Received: 22 July 2019 | Revised: 8 September 2019 | Accepted: 25 September 2019

DOI: 10.1002/bse.2400

RESEARCH ARTICLE

WILEY Business Strategy and the Environment

Coopetition for sustainability: Between organizational benefit and societal good

Siarhei Manzhynski[1] | Frank Figge[2]

[1] Umeå School of Business, Economics and Statistics, Umeå University, Umeå, Sweden

[2] Kedge Business School, Strategy Department, Marseille, France and Macquarie University, Centre for Corporate Sustainability and Environmental Finance, Sydney, Australia

Correspondence
Siarhei Manzhynski, Umeå School of Business, Economics and Statistics, Umeå University, SE-901 87 Umeå, Sweden.
Email: siarhei.manzhynski@umu.se

Funding information
Kamprad Family Foundation for Entrepreneurship, Research and Charity, Grant/Award Number: 20160063

Abstract

Sustainable development requires coopetition, that is, the cooperation of organizations that compete at the same time. Research on coopetition for sustainability is sparse. From a sustainability perspective, coopetition contributes to sustainability when it makes a positive contribution on the societal level. Existing research on coopetition however focuses on organizational outcomes. In this paper, we link organizational and societal outcomes of coopetition. We show that for the simple case of two coopting firms and an economic and an environmental dimension, there are 51 different combinations that make a positive contribution to sustainability. All but one of these combinations consist of a mix of positive and negative outcomes. We identify four types of trade-offs that can occur in coopetition for sustainability and that point to different pathways of achieving sustainability.

KEYWORDS

coopetition, industrial symbiosis, sustainable development, tensions, trade-offs

1 | INTRODUCTION

Sustainable development is one of the biggest challenges society faces today and an important part of this challenge is to use the scarce resources of "spaceship earth" (Boulding, 1973) sustainably. Current resource use has been qualified as unsustainable for a long time (Behrens, Giljum, Kovanda, & Niza, 2007; Green, 1894; Malthus, 1798; Meadows, Meadows, Randers, & Behrens, 1972). Firms play an important role in this context. They are in charge of how resources are used. An efficient use of resources can be considered a necessary condition for their sustainable use (Robinson, 2004). The question whether resources are being used efficiently on a macrolevel is ultimately decided on the level of the resource users, that is, on a microlevel (Figge, Givry, Canning, Franklin-Johnson, & Thorpe, 2017). The call for sustainable development has added environmental and social resources to the resources that need to be used efficiently (Elkington, 1997).

One way to increase eco-efficiency on the macrolevel is to use resource circularly, moving resources back and forth between resource users (Marian R. Chertow, 2007; Pearce & Turner, 1990; Yuan, Bi, & Moriguichi, 2006). This requires that firms that compete with each other collaborate regarding their resource use (Palmieri, Pomponi, & Russo, 2019; Parida, Burström, Visnjic, & Wincent, 2019). The simultaneous competition and cooperation between firms is referred to as coopetition and has been extensively discussed in the management literature (Bengtsson & Kock, 2000; Nalebuff, Brandenburger, & Maulana, 1996; Ritala, 2012).

The management literature describes a wide range of advantages of coopetition. Prominent examples include new product development (Bouncken, Fredrich, Ritala, & Kraus, 2017), better market positions (Gnyawali & Park, 2011), higher production efficiency (Luo, 2007), and increased business model innovation (Ritala, Golnam, & Wegmann, 2014). These positive outcomes are primarily measured on the individual level of the companies. Furthermore, recently, scholars have also suggested that coopetition can be a way to obtain positive sustainability outcomes (Limoubpratum, Shee, & Ahsan, 2015; Stadtler, 2017). Although there are a few studies on coopetition for sustainability (Christ, Burritt, & Varsei, 2017; Limoubpratum et al., 2015; Peloza & Falkenberg, 2009; Stadtler, 2017; Volschenk, Ungerer, & Smit, 2016), it has still not been systematically addressed, and it remains unclear what constitutes coopetition for sustainability and what its outcomes are. We argue that coopetition for sustainability is different from other forms of coopetition as the sustainability outcome is determined on the macrolevel but influenced by the behavior of individual firms on the microlevel.

Coopetition for sustainability can bring positive outcomes both to the firms involved and to the society. The combination of cooperation and competition provides synergistic benefits for firms involved, which is assumed to result in a better performance (Lado, Boyd, & Hanlon, 1997; Quintana-Garcia & Benavides-Velasco, 2004), and research has suggested that this is also true for sustainability outcomes (Christ et al., 2017). However, the relationship between coopetition and sustainability has been overly trivialized, and positive outcomes on both the microlevel and the macrolevel are just one possibility. There are two reasons for this:

First, there is a potential conflict between economic outcomes, and social and/or environmental outcomes (Hahn, Figge, Pinkse, & Preuss, 2010). Coopetition could be positive for one but at the same time negative for another type of outcomes. To better understand if coopetition is beneficial, research needs to distinguish between different outcomes.

Second, existing empirical research on coopetition has focused on outcomes from the perspective of a focal firm (Bouncken & Kraus, 2013; Mention, 2011). This perspective neglects the other participants in the relationship or simply assumes that the other firms in the alliance will enjoy the same benefits. Additionally, as sustainability is a societal concept, the outcomes must be assessed from a macroperspective (Cubas-Díaz & Martinez Sedano, 2018). In practice, *private outcomes* can differ between the partners involved, as one firm may benefit from the alliance whereas others do not and a positive outcome from the perspective of the focal firm does not guarantee a positive contribution to the macrolevel. Macrolevel outcomes are complicated to assess, which may explain why most researchers have focused on the benefits for a focal firm with only a few studies examining aggregated outcomes (Raza-Ullah, 2017).

To address these limitations, and to further explore coopetition for sustainability and its outcomes, the purpose of this article is to examine how coopetition for sustainability can indeed result in positive sustainability outcomes on the societal level. Rather than implicitly assuming that there is only one way to arrive at successful coopetition for sustainability, we distinguish between different patterns.

To compare economic and environmental outcomes, we assume increased efficiency of resource use as a proxy for the general objective of coopetition for sustainability. We therefore look at how coopetition for sustainability can increase the efficiency of resource use on the macrolevel. We go beyond the dominating focus of existing coopetition research on economic efficiency by looking at the efficient use of economic and environmental resources. At the same time, we limit our analysis to two resources and two firms (a focal firm and a coopting firm) to keep complexity low. We use the Sustainable Value approach (Figge, 2001; Figge & Hahn, 2004) to compare the additional value that is created by using economic and environmental resources more efficiently to examine the outcomes. By comparing efficiencies in this way, the economic and environmental benefit of coopetition can be assessed comparatively on different levels. We look at the level of the focal firm, a coopting firm, and the aggregated macrolevel, and we distinguish between the use of economic and environmental resources on these levels. We are interested in how different patterns of the efficient use of economic and environmental resources on the level of the focal and the coopting firms result in positive sustainability outcomes on the macrolevel (Table 1).

We find that a positive sustainability outcome is the result of different microlevel contributions and that a better understanding of the different patterns that can result in positive sustainability outcomes helps us understand the different ways in which coopetition for sustainability can be successful. Different patterns point at the same time to tensions or trade-offs within coopetition partnerships. We identify and discuss four different types of trade-offs.

2 | RESOURCE USE AND SUSTAINABLE DEVELOPMENT

Scarcity of resources has been identified as a limiting factor for human development for a long time (Green, 1894; Malthus, 1798; Meadows et al., 1972). If society needs resources to satisfy growing human needs and if they are limited, then increasing resource efficiency becomes a necessary condition for combining the two goals of continuing to satisfy growing human needs and limiting the use of resources. Resources can be interpreted widely in this context. CO_2 emissions, contributing to climate change, are for example frequently used to represent the use of natural resources (Wackernagel, Lewan, & Hansson, 1999) as they use up limited carbon sinks.

TABLE 1 Conceptualization of sustainability outcomes of coopetition

	Microlevel		Macrolevel
Resource	Focal firm	Coopting firm	Aggregated outcome
Economic resource	Focal firm economic contribution	Coopting firm economic contribution	**Economic contribution**
Environmental resource	Focal firm environmental contribution	Coopting firm environmental contribution	**Environmental contribution**
Aggregated outcome	**Focal firm overall contribution**	**Coopting firm overall contribution** **sustainability outcome**	**Positive**

The relevance of use in bold emphasis is to distinguish the aggregated outcome that is illustrated in the rightmost column and the lowest row.

In the literature on sustainable development, resource efficiency has been discussed in the context of eco-efficiency. Eco-efficiency (World Business Council for Sustainable Development, 1996) relates the use of scare natural resources to economic production. Although a higher production of goods and services is usually preferred to a lower production, lower resource use is preferred to higher resource use, and thus, a higher eco-efficiency is preferred to lower eco-efficiency. Increasing eco-efficiency of resource use is sometimes characterized as a way of contributing to sustainability (DeSimone & Popoff, 1998).

Increasing eco-efficiency is however not sufficient to contribute to sustainability. Research has pointed to the rebound effect (Greene, 1992; Jevons, 1866; Khazzoom, 1980). An increase in the efficiency of resource use might stimulate further demand; resource use might not decrease as much as expected or even increase or "backfire" (Saunders, 2000). Increasing eco-efficiency might therefore be a necessary but not sufficient condition to contribute to sustainable development.

More recent research shows the importance of distinguishing between the microlevel and the macrolevel of resource use (Figge et al., 2017). The focus of sustainable development as a societal concept (Hanley, 2000) is on the use of resources on the macrolevel. Yet it is on the microlevel that resource use is decided. A higher eco-efficiency on the microlevel does not necessarily lead to a higher eco-efficiency on the macrolevel when resource use is cascading or circular (Figge & Thorpe, 2019). From a macrolevel perspective, it is the efficiency of the use of virgin resources that matters as it is only virgin resources that are scarce. Resources that are reused only represent a scarcity to the degree to which they have to be replaced by virgin resources (Figge et al., 2017). This is for example the case when through downcycling (Bernstad, la Cour Jansen, & Aspegren, 2011; Rigamonti, Grosso, & Sunseri, 2009), the quality of the resource degenerates through repeated use. A popular proposal to overcome the scarcity of natural resources is therefore to use resources circularly (Pearce & Turner, 1990). By closing resource loops, resources are used several times. In a perfectly circular economy, resources would be used at an unlimited number of times, and all resource scarcities would be overcome. Although a perfectly circular economy might be unattainable, a more circular use of resources increases the efficiency of resource use on the macrolevel.

A more circular use of resources will more often than not require cooperation between resource users. This is discussed in the literature on industrial ecology as industrial symbiosis (Marian R Chertow, 2000; Ehrenfeld & Gertler, 1997). "Industrial symbiosis engages traditionally separate entities in a collective approach […] involving physical exchange of materials, energy, water and by-products. The key to industrial symbiosis [is] collaboration […]." (Marian R Chertow, 2000, p. 314).

3 | COOPETITION AND SUSTAINABLE DEVELOPMENT

Although cooperation of individual resource users is key to a more efficient resource use, individual resource users compete with each other at the same time. The management literature refers to the cooperation of firms that compete at the same time as coopetition (Bengtsson & Kock, 2000).

Research has pointed to the positive effects of coopetition on innovation and financial performance (Gnyawali & Park, 2011; Mantena & Saha, 2012), knowledge sharing (Bouncken & Fredrich, 2016; Bouncken & Kraus, 2013), competitiveness (Bouncken & Fredrich, 2012), growth and efficiency (Medlin, 2006; Peng, Pike, Yang, & Roos, 2012), leveraging economies of scales (Bengtsson & Kock, 2000), and the ability to manage uncertainty and risk (Bengtsson & Kock, 2000). At the same time, coopetition can not only support innovation and knowledge sharing but can also be an obstacle to innovation and give rise to detrimental knowledge leakage (Liu, Luo, Yang, & Maksimov, 2014). Furthermore, there is a risk of free-riding and imitation (Ritala & Hurmelinna-Laukkanen, 2009) and opportunistic hazards (Pellegrin-Boucher, Le Roy, & Gurău, 2013). The managerial complexity involved can also increase the costs of coordination and costs to control tensions and resolve conflicts (Bouncken, Gast, Kraus, & Bogers, 2015). The potential positive and negative outcomes of coopetition (Bouncken & Kraus, 2013) point to the need to carefully balance positive and negative outcomes. As sustainability encompasses not only economic but also environmental and social goals, as well as microlevel and macrolevel concerns, the need for balancing outcomes is even more prominent.

Most prior studies examine private outcomes and especially outcomes for individual firms on the microlevel. This neglects two aspects. First, outcomes can differ for coopetition partners. A positive outcome for one partner might result in a negative outcome for another partner. Second, a positive outcome on the microlevel might not result in a positive outcome on the macrolevel. Current research frequently overlooks that the focal firm perspective is only one possible perspective. This is especially doubtful in the case of coopetition for sustainability where success needs to be defined on the macrolevel. To conclude, previous inquiries into the outcomes of conventional coopetition focus mainly on the private benefits for the focal firm and concentrate on one specific type of outcome, mainly one which ultimately links to economic profitability. When it comes to coopetition for sustainability, any discussion of outcomes must also take into account concerns for the environment and/or social issues, as well as the microlevel and macrolevel on which outcomes accrue.

Those studies that take an explicit interest in coopetition for sustainability do discuss different types of outcomes on a general level (Bowen, Bansal, & Slawinski, 2018; Christ et al., 2017; Limoubpratum et al., 2015; Meehan & Bryde, 2015; Peloza & Falkenberg, 2009; Planko, Chappin, Cramer, & Hekkert, 2019; Stadtler, 2017; Volschenk et al., 2016). Still, there is a lack of a systematic unpacking of what these possible outcomes of coopetition for sustainability may actually be. Furthermore, the findings of the studies that look at sustainability outcomes of coopetition are somewhat fragmented. Rather than conceptualizing systematically what sustainability outcomes could mean, these studies show that coopetition can be favorable for some specific aspects that relate to sustainability like logistics (Limoubpratum et al., 2015), green product innovation (Melander, 2017), procurement

(Meehan & Bryde, 2015), or recycling (Volschenk et al., 2016). Christ et al. (2017) explore for example a coopetitive agreement in the Australian wine industry that reduced usage of fossil fuels and refrigeration by jointly outsourcing bottling and packaging. In another example, Planko et al. (2019) identify main enablers of coopetition in the Dutch smart grids sector when competitors collaborate in developing innovative technologies that support sustainable development.

In general, the studies of coopetition for sustainability suggest that cooperation between competitors can leverage the limited technological, financial, and human resources available to each participating firm and use such resources in a more efficient way in terms of sustainability.

Perhaps due to the lack of clarity regarding potential outcomes, some researchers (Hahn & Pinkse, 2014; Peloza & Falkenberg, 2009) have questioned the usefulness of coopetition for sustainability. The main argument is that competition between firms hampers the achievement of environmental objectives due to tensions, conflicts, and opportunistic behavior (Hahn & Pinkse, 2014). Still, the management literature on coopetition argues that coopetition can work regardless (e.g., Bengtsson & Kock, 2000; Gnyawali & Park, 2011), and no specific reasons are mentioned why the same should not hold for coopetition for sustainability (Hahn & Pinkse, 2014). Nonetheless, as Hahn and Pinkse (2014) point out, one cannot naively assume that opportunistic behavior simply disappears just because there is a potential to improve sustainability. However, one way to better understand and anticipate opportunistic behavior is to better clarify where and for whom different outcomes arise. To discuss under which conditions coopetition for sustainability is useful or not, and for whom, we need to unpack the types of outcome.

In the next section, we present our method and model that allow us to conceptualize and analyze outcomes of coopetition for sustainability.

4 | OUTCOMES OF COOPETITION FOR SUSTAINABILITY

4.1 | Method

As mentioned before, one important way to increase the efficiency of resource use is to close resource loops and to use resources in a more circular way (Marian R. Chertow, 2007; Pearce & Turner, 1990; Yuan et al., 2006). This requires that competing resource users cooperate.

We use the example of two firms and two dimensions (economic and environmental). We assume that the overall objective is to increase eco-efficiency of resource use overall, that is, to increase the combined efficiency of environmental and economic resources on the aggregated level of the two firms. The higher the efficiency of resource use, the higher the value that is created.

Using efficiency allows us to compare the performances in the economic and the environmental dimension as they can be assessed analogously and in the same unit using the Sustainable Value approach (Figge, 2001; Figge & Hahn, 2004). If absolute measures are used instead, say for instance reduction in CO_2 emissions and increase in profits, the economic and environmental dimension cannot be compared or added up.

Using a simple example, we explain in the following how increases in economic and environmental efficiency can be assessed analogously. In finance, a firm that achieves a return of 40% on a resource of €500 compared with an alternative return of 10% would be considered to have created a value of €150 (see Figure 1). Analogously, a firm that generates a return of €1.33 per ton of CO_2 compared with an alternative return of €1 per ton of CO_2 and that emits 150 tons of CO_2 would create a value of €50 (see Figure 2).

The value of coopetition depends on the additional value that has been created through coopetition. The alternative use is the use of a resource under pure competition. From this perspective, value is created when the efficiency of resource use under coopetition exceeds the efficiency of resource use under competition.

4.2 | Model

We assume a simple case of two firms: A focal firm and a coopting firm use economic and environmental resources to create a profit. Coopetition between these two firms influences their resource efficiency. We express the value created through coopetition in monetary terms as the additional profit created compared with a ceteris paribus situation without collaboration among competitors. Table 2 provides an example. The value for the focal firm corresponds to the

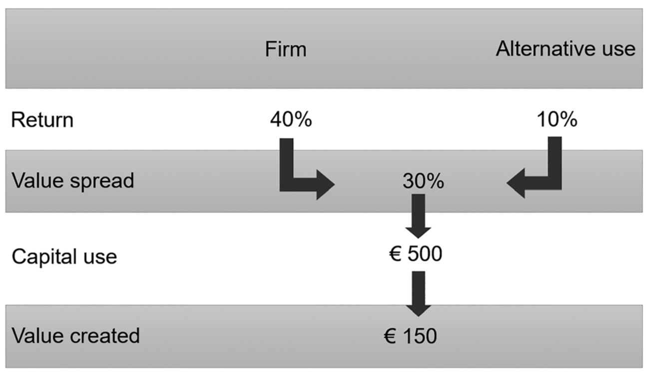

FIGURE 1 Value-oriented analysis of economic resource use

FIGURE 2 Value-oriented analysis of environmental resource use

TABLE 2 Example of outcomes of coopetition for sustainability

Resources	Outcomes (values created by resource use efficiency increases), €		Aggregated outcome (sums for resources/number of resources)
	Focal firm	Coopting firm	
Economic	+150	−40	*+55 (110/2)*
Environmental	+50	+60	*+55 (110/2)*
Aggregated outcome (sums for firms/number of resources)	*+100 (200/ 2)*	*+10 (20/ 2)*	*+110 (Overall)*

Italics shows how the corresponding result is calculated.

calculations above, that is, to the additional profit created compared with a situation before coopetition. Imagine that before coopetition, the coopting firm requires €1,000 of economic capital to generate a profit of €100 (10% return on capital). After coopetition, the profit has gone up to €110, and €1,500 of economic capital is required (7.3% return on capital). Before, €1,500 of capital would have generated a profit of €150; €1,500 now generate a profit of €110, that is, €40 less than before. Let us also imagine that due to coopetition, the coopting firm reduces its emissions from 100 tons of CO_2 to 50 tons. Although before 50 tons would have generated a profit of €50, they now generate a profit of €110, that is, €60 more than before.

Every field in Table 2 reflects the value created through coopetition as seen from a particular perspective. Coopetition between the focal and the coopting firms has for example led to economic resources being used more efficiently by the focal firm; this has created a value of €150 (upper left hand corner).

Because the value for each resource and each firm is expressed in monetary terms, we can also compare the magnitude of the value that is created to determine whether the use of economic resource and environmental resources by one firm (last row of Table 2) or a particular resource by both firms (right-hand column of Table 2) has been positive overall. Hence, our model implies assessing outcomes for resources analogously and combining results for resources within a firm and for firms across a resource. We can furthermore aggregate these results to cover both firms and both resources simultaneously (lower right-hand field of Table 2).

This simple example already allows us to show the link between microlevel and macrolevel outcomes. A positive result in Table 2 means increase of resource use efficiency, whereas a negative result means decrease of resource use efficiency. In other words, a positive result implies benefitting from coopetition, whereas a negative result points to the opposite. We ignore the neutral value of "0" where competition has no effect but concentrate on positive and negative effects. We acknowledge that positive and negative effects can be small or large in magnitude. However, our interest is not in whether the overall effect is small or large but positive or negative. We therefore do not consider absolute magnitudes in the following.

Coopetition for sustainability can be beneficial overall for the focal firm and/or the coopting firm on the level of the aggregated outcome (last row of Table 2). This is a firm perspective on coopetition for sustainability. Coopetition can also be beneficial for the use of the resource overall. This corresponds to a resource perspective on coopetition for sustainability (last column of Table 2). We argue that to make a positive contribution to sustainability, the overall contribution to an efficient use of all resources must be positive. This is a societal perspective on coopetition for sustainability. The societal perspective is reflected by the lower right-hand box in Table 2.

4.3 | Analysis

Resources must be used more efficiently to achieve sustainability, that is, we are interested in all cases where the lower right-hand box of Table 2 is positive. Table 2 contains a total of nine indicators. Every indicator can be positive (+) or negative (−), and there are therefore 2^9 or 512 possibilities. However, not all of them are possible. First of all, some combinations are logically impossible. For example, if the outcomes for economic and environmental resources within a specific firm are both negative, the common outcome for this firm cannot be positive. Second, because we are interested in successful coopetition for sustainability, we only take those cases into account in which the aggregated societal level is positive.

Fifty-one combinations meet these conditions. In only one out of 51 cases, all cells contain positive results. In all other cases, there will be at least a decrease in resource efficiency. In other words, 50 combinations include tensions between outcomes where some are positive and others are negative. We interpret these tensions as trade-offs because they involve a lower efficiency of the use of one resource (economic or environmental)/firm (focal or coopting) in return for a higher efficiency of the use for another resource/firm. We can systemize them into four types of trade-offs: *intrafirm*, *interfirm*, *intraresource*, and *interresource*. In the following, we provide examples for all four types. We use the same representation to characterize the cases that is used in Table 2, but rather than showing absolute numbers, we denote positive efficiency improvements by "+" and deterioration of performance by "−". We follow the example of similar papers that use a +/− styled analysis to structure conceptual positions (see, e.g., Baron, 2009; Windsor, 2013).

Intrafirm trade-offs appear when outcomes for economic and environmental resources within a firm are opposite. For example, coopetition induces the focal firm to use the economic resource less efficiently than without coopetition, whereas the use of environmental resource becomes more efficient, implying a trade-off between economic and environmental performances within the focal firm (Table 3).

Interfirm trade-offs oppose aggregated firm outcomes, that is, while one firm wins overall, the other firm loses. Table 4 provides an example. The focal firm uses economic and environmental resources more efficiently and hence increases the aggregated firm performance. In contrast, although the coopting firm uses the environmental resource more efficiently, the negative effect of losing efficiency of the

TABLE 3 Example of an intrafirm trade-off

	Firm		
Resources	Focal firm	Coopting firm	∑ (res)
Econ	−	+	+
Env	+	+	+
∑ (firm)	+	+	+

TABLE 4 Example of an interfirm trade-off

	Firm		
Resources	Focal firm	Coopting firm	∑ (res)
Econ	+	−	+
Env	+	+	+
∑ (firm)	+	−	+

economic resource use outstrips the higher environmental efficiency, and thus, the coopting firm loses out overall. But the positive outcome for the aggregated societal level is achieved here despite the interfirm trade-off because the focal firm's greater value creation compensates for the coopting firm's reduction.

Intraresource trade-offs emerge in situations when a specific resource (economic or environmental) is characterized by a positive outcome in one firm and a negative outcome in the other firm. Table 5 gives an example. Although the focal firm uses environmental resources more efficiently, the coopting firm uses environmental resources less efficiently. Overall, environmental resources are used more efficiently despite the trade-off between the positive environmental performance for the focal firm and the negative environmental performance for the coopting firm.

Interresource trade-offs appear when the aggregated economic resource outcome is opposite to the aggregated environmental resource outcome. This is the case in Table 6. Here, both firms and thus society have positive outcomes overall (last row), whereas the environmental resource has been used less efficiently by both firms and thus also overall. In this case, the overall positive outcomes are due to the higher efficiency of the use of the economic resource. It is interesting that interresource trade-off can arise even though there are no intraresource trade-offs.

TABLE 5 Example of an intraresource trade-off

	Firm		
Resources	Focal firm	Coopting firm	∑ (res)
Econ	+	+	+
Env	+	−	+
∑ (firm)	+	+	+

TABLE 6 Example of an interresource trade-off

	Firm		
Resources	Focal firm	Coopting firm	∑ (res)
Econ	+	+	+
Env	−	−	−
∑ (firm)	+	+	+

Not all combinations have all typical trade-offs, but they can have more than one trade-off at the same time. In the most complicated cases, all types of the described trade-offs exist. For instance, in Table 7, there are two intrafirm trade-offs both for the focal and the coopting firms, two intraresource trade-offs both for the economic and the environmental resources as well as both interfirm and interresource trade-offs. Despite all of these trade-offs, the overall result is a positive contribution to sustainability on the macrolevel.

All trade-offs described above may result in tensions for the involved firms and their managers. In the next section, we go on to discuss just how to understand and use different trade-offs to make a progress towards sustainability.

5 | DISCUSSION AND IMPLICATIONS

Sustainable development is a normative, societal concept (Robinson, 2004). Sustainable development calls for a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987). This requires an efficient use of resources considering economic and environmental concerns at a societal level. The cooperation of competing, that is, coopting resource users is key to using resources in a more circular and thus more efficient way. The current literature on coopetition concentrates on economic aspects and only for the focal firm. Even in several studies that also distinguish an environmental dimension in coopetition, the main focus is at a microlevel, that is, at the level of the focal firm. Prior studies therefore imply that gains of the focal firm are synonymous with successful coopetition. This view is too naïve, and it is also only one possible way of contributing to sustainability. If we accept that coopetition contributes to sustainability when the coopting alliance wins overall on the macrolevel, then we have many more ways to contribute to sustainability. For example, on the basis of our simplified 2 × 2 model, we have identified 51 combinations of coopetition for sustainability that provide a positive outcome on the societal level. All but one out of these 51 combinations involve trade-offs (Figure 3). We have identified four generic trade-offs that can arise in these 50 combinations at microlevel and macrolevel in coopetitive alliances on the way towards sustainability.

It is particularly interesting to explore these 50 combinations as they might allow to make higher contributions to sustainability than the one combination that has no trade-offs. A focal firm might lose economically and win environmentally. The coopting firm might win economically and lose environmentally. Both firms might be satisfied with the result, and the resources might be used more efficiently at the macrolevel. This combination might even make a higher contribution to sustainability than a form of coopetition that has no trade-offs.

TABLE 7 Example of a multi trade-offs case

Resources	Firm		∑ (res)
	Focal firm	Coopting firm	
Econ	+	-	+
Env	-	+	-
∑ (firm)	+	-	+

Hence, analyzing cases with mixed positive and negative outcomes on different levels opens new opportunities for how coopetition between firms can help to make progress towards sustainability. This opportunity comes at a cost. To arrive at these superior levels of contribution to sustainability coopetition, partners need to accept trade-offs. Such resulting trade-offs are not always managed successfully. More than 50% of all coopetition alliances fail (Lunnan & Haugland, 2008), and this might be one more reason why they fail. It may be particularly interesting to focus on the different interests of firms' stakeholders to further understand trade-offs. Some stakeholders might be interested primarily in economic performance and others in environmental performance. Some stakeholders might be primarily interested in the efficiency of resource use as such regardless of which firm uses the resource. And some stakeholders might be interested in the success of a particular firm whereas others are interested in the success of the corporate sector overall. For instance, in one of the combinations above, where the focal firm loses economically and the coopting firm loses environmentally, tensions may occur within firms (*intrafirm trade-offs* and tensions in the focal and coopting firms). Although stakeholders of the focal firm with environmental interests and stakeholders with economic interests of the coopting firm are satisfied by coopetitive outcomes, coopetition will be considered a failure by those interested in economic performance at the focal firm and in environmental performance at the coopting firm.

Learning to deal with tensions in coopetitive alliances of resource users can help to understand how to improve sustainability. For instance, finding the right partner to share resource flows with is a management task. We can assume that management will be interested first and foremost in the benefit to their own firm. The alternative with the highest benefit to the own firm can be a case that is full of tensions. To be able to establish such a coopetitive relationship with another firm, management needs to find a partner that is a good fit, that is, a firm with complementary interests. Finding the right partner is therefore a necessary but not sufficient condition for successful coopetition for sustainability.

In the case of *intraresource trade-offs*, stakeholders need to accept that some firms will use a resource less efficiently. Although overall resource efficiency increases, the efficiency of the use of a resource by one of the firms decreases. Stakeholders criticizing individual firms for their lack of efficiency of resource use might therefore not be doing the overall efficiency of resource use a favor. Higher efficiency of resource use overall might require a lower efficiency of resource use by a firm.

Another key to higher contributions to sustainability is to accept that some resources are used less efficiently—even on the macrolevel as implied in the case of *interresource trade-offs*. Such trade-offs confront stakeholders on the macrolevel. In Table 6, we have an example where a progress to sustainability is achieved through a higher efficiency of the use of the economic resource. Here, environmental interests of stakeholders (both firm-specific and firm-spanning) clash with economic interests, again both firm-specific and firm-spanning. Christ et al. (2017) provide a practical example of coopetition in the Australian wine industry where an environmentally beneficial coopetition was terminated as it seemed to jeopardize profitability. Expressed in the terminology used here, the environmental benefits of coopetition on the macrolevel did not compensate sufficiently to the decline of economic outcomes.

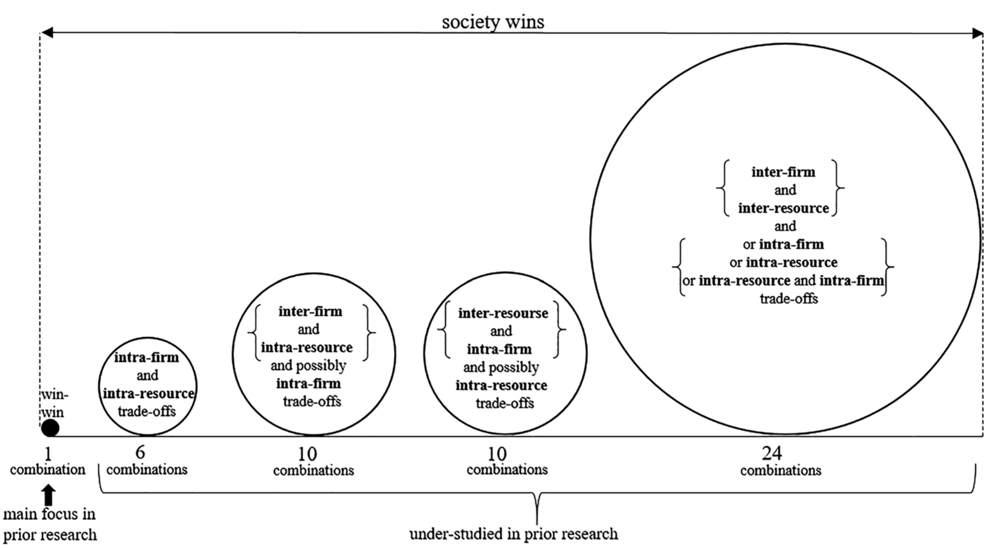

FIGURE 3 Fifty-one combinations of successful coopetition for sustainability

Complexity increases when the overall outcome for one firm is negative and for the other is positive, that is, we observe *interfirm trade-offs*. At first sight, it is difficult to understand why a losing firm would accept interfirm trade-offs even if the overall outcome on the societal level is positive. However, a committed firm that is willing to “pay a price” for a contribution to sustainability might agree to enter into such a coopetitive agreement. Social enterprises can be examples (Kumar & Malegeant, 2006; Stubbs, 2017). But interfirm trade-offs might be accepted by other firms as well. A firm that is only interested in economic performance might find its matching partner in firms that are keen to increase their environmental value. Overall, the positive impact can be that big that there is not only a positive overall contribution to sustainability but possibly even a more efficient use of environmental resources overall on the macrolevel. Hence, it can take a partner who only cares about economic performance to make the use of environmental resources more efficient.

To sum up, on the basis of the analysis of the presented trade-offs, we argue that depending on the perspective taken, successful coopetition for sustainability can be achieved in different ways. At the same time, a positive outcome on the societal level in all 50 analyzed combinations indicates that the alliance as a whole enhances its economic and environmental resource uses despite trade-offs. From a sustainability point of view, “win–win” solutions are therefore not necessarily preferable, but combinations that are characterized by trade-offs can make a positive or even a higher contribution to sustainability. Allowing for tensions and trade-offs can also be in line with the business case and the aim for higher economic returns. Thirty-four out of the 51 possible combinations allow for an increased return on economic resources of one firm and 12 combinations even allow for a higher return on economic resources of both firms. We therefore look at both cases within as well as beyond the business case for sustainability.

This study has some limitations. First, sustainability comprises more than two firms and more than two resources. Still, the basic logic we apply could be used for more complex scenarios. Second, the underlying model uses resource efficiency as a broad proxy for outcomes. However, outcomes of coopetition can be less tangible. For example, possible coopetition outcomes might be the novelty of innovation (Bouncken & Kraus, 2013), decreasing uncertainty and risks (Gnyawali & Park, 2011), knowledge leakages (Liu et al., 2014), or changes in using business models (Ritala & Sainio, 2014). Third, although eco-efficiency is a widely used way of understanding corporate (environmental) sustainability, it is still criticized for only taking into account relative improvements. For the ecosystem, or the climate for that matter, it is only absolute emissions that matter. Hence, many researchers (e.g., Dietz & Neumayer, 2007; Hueting, 1980; Wackernagel & Rees, 1997) argue that absolute changes of the resources use, in physical units, are a more relevant way to measure sustainability outcomes. We acknowledge that looking at efficiencies is a rather narrow way of defining contributions to sustainability, which constitutes a limitation. We chose efficiencies as they allow us to assess contributions to sustainability of economic and environmental resources in an analogous way. However, the findings of our research also hold analogously for other outcomes beyond efficiencies.

We see several avenues for future research. The fact that coopetition is full of tensions is not new (e.g., Bengtsson, Raza-Ullah, & Vanyushyn, 2016; Bouncken et al., 2017). The very fact that firms compete and cooperate at the same time points to relationships between firms that are full of tensions and paradoxes. In this article, we approach coopetition for sustainability from an outcomes perspective. We show that the win–win case of coopetition for sustainability that implies that every dimension improves is only one of many possible outcomes. But more importantly, even the existence of some negative partial outcomes does not mean that coopetitive relationships are not viable. We argue that the question whether coopetition for sustainability is viable depends on the perspective of the stakeholders that are involved in coopetition. Different sets of stakeholder interests in coopetition lead to different forms of workable coopetition. Interestingly, this does not necessarily mean that stakeholders need to share the same interests. Our research therefore points to the viability of unusual stakeholder alliances of coopetition for sustainability. Hence, further research could explore the different patterns in practice that we have identified. More research is required that explores the specific link between outcomes, stakeholders' interpretations, and tensions. Furthermore, it is important not only to understand theoretical linkages and roots of possible tensions in coopetition for sustainability but also to uncover ways to cope with such tensions. For example, we show that choosing the right partner could be one possible of such ways. Our conceptualizations of possible outcomes could be therefore used as a road-map by managers, according to which tensions are anticipated and mitigations are planned.

Although this research focuses on coopetition for sustainability, its findings could be broadened to other forms of coopetition. In general term, the findings apply analogously when two or more partners engage in coopetition pursuing two or more goals.

6 | CONCLUSIONS

This article began by arguing that resources need to be used more efficiently for society to become sustainable. Using resources more circularly is a promising way of improving the efficiency of resource use. We argue that this requires that resource users cooperate. Often, these resource users will be competitors in the market place. The simultaneous cooperation of competitors is referred to as coopetition. This article looks at coopetition for sustainability from an outcome perspective, which is under-researched to date.

We have systematically explored possible outcomes of coopetition for sustainability by examining the model of two coopeting firms using economic and environmental resources. On the basis of our findings, we argue that coopetition for sustainability can be assessed from three different perspectives: *a firm* (outcomes for the separate firm), *a resource* (outcomes related to separately economic and environmental performance), and *a societal* (joint environmental and economic outcomes for all involved firms) perspective. Because sustainability requires to meet both economic and environmental concerns at the macrolevel, we identify and analyze different patterns that lead to positive outcomes from the societal perspective. We show that there are 51 different ways to achieve positive societal outcomes in the model and only one of them reflects the win–win solution where outcomes from all perspectives are positive. We argue that the other 50 ways are under-studied in the existing literature although they can make an even higher contribution to sustainability compared with the win–win case. At the same time, combinations with mixed positive and negative outcomes involve trade-offs on the way towards sustainability, which constitutes a challenge. We identify four types of generic trade-offs that can arise: intrafirm and interfirm as well as intraresource and interresource. Distinguishing different perspectives of outcomes and trade-offs helps us to understand what motivates actors to co-opt and why tensions occur between different stakeholders during coopetition. Thus, a shared but not necessarily identical understanding of outcomes and success must be the base of any endeavor for coopetition for sustainability, and thereby, the findings of the paper apply to both research and practice. For academics, the findings provide insights through synthesis of two areas, coopetition and sustainability, which is under-researched. For practitioners, the study helps to fulfill a more comprehensive assessment of possible sustainability outcomes of coopetitive relationships and, thus, to make a more informed decision about the appropriateness of coopetition. Moreover, the presented approach allows showing outcomes in a quantitative, monetary way that gives an opportunity for comparative analysis of various alternatives.

ACKNOWLEDGMENTS

The authors gratefully acknowledge funding by the Kamprad Family Foundation for Entrepreneurship, Research and Charity (Ref. 20160063) and wish to thank Maria Bengtsson and Herman Stål for their valuable comments.

ORCID

Siarhei Manzhynski https://orcid.org/0000-0003-0499-2927

REFERENCES

Baron, D. P. (2009). A positive theory of moral management, social pressure, and corporate social performance. *Journal of Economics & Management Strategy*, *18*(1), 7–43.

Behrens, A., Giljum, S., Kovanda, J., & Niza, S. (2007). The material basis of the global economy: Worldwide patterns of natural resource extraction and their implications for sustainable resource use policies. *Ecological Economics*, *64*(2), 444–453.

Bengtsson, M., & Kock, S. (2000). "Coopetition" in business networks—To cooperate and compete simultaneously. *Industrial Marketing Management*, *29*(5), 411–426.

Bengtsson, M., Raza-Ullah, T., & Vanyushyn, V. (2016). The coopetition paradox and tension: The moderating role of coopetition capability. *Industrial Marketing Management*, *53*, 19–30.

Bernstad, A., la Cour Jansen, J., & Aspegren, H. (2011). Life cycle assessment of a household solid waste source separation programme: A Swedish case study. *Waste Management & Research*, *29*(10), 1027–1042. https://doi.org/10.1177/0734242X11406170

Boulding, K. E. (1973). The economics of the coming spaceship earth. In H. E. Daly (Ed.), *Towards a steady-state economy*. San Francisco: Freeman.

Bouncken, R. B., & Fredrich, V. (2012). Coopetition: Performance implications and management antecedents. *International Journal of Innovation Management*, *16*(05), 1250028.

Bouncken, R. B., & Fredrich, V. (2016). Learning in coopetition: Alliance orientation, network size, and firm types. *Journal of Business Research*, *69*(5), 1753–1758.

Bouncken, R. B., Fredrich, V., Ritala, P., & Kraus, S. (2017). Coopetition in new product development alliances: Advantages and tensions for incremental and radical innovation. *British Journal of Management.*.

Bouncken, R. B., Gast, J., Kraus, S., & Bogers, M. (2015). Coopetition: A systematic review, synthesis, and future research directions. *Review of Managerial Science*, *9*(3), 577–601.

Bouncken, R. B., & Kraus, S. (2013). Innovation in knowledge-intensive industries: The double-edged sword of coopetition. *Journal of Business Research*, *66*(10), 2060–2070.

Bowen, F. E., Bansal, P., & Slawinski, N. (2018). Scale matters: The scale of environmental issues in corporate collective actions. *Strategic Management Journal*, *39*(5), 1411–1436.

Chertow, M. R. (2000). Industrial symbiosis: Literature and taxonomy. *Annual review of energy and the environment*, *25*(1), 313–337.

Chertow, M. R. (2007). "Uncovering" industrial symbiosis. *Journal of Industrial Ecology*, *11*(1), 11–30. https://doi.org/10.1162/jiec.2007.1110

Christ, K. L., Burritt, R. L., & Varsei, M. (2017). Coopetition as a potential strategy for corporate sustainability. *Business strategy and the environment*, *26*(7), 1029–1040. https://doi.org/10.1002/bse.1967

Cubas-Díaz, M., & Martinez Sedano, M. A. (2018). Measures for sustainable investment decisions and business strategy—A triple bottom line approach. *Business strategy and the environment*, *27*(1), 16–38.

DeSimone, L. D., & Popoff, F. (1998). *Eco-efficiency. The business link to sustainable development* (2nd printing. ed.). Cambridge, Mass.: MIT Press.

Dietz, S., & Neumayer, E. (2007). Weak and strong sustainability in the SEEA: Concepts and measurement. *Ecological Economics*, *61*(4), 617–626.

Ehrenfeld, J., & Gertler, N. (1997). Industrial ecology in practice: The evolution of interdependence at Kalundborg. *Journal of Industrial Ecology*, *1*(1), 67–79.

Elkington, J. (1997). *Cannibals with forks: The triple bottom line of the 21st century business*. Oxford: Capstone.

Figge, F. (2001). Environmental value added—Ein neues Maß zur Messung der Öko-Effizienz (Environmental value added—A new approach to measuring eco-efficiency). *Zeitschrift für angewandte Umweltforschung*, *14*(1-4), 184–197.

Figge, F., Givry, P., Canning, L., Franklin-Johnson, E., & Thorpe, A. (2017). Eco-efficiency of virgin resources: A measure at the interface between micro and macro levels. *Ecological Economics*, *138*, 12–21. https://doi.org/10.1016/j.ecolecon.2017.03.016

Figge, F., & Hahn, T. (2004). Sustainable value added—Measuring corporate contributions to sustainability beyond eco-efficiency. *Ecological Economics*, *48*(2), 173–187.

Figge, F., & Thorpe, A. S. (2019). The symbiotic rebound effect in the circular economy. *Ecological Economics*, *163*, 61–69.

Gnyawali, D. R., & Park, B.-J. R. (2011). Co-opetition between giants: Collaboration with competitors for technological innovation. *Research Policy*, *40*(5), 650–663.

Green, D. I. (1894). Pain-cost and opportunity-cost. *The Quarterly Journal of Economics*, *8*(2), 218–229.

Greene, D. L. (1992). Vehicle use and fuel economy: How big is the “rebound” effect? *The Energy Journal*, *13*(1), 117–144.

Hahn, T., Figge, F., Pinkse, J., & Preuss, L. (2010). Trade-offs in corporate sustainability: You can't have your cake and eat it. *Business strategy and the environment*, *19*(4), 217–229.

Hahn, T., & Pinkse, J. (2014). Private environmental governance through cross-sector partnerships: Tensions between competition and effectiveness. *Organization & Environment*, *27*(2), 140–160.

Hanley, N. (2000). Macroeconomic measures of ‘sustainability’. *Journal of economic surveys*, *14*(1), 1–30.

Hueting, R. (1980). *New scarcity and economic growth: More welfare through less production?* Amsterdam: North-Holland.

Jevons, W. S. (1866). *The coal question* (2nd edition ed.). London: Macmillan.

Khazzoom, J. D. (1980). Economic implications of mandated efficiency in standards for household appliances. *The Energy Journal*, *1*(4), 21–40.

Kumar, S., & Malegeant, P. (2006). Strategic alliance in a closed-loop supply chain, a case of manufacturer and eco-non-profit organization. *Technovation*, *26*(10), 1127–1135.

Lado, A. A., Boyd, N. G., & Hanlon, S. C. (1997). Competition, cooperation, and the search for economic rents: A syncretic model. *Academy of management Review*, *22*(1), 110–141.

Limoubpratum, C., Shee, H., & Ahsan, K. (2015). Sustainable distribution through coopetition strategy. *International Journal of Logistics Research and Applications*, *18*(5), 424–441.

Liu, Y., Luo, Y., Yang, P., & Maksimov, V. (2014). Typology and effects of co-opetition in buyer–supplier relationships: Evidence from the Chinese home appliance industry. 供应中影响: 来中国的实研究. *Management and Organization Review*, *10*(3), 439–465.

Lunnan, R., & Haugland, S. A. (2008). Predicting and measuring alliance performance: A multidimensional analysis. *Strategic Management Journal*, *29*(5), 545–556.

Luo, Y. (2007). A coopetition perspective of global competition. *Journal of World Business*, *42*(2), 129–144.

Malthus, T. R. (1798). *An essay on the principle of population*.

Mantena, R., & Saha, R. L. (2012). Co-opetition between differentiated platforms in two-sided markets. *Journal of Management Information Systems*, *29*(2), 109–140.

Meadows, D. H., Meadows, G., Randers, J., & Behrens, W. W. (1972). *The limits to growth*. New York: Universe Books.

Medlin, C. J. (2006). Self and collective interest in business relationships. *Journal of Business Research*, *59*(7), 858–865.

Meehan, J., & Bryde, D. J. (2015). A field-level examination of the adoption of sustainable procurement in the social housing sector. *International Journal of Operations & Production Management*, *35*(7), 982–1004.

Melander, L. (2017). Achieving sustainable development by collaborating in green product innovation. *Business strategy and the environment*, *26*(8), 1095–1109.

Mention, A.-L. (2011). Co-operation and co-opetition as open innovation practices in the service sector: Which influence on innovation novelty? *Technovation*, *31*(1), 44–53. https://doi.org/10.1016/j.technovation.2010.08.002

Nalebuff, B. J., Brandenburger, A., & Maulana, A. (1996). *Co-opetition*. London: HarperCollinsBusiness.

Palmieri, A., Pomponi, F., & Russo, A. (2019). A triple-win scenario for horizontal collaboration in logistics: Determining enabling and key success factors. *Business strategy and the environment*. https://doi.org/10.1002/bse.2309

Parida, V., Burström, T., Visnjic, I., & Wincent, J. (2019). Orchestrating industrial ecosystem in circular economy: A two-stage transformation model for large manufacturing companies. *Journal of Business Research*, *101*, 715–725.

Pearce, D. W., & Turner, R. K. (1990). *Economics of natural resources and the environment*. Baltimore, MD: John Hopkins University Press.

Pellegrin-Boucher, E., Le Roy, F., & Gurău, C. (2013). Coopetitive strategies in the ICT sector: typology and stability. *Technology Analysis & Strategic Management*, *25*(1), 71–89.

Peloza, J., & Falkenberg, L. (2009). The role of collaboration in achieving corporate social responsibility objectives. *California Management Review*, *51*(3), 95–113.

Peng, T. J. A., Pike, S., Yang, J. C. H., & Roos, G. (2012). Is cooperation with competitors a good idea? An example in practice. *British Journal of Management*, *23*(4), 532–560.

Planko, J., Chappin, M. M., Cramer, J., & Hekkert, M. P. (2019). Coping with coopetition—Facing dilemmas in cooperation for sustainable development: The case of the Dutch smart grid industry. *Business strategy and the environment*. https://doi.org/10.1002/bse.2271

Quintana-Garcia, C., & Benavides-Velasco, C. A. (2004). Cooperation, competition, and innovative capability: A panel data of European dedicated biotechnology firms. *Technovation*, *24*(12), 927–938.

Raza-Ullah, T. (2017). A theory of experienced paradoxical tension in coopetitive alliances. Umeå University,

Rigamonti, L., Grosso, M., & Sunseri, M. C. (2009). Influence of assumptions about selection and recycling efficiencies on the LCA of integrated waste management systems. *The International Journal of Life Cycle Assessment*, *14*(5), 411–419.

Ritala, P. (2012). Coopetition strategy—When is it successful? Empirical evidence on innovation and market performance. *British Journal of Management*, *23*(3), 307–324.

Ritala, P., Golnam, A., & Wegmann, A. (2014). Coopetition-based business models: The case of Amazon. com. *Industrial Marketing Management*, *43*(2), 236–249.

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.

Ritala, P., & Sainio, L.-M. (2014). Coopetition for radical innovation: Technology, market and business-model perspectives. *Technology Analysis & Strategic Management*, *26*(2), 155–169.

Robinson, J. (2004). Squaring the circle? Some thoughts on the idea of sustainable development. *Ecological Economics*, *48*(4), 369–384.

Saunders, H. D. (2000). A view from the macro side: Rebound, backfire, and Khazzoom–Brookes. *Energy Policy*, *28*(6), 439–449.

Stadtler, L. (2017). Tightrope walking: Navigating competition in multicompany cross-sector social partnerships. *Journal of Business Ethics*, 1–17.

Stubbs, W. (2017). Sustainable entrepreneurship and B corps. *Business Strategy and the Environment*, *26*(3), 331–344.

Volschenk, J., Ungerer, M., & Smit, E. (2016). Creation and appropriation of socio-environmental value in coopetition. *Industrial Marketing Management*, *57*, 109–118.

Wackernagel, M., Lewan, L., & Hansson, C. B. (1999). Evaluating the use of natural capital with the ecological footprint: Applications in Sweden and subregions. *Ambio*, 604–612.

Wackernagel, M., & Rees, W. E. (1997). Perceptual and structural barriers to investing in natural capital: Economics from an ecological footprint perspective. *Ecological Economics*, *20*(1), 3–24.

Windsor, D. (2013). Corporate social responsibility and irresponsibility: A positive theory approach. *Journal of Business Research*, *66*(10), 1937–1944.

World Business Council for Sustainable Development (1996). *Eco-efficiency and cleaner production: Charting the Course to Sustainability*. Geneva: WBCSD.

World Commission on Environment and Development (1987). *Our common future*. New York: Oxford University Press.

Yuan, Z., Bi, J., & Moriguichi, Y. (2006). The circular economy: A new development strategy in China. *Journal of Industrial Ecology*, *10*(1-2), 4–8.

How to cite this article: Manzhynski S, Figge F. Coopetition for sustainability: Between organizational benefit and societal good. *Bus Strat Env*. 2020;29:827–837. https://doi.org/10.1002/bse.2400