game *2*** *for the players*	3	4	6	5	2	3	5	7
Episode level value created *for players* as a result of **aligned strategies in the two Games**	5	8	8	9	4	*7*	7	11
Relationship level **value creation of the episode**	13		17		11		18	
Value capture *of players* at the end of the **episode**	38.5%	***61.5%***	47.1%	***52.9%***	36.4%	***63.6%***	38.9%	***61.1%***

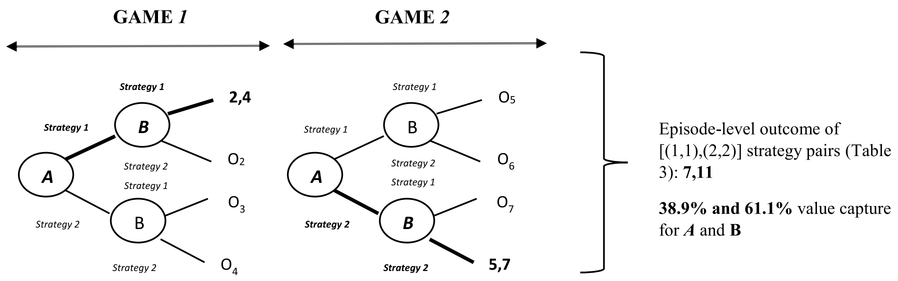

Fig. 3 Performance implications of the [(1,1),(2,2)] strategy pair for both players (in absolute and relative terms)

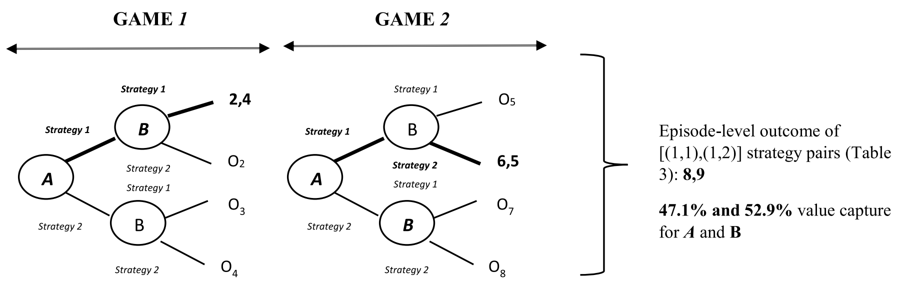

Fig. 4 Performance implications of the [(1,1),(1,2)] strategy pair for both players (in absolute and relative terms)

5.2 Behavioral experiment as a tool for modelling coopetitive dynamics and for testing the role of their hypothesized drivers

The above discussion illustrates that "coopetition strategy arises out of continuously reformulated activities by top and middle management against the articulated intentions agreed upon between the competitors" (Dahl et al. 2016: 104). Game *1* was intentionally a competitive interaction, while Game *2* a cooperative. Thus, Nash equilibrium was supposed to be followed first, then the Pareto optimum of the subsequent game. Actual decisions might differ from these intentions. And not because managers make ad hoc decisions (Dahl et al. 2016). Instead, these decisions seem to be systemic since they stem from the very basic structural relationship between the partners: they are interested in joint value creation, still they remain competitors with the long-term objective to outdo each other. This creates an inherently paradoxical state in any coopetitive endeavor. When individual and relational interests (performance) of coopetitive decision-makers and/or their short- and long-term motivation intersect, this paradox manifests and tensions arise. How this tension is resolved is a critical issue. Existing conceptualizations and aligned operationalizations of coopetition have not allowed for an explicit performance measurement and could not make all their potential implications visible. The paper proposed a new one capable of mapping the dynamic interplay in potential performance implications; it can make critical moments clearly visible and thus provides the opportunity for empirically testing the role of their hypothesized drivers; specifically, the role of behavioral features of coopetitive decision-makers.

Behavioral experiments are tools for the kind of empirical investigation that has already been called for in the coopetition literature (Dahl 2014). We argue that based on the proposed conceptualization and operationalization one can develop behavioral experiments through which future research can develop appropriate data sets for more reliable statistical analysis and can enhance our understanding about the behavioral underpinning of effective coopetitive strategy formulation, contributing both to its theoretical understanding but also providing practical guidance for managers.

Section 2 introduced the literature calling for future research on the role of behavioral antecedents of coopetition. Here, we complement this discussion and provide a summary of these features. Future empirical research using behavioral experiments can incorporate them into their design individually, or even by combining several features, and make their roles empirically testable. They can be divided into three broad categories: (1) the idiosyncratic features of the individual decision-makers involved; (2) the perception-based features of the decision-maker as experience by his/her partner, and (3) the level of mutuality in these perception-based attributes:

1. Idiosyncratic features of the decision-makers:
    a. Basic individual characteristics, like age, qualification of managers for example (Ocasio 1997).
    b. Cooperative or competitive orientation of the decision-makers (Kylänen and Rusko 2011; Bouncken and Fredrich 2016; Czakon et al. 2020b).
    c. Rivalrous spirit (Gnyawali and Ryan Charleton 2018).
    d. Ambidexterity of managers (Seepana et al. 2020; Rojas-Cordova et al. 2022).
    e. Past experience in coopetition (Dorn et al. 2016; Bouncken et al. 2020a; Czakon et al. 2020b).
    f. Short-term or long-term orientation (Das and Teng 2000).
    g. Coopetitive mindset (Czakon et al. 2020b).
    h. Relational or economic motivation (Jarzabkowski and Bednarek 2018).
    i. The decision maker's position in the organizational hierarchy, since several authors have emphasized that not only top managers are engaged in strategy formulation, and they might behave differently (Dahl et al. 2016; Crick 2018).
2. Perception-based features of the decision-makers:
    a. Reputation (Bengtsson and Raza-Ullah 2016; Czakon and Czernek 2016; Crick and Crick 2021b).
    b. Trust (Virtanen and Kock 2022; Jakobsen 2020; Raza-Ullah 2020a; Czakon et al. 2020b).
    c. Behavioral consistency (Czakon et al. 2020b; Crick et al. 2020).
3. Mutuality in the above-mentioned perception-based attributes (Chin et al. 2008).

6 Conclusion: contribution, limitations, and future research directions

We have already referred to the article by Gnyawali and Song (2016) calling for more systemic rigor in coopetition research by discussing its three interlinked aspects: conceptual, methodological, and empirical rigor. In line with these requirements, our paper provides a new process-based conceptualization of the coopetitive strategy formulation over time which is rooted in the strategy-as-practice approach (Jarzabkowski 2005; Jarzabkowski and Bednarek 2018). This conceptualization has been complemented with a methodological proposition applying game theoretical concepts to operationalize this inherently dynamic strategizing process. We introduced a two-step sequential game modelling a coopetitive episode with an intentionally competitive and another cooperative interaction. Performance implications of managerial decisions are expressed here by the payoff values of the games. Thus, an important positive feature of the proposed game theoretic operationalization is its capacity to reflect the interdependencies of these payoff values which makes the performance implications of all potential strategic decision pairs explicit, at both individual and relationship levels, in both absolute and relative terms. We introduced the concept of the episode-level coopetition composed solution matrix that can explicitly show the performance implications of any potential decision pairs of interactions and their interplay. Thus, critical moments loaded with coopetitive tension become visible, meaning that managers can consider individual and relationship-level consequences and make decisions that are no more biased and fragile. So, the role of their idiosyncratic attributes can be analyzed reliably leading to more robust results.

We argued that the proposed conceptualization and operationalization can effectively be used for developing behavioral experiments to generate new empirical knowledge about the development of coopetitive strategy formulation. The main reason for this is that experiments can generate large-scale data sets for further analysis creating the possibility of more reliable and methodologically more robust research results and can help to turn coopetitive research from exploratory to explanatory (Bengtsson et al. 2016b; Gnyawali and Song 2016).

Specifically, they can contribute to an enhanced understanding of the role idiosyncratic managerial attributes play in the effective management of tension. Besides the theoretical and empirical value of the proposed conceptualization and operationalization, the paper can also be of value to decision makers, as it makes the internal complexity of the coopetitive strategizing and its inherent interdependencies explicit, providing a deeper insight into this complex phenomenon.

Limitation of the proposed operationalization is that it does not take into consideration the relative inputs made by alliance partners, and the concept of value-creation-capture equilibrium (Bouncken et al. 2020b). For simplicity, we discussed a two-step sequential game and thus limited the focus to a coopetitive episode, at the level of two interlinked interactions. It is widely accepted as the basic analytical level of any coopetitive endeavor (Brandenburger and Nalebuff

1995); however, this can be a limitation. We note that this temporal constraint can easily be overcome by adding new interlinked interactions to the base model and thus developing several-step game designs. Adding new interactions makes the interplay between specific strategic decisions and their performance implications highly complex, but nonetheless closer to real-life situations. These experiments can serve as tools for empirically analyzing coopetitive strategy as a reality in flux (Golsorkhi et al. 2010) and help understand how and why coopetition strategy as an activity manifests itself (Dahl et al. 2016).

It is quite widely accepted that behavioral experiments may facilitate empirical research, and in particular that which analyses casual relationships between concrete behaviors and specific factors of interest. One of its key advantages is that it can minimize self-deception (Tang 2017). However, behavioral experiments have downside and challenges as well (Leung and Su 2004). Besides the key generic problems that concern the external validity of experiments (generalizability of the results to the population and whether exhibited preferences in a controlled environment can be generalized to other environments) (Nelson 2015), it is questionable whether results in a specific setting can be generalized to other settings (Schneider 2011). This is especially challenging in coopetition, which is understood as a special strategy deeply embedded in the social and economic specificities of the relationship itself. As discussed, coopetitive behavior is hypothesized to be influenced by both idiosyncratic features of managers and some relationship attributes. These might be interlinked, making the analysis highly complex. Extensive empirical research is needed to develop deeper insights in these interdependencies. Literature suggests the combination of experiments with other methods (Croson et al. 2007) and the triangulation of the empirical analysis (Zellmer-Bruhn et al. 2016).

Appropriate game design determines the success of any behavioral experiments. Careful planning of the decision scenario and the organization of the data collection must follow strict rules (Shadish et al. 2002). Future research is needed in this field, and this is especially so for investigations involving several-step game designs that are not limited to a coopetitive episode but instead include several interlinked interactions that are highly useful in analyzing the timely development of perception-based features of the decision makers, liker reputation and trust.

Funding Open access funding provided by Corvinus University of Budapest.

Data availability statement This manuscript has no associate data.

References

Bengtsson M, Kock S (2000) Coopetition in business networks: to cooperate and compete simultaneously. Ind Mark Manag 29(5):411–426. https://doi.org/10.1016/S0019-8501(99)00067-X

Bengtsson M, Kock S (2014) Coopetition—Quo vadis? Past accomplishments and future challenges. Ind Mark Manag 43(2):180–188. https://doi.org/10.1016/j.indmarman.2014.02.015

Bengtsson M, Raza-Ullah T (2016) A systematic review of research on coopetition: toward a multilevel understanding. Ind Mark Manag 57:23–39. https://doi.org/10.1016/j.indmarman.2016.05.003

Bengtsson M, Raza-Ullah T (2022) Paradoxical tensions at multiple levels and to management team cross-level bridging in coopetition: a conceptual model. Strateg Manag Rev (Forthcoming)

Bengtsson M, Kock S, Lundgren-Henriksson EL, Näsholm MH (2016a) Coopetition research in theory and practice: growing new theoretical, empirical, and methodological domains. Ind Mark Manag 57:4–11. https://doi.org/10.1016/j.indmarman.2016.05.002

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

Bouncken RB, Fredrich V (2016) Business model innovation in alliances: successful configurations. J Bus Res 69(9):3584–3590. https://doi.org/10.1016/j.jbusres.2016.01.004

Bouncken RB, Kraus S (2013) Innovation in knowledge-intensive industries: the double-edged sword of coopetition. J Bus Res 66(10):2060–2070. https://doi.org/10.1016/j.jbusres.2013.02.032

Bouncken RB, Gast J, Kraus S, Bogers M (2015) Coopetition: a systematic review, synthesis, and future research directions. RMS 9(3):577–601. https://doi.org/10.1007/s11846-015-0168-6

Bouncken RB, Fredrich V, Kraus S (2020a) Configurations of firm-level value capture in coopetition. Long Range Plan 53(1):101869. https://doi.org/10.1016/j.lrp.2019.02.002

Bouncken RB, Fredrich V, Ritala P, Kraus S (2020b) Value-creation-capture-equilibrium in new product development alliances: a matter of coopetition, expert power, and alliance importance. Ind Mark Manag 90:648–662. https://doi.org/10.1016/j.indmarman.2020.03.019

Brandenburger A, Nalebuff BJ (1995) The right game: use game theory to shape strategy. Harvard Bus Rev 57–71

Brandenburger A, Nalebuff BJ (1996) Co-opetition: a revolution mindset that combines competition and cooperation. Crown Business, New York

Carfi D (2015) A model for coopetitive games. J Math Econ Finance 1(1):46–75

Chai L, Li J, Clauss T, Tangpong C (2019) The influences of interdependence, opportunism and technology uncertainty on interfirm coopetition. J Bus Indust Market 34(5):948–964. https://doi.org/10.1108/JBIM-07-2018-0208

Chen MJ, MacMillan IC (1992) Nonresponse and delayed response to competitive moves: the roles of competitor dependence and action irreversibility. Acad Manag J 35(3):539–570. https://doi.org/10.5465/256486

Chen MJ, Smith KG, Grimm CM (1992) Action characteristics as predictors of competitive responses. Manag Sci 38(3):439–455. https://doi.org/10.1287/mnsc.38.3.439

Chen X, Luo Z, Wang X (2019) Compete or cooperate: intensity, dynamics, and optimal strategies. Omega 86:76–86. https://doi.org/10.1016/j.omega.2018.07.002

Chin KS, Chan BL, Lam PK (2008) Identifying and prioritizing critical success factors for coopetition strategy. Ind Manag Data Syst 108(4):437–454. https://doi.org/10.1108/02635570810868326

Chiambaretto P, Massé D, Mirc N (2019) All for one and one for all? Knowledge broker roles in managing tensions of internal coopetition: the Ubisoft case. Res Pol 48(3):584–600. https://doi.org/10.1016/j.respol.2018.10.009

Crick JM (2018) The facets, antecedents and consequences of coopetition: an entrepreneurial marketing perspective. Qualit Market Res 21(2):253–272. https://doi.org/10.1108/qmr-11-2016-0109

Crick JM (2019) The dark side of coopetition: when collaborating with competitors is harmful for company performance. J Bus Ind Market 35(2):318–337. https://doi.org/10.1108/JBIM-01-2019-0057

Crick JM (2020) Unpacking the relationship between a coopetition-oriented mindset and coopetition-oriented behaviours. J Bus Ind Market 36(3):400–419. https://doi.org/10.1108/JBIM-03-2020-0165

Crick J, Crick D (2021a) Internationalizing the coopetition construct: quadratic effects on financial performance under different degrees of export intensity and an export geographical scope. Loughborough University. J Contrib. https://hdl.handle.net/2134/13483611.v1

Crick JM, Crick D (2021b) The dark-side of coopetition: Influences on the paradoxical forces of cooperativeness and competitiveness across product-market strategies. J Bus Res 122:226–240. https://doi.org/10.1016/j.jbusres.2020.08.065
Crick JM, Crick D, Chaudhry S (2020) The dark-side of coopetition: it's not what you say, but the way that you do it. J Strateg Market. https://doi.org/10.1080/0965254X.2019.1642936
Croson R (2002) Why and how to experiment: methodologies from experimental economics. Univ Ill Law Rev 4:921–945
Czakon W, Czernek K (2016) The role of trust-building mechanisms in entering into network coopetition: the case of tourism networks in Poland. Ind Mark Manage 57:64–74. https://doi.org/10.1016/j.indmarman.2016.05.010
Czakon W, Gnyawali D, Le Roy F, Srivastava MK (2020a) Coopetition strategies: critical issues and research directions. HAL Post-Print, (hal-02517434). https://doi.org/10.1016/j.lrp.2019.101948
Czakon W, Klimas P, Mariani M (2020b) Behavioral antecedents of coopetition: a synthesis and measurement scale. Long Range Plan 53(1):101875. https://doi.org/10.1016/j.lrp.2019.03.001
Dagnino GB, Picone PM, Ferrigno G (2021) Temporary competitive advantage: a state-of-the-art literature review and research directions. Int J Manag Rev 23(1):85–115. https://doi.org/10.1111/ijmr.12242
Dahl J (2014) Conceptualizing coopetition as a process: an outline of change in cooperative and competitive interactions. Ind Mark Manag 43(2):272–279. https://doi.org/10.1016/j.indmarman.2013.12.002
Dahl J, Kock S, Lundgren-Henriksson EL (2016) Conceptualizing coopetition strategy as practice: a multilevel interpretative framework. Int Stud Manag Organ 46(2–3):94–109. https://doi.org/10.1080/00208825.2015.1093794
Das TK, Teng BS (2000) Instabilities of strategic alliances: an internal tensions perspective. Organ Sci 11(1):77–101. The Academy of Management Annals 6(1):285–336. https://doi.org/10.1287/orsc.11.1.77.12570
De Ngo D, Okura M (2008) Coopetition in a mixed duopoly market. Econ Bullet 12(20):1–9
Devece C, Ribeiro-Soriano DE, Palacios-Marqués D (2019) Coopetition as the new trend in inter-firm alliances: literature review and research patterns. RMS 13(2):207–226. https://doi.org/10.1007/s11846-017-0245-0
Dorn S, Schweiger B, Albers S (2016) Levels, phases and themes of coopetition: a systematic literature review and research agenda". Eur Manag J 34(5):484–500. https://doi.org/10.1016/j.emj.2016.02.009
Fredrich V, Bouncken RB, Kraus S (2019) The race is on: Configurations of absorptive capacity, interdependence and slack resources for interorganizational learning in coopetition alliances. J Bus Res 101:862–868. https://doi.org/10.1016/j.jbusres.2018.11.038
Gernsheimer O, Kanbach DK, Gast J (2021) Coopetition research—a systematic literature review on recent accomplishments and trajectories. Ind Mark Manag 96:113–134. https://doi.org/10.1016/j.indmarman.2021.05.001
Gibbons R (1997) An introduction to applicable Game theory. J Econ Perspect 11(1):127–149. https://doi.org/10.1257/jep.11.1.127
Golsorkhi D, Rouleau L, Seidle D, Vaara E (2010) What is strategy as practice?". In: Golsorkhi D, Rouleau L, Seidle D, Vaara E (eds) Cambridge handbook of strategy as practice. Cambridge University Press, Cambridge, pp 1–20
Gnyawali DR, Park BJ (2011) Co-opetition between giants: collaboration with com-petitors for technological innovation. Res Policy 40:650–663. https://doi.org/10.1016/j.respol.2011.01.009
Gnyawali DR, Song Y (2016) Pursuit of rigor in research: illustration from coopetition literature. Ind Mark Manag 57:12–22. https://doi.org/10.1016/j.indmarman.2016.05.004
Gnyawali DR, Ryan Charleton T (2018) Nuances in the interplay of competition and cooperation: towards a theory of coopetition. J Manag 44(7):2511–2534. https://doi.org/10.1177/01492063187889
Gnyawali DR, Madhavan R, HeJ BM (2016) The competition–cooperation paradox in inter-firm relationships: a conceptual framework. Ind Mark Manag 53:7–18. https://doi.org/10.1016/j.indmarman.2015.11.014
Gulati R, Wang LO (2003) Size of the pie and share of the pie: implications of network embeddedness and business relatedness for value creation and value appropriation in joint ventures. In: The governance of relations in markets and organizations. Emerald Group Publishing Limited
Holmlund M (2004) Analyzing business relationships and distinguishing different interaction levels. Ind Mark Manag 33(4):279–287. https://doi.org/10.1016/S0019-8501(03)00057-9

Jakobsen S (2020) Managing tension in coopetition through mutual dependence and asymmetries: a longitudinal study of a Norwegian R&D alliance. Ind Mark Manag 84:251–260. https://doi.org/10.1016/j.indmarman.2019.07.006

Jarzabkowski P (2005) Strategy as practice. Strategy Pract 1–216. http://digital.casalini.it/9781847877598

Jarzabkowski P, Bednarek R (2018) Toward a social practice theory of relational competing. Strateg Manag J 39(3):794–829. https://doi.org/10.1002/smj.2724

Jarzabkowski P, Balogun J, Seidl D (2007) Published in human relations. Hum Relat 60:5–27. https://doi.org/10.1177/0018726707075703

Kale P, Dyer JH, Singh H (2002) Alliance capability, stock market response, and long-term alliance success: the role of the alliance function. Strateg Manag J 23(8):747–767. https://doi.org/10.1002/smj.248

Klimas P, Czakon W (2022) Gaming innovation ecosystem: actors, roles and co-innovation processes. RMS 16(7):2213–2259. https://doi.org/10.1007/s11846-022-00518-8

Klimas P, Czakon W, Fredrich V (2022) Strategy frames in coopetition: an examination of coopetition entry factors in high-tech firms. Eur Manag J 40(2):258–272. https://doi.org/10.1016/j.emj.2021.04.005

Kylänen M, Rusko R (2011) Unintentional coopetition in the service industries: the case of Pyhä-Luosto tourism destination in the Finnish Lapland. Eur Manag J 29(3):193–205. https://doi.org/10.1016/j.emj.2010.10.006

Lant TK, Baum JAC (1995) Cognitive sources of socially constrained competitive groups: examples from the Manhattan hotel industry. In: The institutional construction of organizations: International and Longitudinal Studies, Scott WR, C

Lavie D (2006) The competitive advantage of interconnected firms: an extension of the resource-based view. Acad Manag Rev 31(3):638–658. https://doi.org/10.5465/amr.2006.21318922

Leroy F, Czakon W (2016) Managing coopetition: the missing link between strategy and performance. Ind Market Manag 53:3–6. https://doi.org/10.1016/j.indmarman.2015.11.005

Letcher B, de Villiers SM, Graham W (2021) Small firm coopetition—the missing links: coopetitive tension, balance and value. J Bus Ind Market 37(11):2247–2259. https://doi.org/10.1108/JBIM-11-2020-0495

Leung K, Su SK (2004) Experimental methods for research on culture and management. In: Punnett BJ, Shenkar O (eds) Handbook for international management research, 2nd edn. University of Michigan Press, Ann Arbor, pp 68–97

Levinthal DA (2011) A behavioral approach to strategy—what's the alternative? Strateg Manag J 32(13):1517–1523. https://doi.org/10.1002/smj.963

Lewis MW (2000) Exploring paradox: Toward a more comprehensive guide. Acad Manag Rev 25:760–776. https://doi.org/10.5465/amr.2000.3707712

Madhok A, Tallman SB (1998) Resources, transactions and rents: Managing value through interfirm collaborative relationships. Organ Sci 9(3):326–339. https://doi.org/10.1287/orsc.9.3.326

Marcel JJ, Barr PS, Duhaime IM (2011) The influence of executive cognition on competitive dynamics. Strateg Manag J 32(2):115–138. https://doi.org/10.1002/smj.870

Mariani MM (2007) Coopetition as an emergent strategy: empirical evidence from an Italian consortium of opera houses. Int Stud Manag Organ 37(2):97–126. https://doi.org/10.2753/IMO0020-8825370205

Meena A, Dhir S, Sushil S (2023) A review of coopetition and future research agenda. J Bus Ind Market 38(1):118–136. https://doi.org/10.1108/JBIM-09-2021-0414

Müller D (2010) Alliance coordination, dysfunctions, and the protection of idiosyncratic knowledge in strategic learning alliances, ZBW-Deutsche Zentralbibliothek für Wirtschaftswissenschaften, Leibniz-Informationszentrum Wirtschaft, Kiel und Hamburg This Version is http://hdl.handle.net/10419/41039

Narayanan VK, Zane LJ, Kemmerer B (2011) The cognitive perspective in strategy: an integrative review. J Manag 37(1):305–351. https://doi.org/10.1177/0149206310383986

Nelson JA (2015) Are women really more risk-averse than men? A re-analysis of the literature using expanded methods. J Econ Surv 29:566–585. https://doi.org/10.1111/joes.12069

Ocasio W (1997) Towards an attention-based view of the firm. Strateg Manag J Summer Special Issue 18:187–206. https://doi.org/10.1002/(SICI)1097-0266(199707)18:1+%3c187::AID-SMJ936%3e3.0.CO;2-K

Olk P (2002) Evaluating strategic alliance performance. In: Contractor FJ, Lorange P (eds) Cooperative strategies and alliances. Pergamon, Amsterdam, pp 119–143
Peng TJA, Yen MH, Bourne M (2018) How rival partners compete based on cooperation? Long Range Plan 51(2):351–383. https://doi.org/10.1016/j.lrp.2017.10.003
Pateli A, Lioukas S (2012) Antecedents to value creation and value appropriation outcomes of strategic alliances. In: Das TK (ed) Management dynamics in strategic alliances. Research in Strategic Alliances, pp 53–72
Porter M (1985) Competiive advantage—creating and sustaining superior performance. The Free Press, New York
Rai RK (2016) A co-opetition-based approach to value creation in interfirm alliances: construction of a measure and examination of its psychometric properties. J Manag 42(6):1663–1699. https://doi.org/10.1177/0149206313515525
Raza-Ullah T (2020) Experiencing the paradox of coopetition: a moderated mediation framework explaining the paradoxical tension–performance relationship. Long Range Plan 53(1):101863. https://doi.org/10.1016/j.lrp.2018.12.003
Raza-Ullah T (2021) When does (not) a coopetitive relationship matter to performance? An empirical investigation of the role of multidimensional trust and distrust. Ind Mark Manag 96:86–99. https://doi.org/10.1016/j.indmarman.2021.03.004
Raza-Ullah T, Kostis A (2020) Do trust and distrust in coopetition matter to performance? Eur Manag J 38(3):367–376. https://doi.org/10.1016/j.emj.2019.10.004
Raza-Ullah T, Bengtsson M, Kock S (2014) The coopetition paradox and tension in coopetition at multiple levels. Ind Mark Manag 43(2):189–198. https://doi.org/10.1016/j.indmarman.2013.11.001
Raza-Ullah T, Bengtsson M, Vanyushyn V (2018) Coopetition capability: what is it?, Routledge companion to coopetition. Strategies 1(1):219–226
Raza-Ullah T, Bengtsson M, Gnyawali DR (2020) The nature, consequences, and management of emotions in interfirm paradoxical relationships—a conceptual framework. Scand J Manag 36(4):101127. https://doi.org/10.1016/j.indmarman.2021.03.004
Ritala P, Tidström A (2014) Untangling the value-creation and value-appropriation elements of coopetition strategy: a longitudinal analysis on the firm and relational levels. Scand J Manag 30(4):498–515. https://doi.org/10.1016/j.scaman.2014.05.002
Ritala P, Hurmelinna-Laukkanen P (2009) What's in it for me? Creating and appropriating value in innovation-related coopetition. Technovation 29(12):819–828. https://doi.org/10.1016/j.technovation.2009.07.002
Rojas-Córdova C, Williamson AJ, Pertuze JA, Calvo G (2022) Why one strategy does not fit all: a systematic review on exploration–exploitation in different organizational archetypes. Rev Manag Sci. https://doi.org/10.1007/s11846-022-00577-x
Rusko R (2011) Exploring the concept of coopetition: a typology for the strategic moves of the Finnish Forest industry. Ind Mark Manag 40(2):311–320. https://doi.org/10.1016/j.indmarman.2010.10.002
Schneider A (2011) Is investment decision-making influenced by perceptions relating to auditors' client dependence and amount of audit fees? Adv Account 27(1):75–80. https://doi.org/10.1016/j.adiac.2010.10.006
Shadish WR, Cook TD, Campbell DT (2002) Experimental and quasi-experimental designs for generalized causal inference. Houghton Mifflin Co., Boston
Seepana C, Paulraj A, Huq FA (2020) The architecture of coopetition: strategic intent, ambidextrous managers, and knowledge sharing. Ind Mark Manage 91:100–113. https://doi.org/10.1016/j.indmarman.2020.08.012
Smiljic S, Aas TH, Mention AL (2022) Coopetitive tensions across project phases: a paradox perspective. Ind Mark Manag 105:388–403. https://doi.org/10.1016/j.indmarman.2022.06.017
Tang WR (2017) Watch his deed or examine his words? Exploring the potential of the behavioral experiment method for collecting data to measure culture. Cross Cult Strateg Manag 24(4):669–695. https://doi.org/10.1108/CCSM-10-2016-0175
Tidström A (2008) Perspectives on coopetitionon actor and operational levels. Manag Res 6(3):207–217. https://doi.org/10.2753/jmr1536-5433060304
Tidström A (2014) Managing tensions in coopetition. Ind Mark Manag 43(2):261–271. https://doi.org/10.1016/j.indmarman.2013.12.001
Tidström A, Rajala A (2016) Coopetition strategy as interrelated praxis and practices on multiple levels. Ind Mark Manag 58:35–44. https://doi.org/10.1016/j.indmarman.2016.05.013

Virtanen H, Kock S (2022) Striking the right balance in tension management. The case of coopetition in small-and medium-sized firms. J Bus Ind Market. https://doi.org/10.1108/JBIM-10-2021-0469
Wang MC, Chen JS (2022) Driving coopetition strategy to service innovation: the moderating role of coopetition recognition. RMS 16(5):1471–1501. https://doi.org/10.1007/s11846-021-00488-3
Whittington R (2006) Completing the practice turn in strategy research. Organ Stud 27(5):613–634. https://doi.org/10.1177/0170840606064101
Weigelt K, MacMillan I (1988) An interactive strategic analysis framework. Strateg Manag J 9(S1):27–40. https://doi.org/10.1002/smj.4250090705
Yami S, Castaldo S, Dagnino GB, Le Roy F, Czakon W (2010) Coopetition strategies: towards a new form of inter-organizational dynamics? In: Yami S, Castaldo S, Le Roy F (eds) Coopetition winning strategies for the 21st century. Edward Elgar, Cheltenham, pp 1–16
Zellmer-Bruhn M, Caligiuri P, Thomas DC (2016) From the editors: experimental designs in international business research. J Int Bus Stud 47(4):399–407. https://doi.org/10.1057/jibs.2016.12
Zeng M, Chen XP (2003) Achieving cooperation in multiparty alliances: a social dilemma approach to partnership management. Acad Manag Rev 28(4):587–605. https://doi.org/10.5465/amr.2003.10899383