The governance of collaboration for sustainable development: exploring the "black box"

Diego Vazquez-Brust

Professor of Global Business Sustainability and Strategy
Portsmouth Business School, Richmond Building
Portland Street Portsmouth P01 3DE (Office: Richmond 6.23)
Phone: 44 (0) 23 9284 8484 E-mail: diego.vazquez-brust@port.ac.uk

Roberta Souza Piao*
Lecturer, Department of Production Engineering
Polytechnic School, University of São Paulo
Av. Prof. Luciano Gualberto, n.1380. São Paulo – SP Zip Code 05508-010
Phone: 5511 5525-8762 E-mail: robertacsouza@usp.br

Mary Fernanda de Sousa de Melo

PhD Student, Department of Production Engineering
Polytechnic School, University of São Paulo
Av. Prof. Luciano Gualberto, n.1380. São Paulo – SP Zip Code 05508-010
Phone: 5511 5525-8762 E-mail: marymelo@usp.br

Rodrigo Trotta Yaryd

Undergraduate Student, Department of Production Engineering
Polytechnic School, University of São Paulo
Av. Prof. Luciano Gualberto, n.1380. São Paulo – SP Zip Code 05508-010
Phone: 5511 5525-8762 E-mail: rodrigotrottayaryd@gmail.com

Rodrigo is doing his first degree in Production Engineering in the Polytechnic School, the University of São Paulo, Brazil. His main research interests are corporate social responsibility.

Marly Monteiro de Carvalho

Full Professor, Department of Production Engineering
Polytechnic School, University of São Paulo
Av. Prof. Luciano Gualberto, n.1380. São Paulo – SP Zip Code 05508-010
Phone: 5511 5525-8755 E-mail: marlymc@usp.br

mailto:robertacsouza@usp.br

Abstract

Private sector collaboration for sustainable development remains a "black box" in terms of collaborative governance mechanisms: the specific arrangements or types of collaboration used by multiple actors to come together and implement and oversee rules to align their efforts towards shared goals. Therefore, a theoretical framework is needed to guide the design of collaborative efforts towards the achievement of UN Sustainable Development Goals. We address such a need, using a systematic literature review to conceptualize the main dimensions of collaborative governance (hierarchy, formalization, centralization), and the factors influencing the impact of collaborative governance choice on sustainable development outcomes. Our results highlight that there are different types of collaboration as a governance mechanism for progress towards Sustainable Development Goals and that alternative governance arrangements should be combined. We also found that the success of collaboration is contingent not only on governance-specific dimensions but also on the type of SDG and the type of partners involved.

Keywords: collaboration; mechanisms of governance; sustainable development goals.

1. Introduction

The need to understand better what factors influence the success of collaboration for sustainability, in particular when collaborations are initiated and led by the private sector, has become more pressing since the United Nations (UN) launched Transforming our World, the 2030 Agenda for Sustainable Development (Schaltegger, Beckman & Hockerts, 2018). This agenda defined 17 sustainable development goals (SDG) that are aimed at stimulating and guiding efforts to address major sustainability challenges faced by humankind and the planet (Bebbington & Unerman, 2018). The goals include, for instance, ending poverty and world hunger, transitioning towards responsible consumption and production, fighting climate change and reducing inequalities. The sustainable goal 17 indicates that the best way to organize such efforts is through "partnerships for the goals". At the core of the SDG agenda is, therefore, the understanding that no single actor can fully address a sustainability challenge (Schaltegger, Beckman & Hockerts, 2018). Progress towards SDG requires collaborative efforts of states, the private sector and civil society to scale up initiatives and accelerate progress towards the achievement of the goals (Schaltegger, Beckman & Hockerts, 2018; Florini & Pauli, 2018). Even within one specific SDG or sustainability issue, typically no single actor can fully solve a sustainability challenge (Mintrom & Thomas, 2018). Progress towards sustainable production and consumption (SDG 12) or climate change prevention (SDG 13) cannot be achieved without the collaboration of companies with actors throughout their supply chain and with civil society organizations (Yakovleva, Frei & Murthy, 2019). This is because the externalities generated by firms such as waste, pollution and overuse of natural resources pose one of the major threats to the achievement of sustainable development goals, particularly in areas where legislation and enforcement are wanting (Florini & Pauli, 2018). As a case in point, it is estimated that 85% of projected losses in biodiversity (addressed by Sustainable Development Goal 15) will be caused by agriculture and forestry (Castka & Leaman, 2016). Both sectors are characterized by the presence of large multinational firms, many of which voluntarily endorse and implement sustainability and biodiversity protection standards that establish criteria for sustainable production and sustainable management practices in their supply chains; thus, requiring collaboration with suppliers and customers for their implementation (Aggestam, Fleiß & Posch, 2017)

In practice, however, collaboration for sustainability involving the private sector has not always been a panacea. For instance, Pattberg and Widerberg (2016) analysed 340 partnerships for sustainability noting that 211 of them failed to achieve their objectives or became inactive

soon after their start. Only 3.5% of these partnerships were led by private business and most failed. Problems such as wrong partner mix, discontinued funding, poor leadership and inadequate fit to problem structure, were compounded by issues related to inappropriate collaborative governance structures. Similarly, Vazquez-Brust, Sarkis and Cordeiro (2013) had pointed out the lack of evidence supporting positive performance of business-led collaboration for sustainability and noted that many private-sector led partnerships for sustainability tend to follow a one-size-fits-all approach (despite evidence suggesting that contingent approaches are needed) partly because there is no academic guidance about alternative governance mechanisms for collaboration.

In other words, we know that we cannot progress towards sustainable development goals without collaboration between business and other actors. However, despite the increasingly protagonist role of the private sector in sustainability policy, usually channelled through corporate social responsibility or corporate sustainability initiatives (Arenas & Ayuso, 2016), we know little about the consequences for sustainability of business´ choice of collaborative governance mechanisms: the specific arrangements or types of collaboration used by multiple actors to come together and implement and oversee rules to align their efforts towards shared goals (Jackson and Rathert, 2017). There is an outstanding gap in terms of understanding ecological equifinality- to what extent alternative collaborative governance mechanisms are equally effective to foster progress towards SDG- (Derkx and Glasbergen, 2014), and fit-to-problem structure - extent to which collaborative governance approaches differ according to the type of sustainable practice being implemented through collaboration (e.g, climate change or waste management) (Abbot, 2012; Pattberg and Widerberg, 2016)

This study aims to start addressing the gaps in our understanding of private-led collaborative governance for sustainable development, using a literature review to identify lessons learned from the last ten years of scholarship. It will refine that knowledge to develop a theoretical framework conceptualizing the relationship between collaborative mechanisms of governance of corporate social responsibility practices and performance indicators for sustainable development goals, and the factors moderating such a relationship.

To achieve this objective, the research design applies a mixed-method approach to the analysis of literature with qualitative content analysis and a coding schema exploring descriptive statistics of frequencies and relations among variables through cross-tabulation and network analysis towards a conceptual framework.

Our framework proposes that there are different types of collaboration for progress towards sustainable development goals (SDGs). Our analysis suggests that the success of

collaboration depends on governance-specific aspects (hierarchy, formalization, centralization) but also on the type of SDG addressed by the partnership and the type of partners. We also find that distinct factors moderate the impact on sustainability outcomes of each dimension of collaborative governance.

Our results provide the foundations to theorize the role of collaborative governance choice as a determinant of the success of collaborative efforts towards social outcomes. This has strong policy implications and can help when designing better collaborative arrangements. Theoretically, our framework adds granularity to emerging literature on business and sustainable development goals (Kolk, Kourula & Pisani, 2017; Van Zanten & Van Tulder, 2018). It also has theoretical implications for Corporate Social Responsibility research, especially studies in private governance of CSR (e.g. Husted, 2003; Husted, Allen & Rivera, 2010; Husted & Sousa-Filho, 2016) where collaborative governance mechanisms for implementation of CSR practices are still underexplored. Finally, we make a modest contribution to enlarge the scope of the literature looking at hybrid governance arrangements in general (Menard, 2004; Makadok & Coff, 2009).

The paper is organized as follows. Section 2 presents the relevant literature on the mechanism of governance in the CSR context. Next, the research design used to develop this study is presented. This is followed by the results and discussion, presenting a conceptual model. Finally, the main conclusions and contributions are highlighted.

2. Literature Review.

2.1 Governance Mechanisms.

The roots of the term "governance mechanism" are presented in the transaction costs economy approach proposed by Coase (1988) and Williamson (1991). According to Williamson (1985) it is necessary to choose the mechanism of governance or coordination that minimizes the transaction costs involved. Transaction costs are the costs *ex-ante* and *ex-post* of an agreement. They are related to adjustments and adaptations necessary to reach a better transaction. Governance mechanisms are sometimes referred to as the boundaries of the firm (the extent to which transactions belong to the firm or are carried out externally). The terms make or buy, do or buy or vertical integration versus markets or hierarchies versus markets are also used (Williamson, 1991). In the transaction costs/boundaries of the firm perspective, collaborative governance arrangements are referred to as networks or hybrids and have been steadily attracting research interest in the last decade (Menard, 2004; Makadok & Coff, 2009).

Husted (2003) extended the transaction costs approach to include transactions aimed to achieve pro-social objectives, more concretely transactions between donors and recipient of corporate social responsibility (CSR) oriented resources. CSR has been defined as the social, environmental, ethical and philanthropic obligations of companies towards society (Carroll & Shabana, 2010). Private practices, aimed at contributing towards SDG, are usually channelled by firms through their CSR or Corporate Sustainability departments (Schönherr, Findler, & Martinuzzi, 2017). For Husted (2003, p. 483) "a CSR activity consists of the transfer of firm resources for the production of social goods and services" and "CSR governance refers to how these activities are organized"; in turn he uses the term private governance to discuss the coordination of CSR activities. Similarly, Jackson and Rathert (2017, p. 446) called private governance "the ability of private actors to devise and implement behavioral norms that regulate their activities".

Husted (2003) noted that there are different types of private governance: internal, external and collaborative. CSR practices could be organized internally by firms, developing resources and capabilities for these. Companies could also outsource CSR actions, through the creation of philanthropic corporate foundations or charitable contributions. Yakovleva (2017) adds to external governance the use of specialist consultants and contractors. Finally, companies can also collaborate to undertake CSR practices (Acquier, Valiorgue & Daudigeos, 2017; Yakovleva, 2017) for instance, through partnerships with other companies (Liao et al., 2017; Ritson, Wilson & Cohen, 2017), local communities and/or NGOs (Dorobantu & Odziemkowska, 2017; Fordham, Robinson & Blackwell, 2017; Yakovleva & Vazquez-Brust, 2018), or governments (King, 2007; Rodríguez et al., 2016).

As mentioned before, several studies suggest that collaboration is fundamental in undertaking effective CSR practices (Sakarya et al., 2012; Arenas, Sanchez & Murphy, 2013; Vock, Van Dolen & Kolk, 2013; Husted & Sousa-Filho, 2016; Niesten et al., 2017; Schneider, Wickert & Marti, 2017). A feature of interest regarding collaborative modes of governance is that they require collective action and are more closely aligned with sustainability science approaches (Yakovleva & Vazquez-Brust, 2018).

2.2 Different types of collaboration.

Jabbour (2015) proposes to classify governance modes as internal or external. The classification is based on the level of engagement of the company with CSR practices and internal governance represents a higher level of engagement than external governance. From

the transaction cost economy perspective, the level of engagement could be analyzed from the level of control that the company has on CSR transactions and their potential for value creation. Therefore, in this perspective, collaborative modes represent an intermediate level of engagement between internal (in-house) and external (market/foundations modes). Accordingly, Husted & Sousa-Filho, (2016) suggest that collaborative governance is more likely to be the preferred governance mode for corporate social responsibility practices when the firm's CSR activity is neither strongly nor weakly related to the firm's core business activity. However, Gauthier and Gilomen (2015) argue that sustainable value may no longer be created by the CSR practices of firms acting autonomously, but by organizations working collectively to accomplish its delivery through collaborative CSR projects. Their idea of collaborative projects is similar to the concept of collaborative governance posited by Husted (2003), which implies the participation of different stakeholders in CSR actions; however, their findings suggest that, in the energy field, collaboration is increasingly chosen for CSR activities strongly related to the firm's core activity. Overall, the literature related to sustainability highlights the rising importance of collaboration for coordinating CSR actions (Vurro, Russo & Perrini, 2009; Gimenez & Sierra, 2013; Formentini & Taticchi, 2016). For instance, Gimenez and Tachizawa (2012) analysed the enablers of sustainable practices, and observed that collaboration is a key enabler that assists companies in achieving CSR actions.

However, collaboration governance mechanisms are still a "black-box" regarding CSR practices. Recently, Husted and Sousa-Filho (2016) noted that although previous research recognized collaboration as the key to address the complexity of sustainability problems, studies about the complexity of collaborative organizational responses to CSR challenges are still scarce. Many studies talk about collaboration and cooperation in a generic way, but there is a paucity of research investigating differences in collaboration. For instance, previous literature reviews on governance of CSR have attempted to categorize the sustainability actions with suppliers (Tachizawa & Wong, 2014), identify tensions between the three elements of the TBL (Gimenez & Tachizawa, 2012) or focus on closed-loop supply chain management and the coordination problems in terms of operations (Pishchulov et al., 2019). These studies, however, do not differentiate between different types of collaboration, nor do Husted and Sousa-Filho.

The literature on social and environmental upgrading in supply chains (Gereffi and Lee, 2016; Lund-Thomsen and Lindgreen, 2014; Navas-Aleman, 2011), has emphasised the importance of governance types for social and environmental outcomes of collaboration. It suggested that collaboration types can be classified according to the degree of hierarchical relations between partners, as more or less vertically integrated or more or less horizontal,

taking into account, for instance, the control of a dominant partner and the switching costs of other partners. Golini et al. (2018) differentiate between modular, relational and captive collaboration. In modular collaboration, one partner provides specifications to the others, and collaboration is defined though these exchanges without assessment of the extent to which partners follow specifications. In relational collaboration, there is frequent interaction, knowledge-sharing, mutual trust and often long-term relationships between partners with similar power. Finally, in captive collaboration, the switching costs of non-dominant partners are high and the dominant, more powerful partner dictates the conditions in which all aspects of the partnership are carried out.

Golini et al. (2018) empirically confirm that relational and captive collaboration results in progress towards a production system that avoids environmental damage (environmental upgrading) There is , however, an outstanding gap in terms of understanding the extent to each of these alternative collaborative governance modes is equally effective to improve the performance of practices related to different SDG and what factors influence the relation between governance mechanism and sustainability outcomes Moreover, there is also a need to conceptualize other dimensions of collaborative governance mechanisms in addition to hierarchies, in order to increase granularity in our understanding of how collaboration can be designed.

From this idea, a systematic literature review was conducted about how CSR practices could be coordinated, exploring the relations between mechanisms of coordination and SDG results. As far as is known, no prior literature review focuses on understanding the different types of collaborative governance mechanisms. So, as such, analysing the different characteristics of collaboration and their relations with SDG oriented practices would bring much needed light to the coordination of CSR practices.

3. Method

Aligned with the research objectives, we present a literature review with mixed qualitative and quantitative approaches. The content analysis strength is in being both quantitative and qualitative, towards a rich and meaningful analysis of the literature surveyed (Duriau, Reger & Pfarrer, 2007). The triangulation between quantitative and qualitative analysis helps in building the conceptual framework, looking at the latent content through interpretation (Seuring & Gold, 2012).

3.1 Sampling Procedure and Data Collection

The search process was conducted using the Web of Science database with a range from 1900 until December 2018. ISI Web of Science Core Collection (WoS) was selected due to its high relevance and impact. The language was determined as English only, and the document types were limited to articles and reviews. In the end, the categories of topics were limited as Operations Research Management Science OR Management OR Business Finance OR Business OR Economics. There was selected a set of search strings and logic operators, developed for this research, were as follows: (“sustain* OR environment* OR Corporate Social Responsibility OR green* OR social* OR poverty OR inequality). There were created eight combinations: ("coordination mechanism*" OR "mechanism* of coordination"); ("make or buy" OR "do or buy" OR "buy or make" OR "buy and make"); (“outsourcing” AND “governance”); ("transaction* cost* economic*); (“TCE”); (“subcontracting”); ("vertical integration"); and ("boundar* of the firm"). The keywords search resulted in the identification of 733 articles. The title and abstracts of all identified articles were read to determine whether to include the article in the review. After this process, 96 papers were selected for further analysis and screening. After reading the full papers selected in the last stage, the final sample was composed of 43 papers. The focus was on papers referring to mechanisms of governance to coordinate CSR practices/actions. Critical in this stage was selecting papers where types of collaboration governance could be identified (e.g. papers generically talking about collaboration were deselected) and papers allowing to differentiate between CSR practices and outcomes aligned to specific UN SDG. Papers talking generically about CSR practices were deselected.

3.2 Data collection and analysis

For the selected sample, all metadata were exported from the WoS database and all article files were included in the NVivo software (Carvalho et al. 2013).

The data analysis was composed of three phases. First, there was conducted a qualitative content analysis. This analysis consists of the identification of the broad themes present in the analyzed articles intending to understand how CSR practices are being coordinated. For this stage, NVivo software was used to handle the sample and share analysis among researchers. The analysis was structured to answer two questions: (1) what are the most explored approaches to collaborative governance? and (2) to which SDGs is collaboration linked in the papers analysed?

At the end of this stage we used interpretive analysis to obtain a tentative framework outlining three main dimensions of collaborative governance that emerged from the literature: hierarchy, formalization and centralization. Hierarchy refers to the classification developed by Golini et al (2018). Formalization captures whether collaboration is formal (contracts ruling collaboration) or informal (based on personal links, common interests, common values or non-written, tacit rules and agreements). Captures whether there is a hub coordinating operating or operations which are decentralized and coordinated between ad-hoc arrangements (Walther, Schmid and Spengler, 2008).

A coding schema for governance mechanism was developed based on these dimensions. Another coding scheme was developed to classify papers in terms of UN SDG (see Table 1). After coding, a quantitative analysis was developed to explore code frequencies and relations among codes relating the different dimensions of collaborative governance and SDGs. In this phase, IBM SPSS was used for cross-tabulation among governance mechanisms and UN SDGs, and UCINET 6 and NetDraw softwares were used to illustrate the relationship among codes for network analysis (Borgatti, Everett & Freeman, 2002).

Third, the discussion and triangulation of the qualitative-quantitative analysis were used to consolidate and refine the conceptual framework, adding factors influencing the relation between dimensions of governance and SDG outcomes.

4. Results

Based on the research objective and the literature review, two broad themes were identified to conduct the analysis and to elaborate the conceptual framework: the underlying dimensions of mechanisms of governance and the sustainable development goals. The first stage of analysis resulted in the identification of dimensions of collaborative governance and the subsequent development of a coding schema. The coding schema and references are detailed in Table 1.

Themes	Variables	Description	Code	n	%	References
Mechanism of Governance	Formalization	Formal	MCF	29	64%	Arena, Azzone and Mapelli (2018), Kumar et al. (2018), Alvarez, Pilbeam and Wilding. (2010), Bazan, Jaber and Zanoni (2017), Bougherara et al. (2009a), Bougherara et al. (2009b), Dong et al. (2014), Herlin and Solitander (2017), Hoejmose, Brammer and Millington (2012), Husted (2003), Islam, Hossain and Mia (2018), Jorsfeldt, Hyolby and Nguyen (2016), Kortmann and Piller (2016), Liljestrand (2017), Pagell,Wu and Wasserman (2010), Paulraj and Blome (2017), Picciotti (2017), Pishchulov et al. (2019), Sallnas (2016), Schaltegger and Burritt (2018), Schottker et al. (2016), Shi and Min (2013), Steele (2010), Tesfaye and Brouwer (2012), Thiel et al. (2016), Toptal and Cetinkaya (2017), Zhou, Liu and Zhao (2018)
		Informal	MCI	12	27%	Formentini and Taticchi (2016), Alvarez, Pilbeam and Wilding. ((2010), Herlin and Solitander (2017), Hoejmose, Brammer and Millington (2012), Husted (2003), Kortmann and Piller (2016), Luo et al. (2014), Schaltegger and Burritt (2018), Steele (2009), Steele (2010), Tesfaye and Brouwer (2012), Yakovleva and Vazquez-Brust (2018) Xie (2015)
	Hierarchy	Captive	MCP	12	27%	Golini et al. (2018), Bougherara, Brolleau and Mzoughi (2009a), Carter (2008) Dong et al. (2014), Jorsfeldt, Hyolby and Nguyen (2016), Koo, Chung and Ryoo. (2014), Liljestrand (2017), Pagell, Wu and Wasserman (2010), Thiel et al. (2016), Walther, Schmid and Spengler (2008), Meinlschmidt, Schleper and Foerstl. (2018), Mokthar et al. (2019)
		Assessment	MA	3	7%	Gimenez and Tachizawa (2012), Herlin and Solitander (2017), Paulraj and Blome (2017)
		Relational	MCR	25	56%	Formentini and Taticchi (2016), Arena, Azzone and Mapelli (2018), Golini et al. (2018), Kumar, Subramaniam and Arputham (2018), Alvarez, Pilbeam and Wilding. (2010), Bazan, Jaber and Zanoni (2017), Bougherara, Grolleau and Mzoughi. (2009a; 2009b), Finon and Perez (2007), Herlin and Solitander (2017), Hoejmose, Brammer and Millington (2012), Islam et al. (2018), Liljestrand (2017), Luo et al. (2014), Pagell et al. (2010), Paulraj and Blome (2017), Sallnas (2016), Schaltegger and Burritt (2018), Schniederjans and Hales (2016), Shi and Min (2013), Steele (2010), Tesfaye and Brouwer (2012), Thiel et al. (2016), Meinlschmidt et al. (2018), Yakovleva and Vazquez-Brust (2018), Mokthar et al. (2019)
	Centralization	Centralized	MC	5	11%	Pishchulov et al. (2019), Shi and Min (2013), Xie et al. (2012), Xie (2015), Zhou et al (2018)

		Decentralized	MD	6	13%	Pishchulov et al. (2019), Shi and Min (2013), Walther et al. (2008), Xie et al. (2012), Xie (2015), Zhou et al. (2018)

Table 1. Coding Schema and references (continued)

Sustainable Development Goals	SDGs	Zero Hunger	SDG2	1	2%	Liljestrand (2017)
		Clean Water and Sanitation	SDG6	3	7%	Bougherara et al. (2009a), Herlin and Solitander (2017)
		Affordable and Clean Energy	SDG7	8	18%	Formentini and Taticchi (2016), Bazan, Jaber and Zanoni (2017), Dong et al. (2014), Paulraj and Blome (2017), Picciotti (2017), Xie et al (2012), Xie (2015), Zhou et al. (2018)
		Sustainable Cities and Communities	SDG11	2	4%	Bazan (2017), Dong et al. (2014)
		Responsible Consumption and Production	SDG12	10	22%	Kumar et al. (2018), Boehe and Barin-Cruz (2010), Bougherara et al. (2009a), Dong et al. (2014), Pagell et al. (2010), Paulraj and Blome (2017), Schniederjans (2016), Shi and Min (2013), Walther et al. (2008), Mokthar et al. (2019), Yakovleva and Vazquez-Brust (2018)
		Climate Action	SDG13	7	16%	Arena et al. (2018), Alvarez et al. (2010), Bougherara et al. (2009a), Herlin and Solitander (2017), Jorsfeldt et al. (2016), Koo et al. (2014), Toptal and Cetinkaya (2017)
		Life on land	SDG15	6	13%	Herlin and Solitander (2017), Husted (2003), Steele (2009, 2010), Tesfaye and Brouwer (2012), Thiel et al. (2016)

Table 1. Coding Schema and references

The next stage of our analysis aimed to quantitatively map current research along our emerging theoretical framework. It was structured along two questions: What are the most explored approaches to collaborative governance; and to which SDGs is collaboration linked?

4.1 What are the most explored approaches to collaborative governance?

To answer this question, we aligned current literature with the three dimensions of collaborative identified through our qualitative analysis.

The first dimension, Hierarchy, takes into account whether collaborative arrangements are closer to hierarchies or closer to arms-length transactions. Following Golini et al. (2018) we identify two main alternative arrangements: captive and relational. Captive refers to collaboration arrangements where a dominant and more powerful partner defines and closely monitors rules and processes. Relational refers to relations where partners have similar power and switching costs and define rules jointly through frequent interaction, trust and shared experiences. In addition, we find some instances of Assessment-based arrangements that sit between relational and captive governance.

The second dimension observed is Formalization. Following Formentini and Taticchi (2016), in formal collaboration there are comprehensive and detailed contracts ruling all aspects in the collaboration. On the other hand, informal collaboration is based on personal links, common interests, common values or non-written, tacit rules and agreements,

The third dimension of collaboration is Coordination Centrality. Coordination centrality captures whether there is a hub coordinating operating or operations which are decentralized and coordinated between ad-hoc arrangements (Walther, Schmidt & Spengler, 2008). For example, in the collaboration of waste reduction with high coordination centrality, the focal manufacturer implements reverse logistic processes to take back products from customers. In a decentralized approach, the customers (e.g. retailers) organize their own recovery, recycling and returns to focal firms.

We developed 7 coding categories capturing aspects of collaborative governance (captive, relational, assessment-based, formal, informal, centralized, decentralized) based on the above described dimensions. After coding and quantitatively analysing the codes we found that the most often discussed aspects of collaborative governance are formal governance -MCF (64%) and relational governance - MCR (56%) which are followed by informal governance - MCI and captive governance MCP (both 27%). Fewer papers investigate assessment based – MA (7%), centralized MC (11%) and de-centralized - MD (13%) governance.

Figure 1 shows the relationship between collaborative governance codes. Considering the relationship between dimensions of governance, formalization and hierarchy are more often linked, particularly formal governance and relational governance. This is interesting in itself, since formal governance is traditionally associated with the more hierarchical approaches to governance.

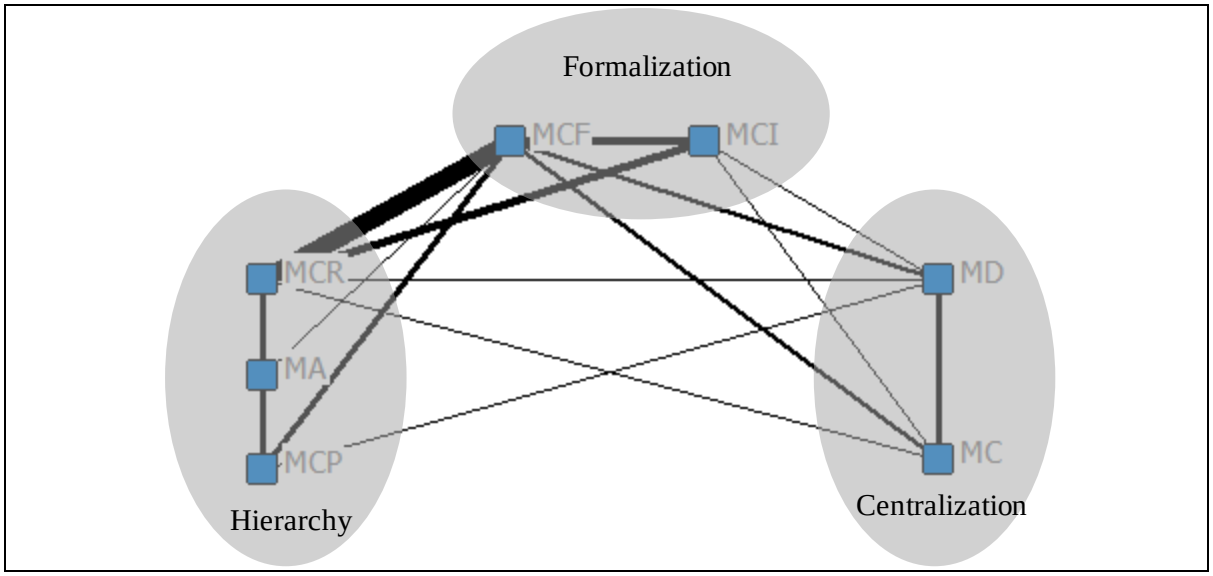

Figure 1. Relationship between mechanisms of governance

In terms of formal versus informal approaches to collaborative governance, the most common approach is the use of formal approaches only followed by a combination of formal and informal approaches. Collaboration relying only on informal mechanisms was identified in only 5 papers.

Although they did not necessarily use the term captive, several papers described a close relationship where a dominant firm imposed conditions on partners with reduced switching power and closely followed their performance, while simultaneously strong relational bonds were built. Most authors study relational governance on its own, but a group of papers contrasted assessment-based governance versus relational governance.

Although assessment-based governance evokes a dominant firm carrying out the assessment, our analysis suggests that assessment is often self-reported and unverified, thus suggesting a type of governance closer to what Golini *et al* (2018) calls modular governance. Findings also suggest that assessment is usually combined with relational governance. Centralized and decentralized governance are relatively less investigated, in particular centralized governance. Interestingly there are papers linking captive governance with decentralized but not with centralized governance.

Relational, centralized and decentralized approaches have been more studied in conjunction with formal governance than with informal governance, whereas captive governance and assessment-based governance are only linked to formal governance. Most papers refer to collaboration between a focal firm and its suppliers, followed by collaboration between firms and civil society organizations and collaboration between a focal firm and its customers. Two papers deal with relations with distributors and only one considers lower tier suppliers.

The preliminary results also indicate that governance mechanisms evolve but it is also important to point out the lack of agreement in the literature about how governance mechanisms evolve.

4.2 To which SDGs is collaboration linked?

The most explored SDGs in the literature are SDG12, Sustainable Consumption and Production, SDG7 Affordable and Clean Energy, SDG13, Climate Change, and SDG15, Life on Land (see Table 1). It is noticeable the scarcity of literature on collaborative governance for issues related to ending poverty, reducing inequalities or improving education, among others.

The connection between SDG7 and SDG11 – Sustainable Cities- and between SDG7 and SDG12 is often seen in the surveyed literature as shown in Figure 2.

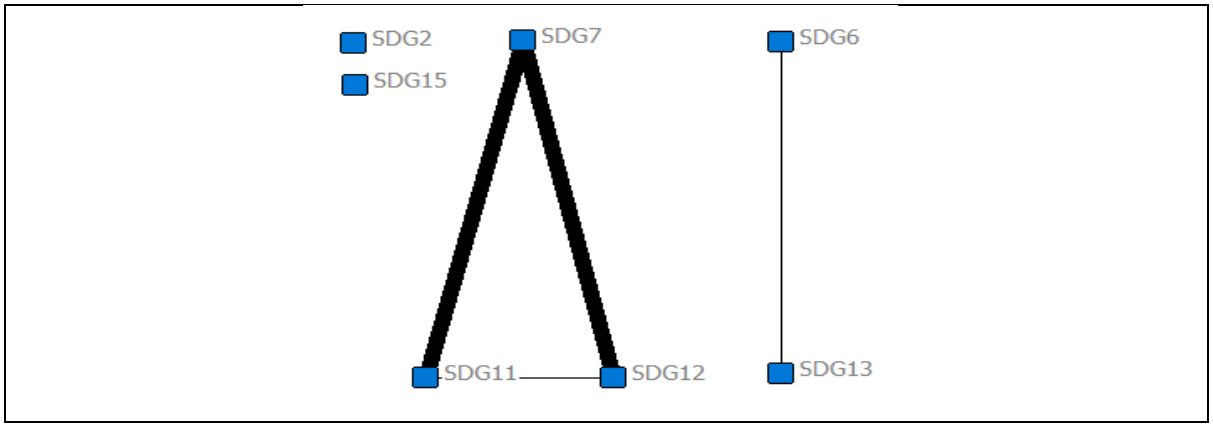

Figure 2. Relationship between SDGs

The literature explored convergences in the identification of a positive relation between collaborative modes of governance and SDGs. Exploring the relationship between the mechanism of governance and SDGs, the cross-analysis shows the link between MCF, MCR and MCC with SDG7, SDG12, SDG13 and SDG 15 is more explored by the surveyed literature, as shown in Figure 3.

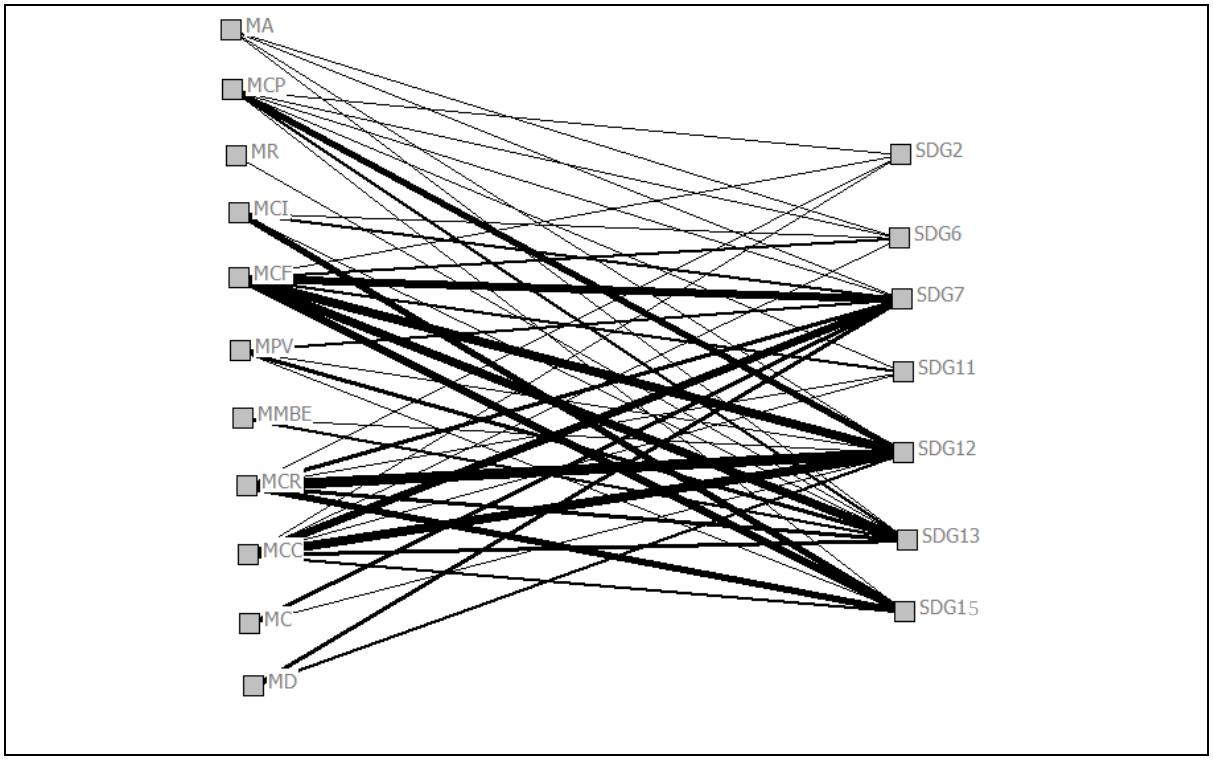

Figure 3. Relationship between mechanisms of governance and SDGs

Finally, our analysis shows that three dimensions of collaboration (hierarchy, formalization, and centrality) lead to different configuration modes in relation to SDG. The cross-tabulation analysis is shown in Figure 4.

The figure maps the amount of literature exploring the relations between dimensions and between the dimensions and UN SDG. It shows a gap in the research investigating centrality in relation to the other dimensions and to SDG.

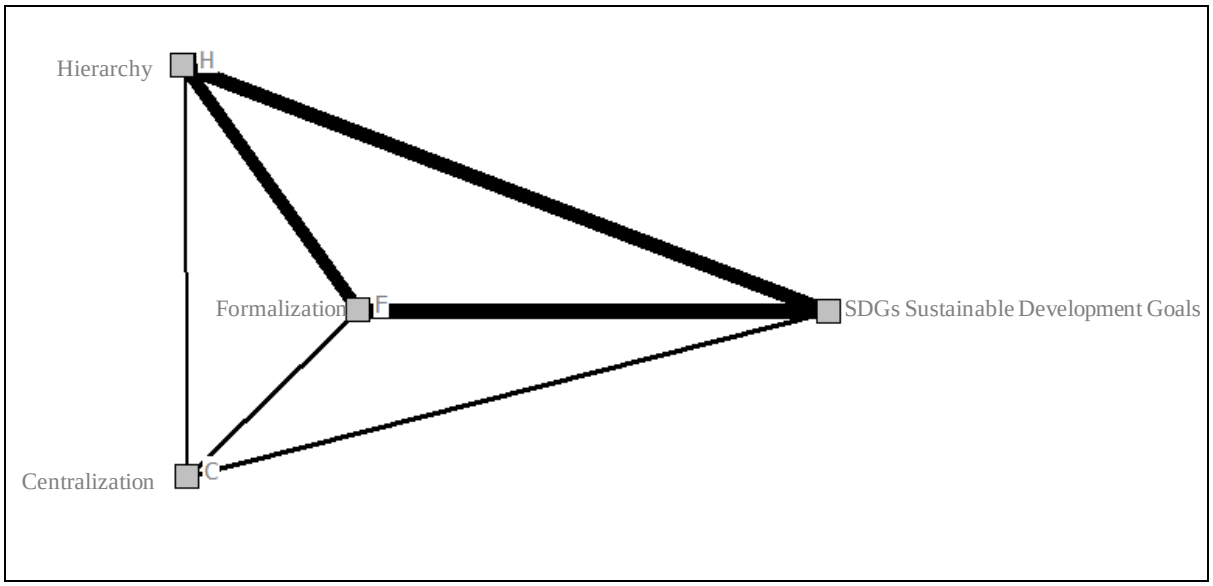

Figure 4. Dimensions of collaboration and SDGs

The triangulation between quantitative analysis and qualitative analysis leading to consolidation of the theoretical framework is explored in the following section. The questions we look at is how do different modes of governance relate to SDGs?

5. Theoretical Framework

5.1 How do different modes of governance relate to SDG?

In our analyses we sought to identify what dimensions are more investigated, and what levels of each dimension are more conducive to better environmental performance (environmental upgrading). One aspect that emerges from the analysis is the extent to which alternative arrangements in each dimension are substitutes (e.g. for better environmental results companies should have either relational or captive cooperation) or complements (for better results relational and captive cooperation should be combined).

Relational governance seems to be more effective in terms of environmental upgrading than more hierarchical forms of governance -e.g. captive, assessment (e.g. Steele 2009, 2010, Gimenez & Tachizawa, 2012; Golini et al., 2018; Islam et al., 2018; Schaltegger & Burritt, 2018). For instance, Golini et al., (2018) find that the more hierarchical captive governance

leads to environmental upgrading in collaboration with suppliers, but relational governance can obtain upgrading effects with both suppliers and customers. Similarly, Paulraj and Blome (2017) observe that a higher level of relational collaboration leads to better environmental performance than higher levels of assessment and audits. However, Hoejmose (2012) found that more intensity of relational governance is not related to improved green performance in certain supply chains. Indeed, a few researchers found that stronger types of relational governance can have negative effects. Luo et al. (2014) found that stronger *guanxi* relations lead to reduced green performance in China. Zhang and Quin (2018) also found that captive is more effective than relational to achieve environmental improvements in low tier suppliers' performance. Koo, Chung & Ryoo (2014) found that green supply chain performance increases with the strength of captive relations with suppliers. There is some degree of convergence in findings suggesting that the best approach to obtain improved environmental performance is a hybrid of captive and relational governance (Tesfaye and Brouwer, 2012; Sallnas, 2016; Paulraj & Blome, 2017; Zhang & Quin, 2018). For instance, Sallnas (2016) observed that a combination of captive (direct supervision, co-location) and relational governance (negotiated standardization of outputs and skills through socialization) between a firm and its suppliers resulted in reduced CO2 emissions. Tesfaye and Brouwer (2012) found that hierarchical arrangements between private actors and NGOs, to implement actions for biodiversity protection, worked only in combination with trust and shared experiences. On the other hand, Paulraj and Blome (2017) note that hierarchical and non- hierarchical approaches are not substitutes, but in certain conditions can be complements, which can also lead to trade-offs. For instance, trade-offs emerge when there is high intensity of both captive and relational governance. Thus, in the complex collaboration observed in our analysis, relational and captive governance arrangements can be either mutually reinforcing or oppositional, suggesting that outcomes need to be distinguished from the underlying processes.

The literature also identifies several moderators for the combination of relational and captive. Thiel et al (2016) agree that a combination of relational and captive governance is the best approach for biodiversity conservation, but the right mix of captive and relational approaches depends on the *characteristics of the nature- related transaction*. Asset specificity, uncertainty, frequency, and rivalry increase the positive impacts of captive approaches in green performance (Luo et al., 2014, Thiel, 2016). Jointness, excludability and social-relational distance favour relational approaches (Thiel, 2016). Zhang and Quin (2018) observe that the higher the transaction risk, the more integration and use of captive forms. Medium risk is associated with relational forms. Multipliers (training and evaluating first tier supplier to do

the same with lower level suppliers) lead to more intensity of lower tier sustainability performance than alliances (directly training and evaluating the low tier suppliers). The *nature of relations* between collaborating actors further moderates the relation between governance and environmental performance. Mokthar et al. (2019) found that captive approaches lead to better results in CO2 emissions reduction when the focal firm has a high level of power and relational approaches have better results when there are high levels of built trust. Carter (2014) notes dependence on resources provided by a partner lead to more integration and preference for captive forms of governance. Another moderator is the *nature of supply chains*. Hoejmose, Brammer and Millington (2012) find that relational governance approaches (trust, confidence, long term) are only positively related to improvements in environmental performance when the supply chain is business to business. Influencing *Market characteristics* include supply and demand uncertainty, which both increase the need for integration and captive governance. Finally, there is a moderating role of the strategic *centrality* of environmental issues. Pagell. Wu and Wasserman (2010) note that the strategic importance of environmental issues increases preference for captive forms but if suppliers have power because of low numbers (supply risks), companies will combine long term contracts with high investment in supplier development and try to build long term commitment through relational approaches.

In terms of formal versus informal, the literature suggests that formal approaches on their own lead to better environmental results than informal governance on its own. Schöttker et al (2016) observed that collaboration between farmers and non-governmental organizations has a more positive impact on biodiversity conservation when it is highly formalized. Zhang and Quin (2018) found that compliance-based approaches without contractual specifications and assessment have poor results in terms of improving the environmental performance of low tier suppliers. However, in many cases contracts result in self-assessment based on standards provided by focal companies with equally dubious results (Golini et al, 2018). Paulraj and Blome (2017) note that formal (ie audits) and informal controls are not substitutes and should be combined. Our analysis suggests that best results can be obtained when formal approaches and informal approaches are implemented together with a combination of relational and captive governance; for instance, formal assessment of contractual environmental requirements combined with long-term relationship building (Gimenez & Tachizawa, 2012; Paulraj & Blome, 2017). For instance, Jorsfeldt, Hyolby and Nguyen (2016) present a case study where a dominant company maximises CO2 reductions in the supply chain with contractual CO2 reduction targets from suppliers but also uses the logistic function to informally coordinate integration of activities seeking value creation through CO2 reduction with suppliers. Research

by Liljestrand (2017) suggests that the nature of the issue transacted influences the extent to which formal or informal agreements have better results. Studying waste minimization in retailers, he found more informal governance mechanisms for packaging (joint decision-making, information) than for expired food (rules, price). Finon and Perez (2007) observe that long term formal supply chain agreements are the preferred governance arrangements for energy efficiency. Hoejmose, Brammer and Millington (2012) finds that top manager involvement improves the outcomes of both formal and informal governance.

When it comes to coordination centrality, the findings are contradictory. Some papers found that decentralized coordination has fewer positive results than centralized coordination both in terms of carbon emissions (Toptal and Cetinkaya, 2017) and energy efficiency (Xie, 2015, Zhou, Liu and Zhao, 2018). However, Xie et al. (2012) found that centralized governance has negative effects in energy conservation. Pishchulov et al. (2019) note that decentralized coordination of closed loops (by retailers) has better environmental outcomes than centralized coordination (manufacturer) Shi and Min (2013) observe that centralized coordination (manufacturer) results in higher waste disposed at landfill and Walther et al. (2008) observed that decentralized coordination mechanisms in supply chains lead to satisfactory results in the fulfilment of regulatory requirements for recycling. However, with more stringent legal requirements, centralized coordination has better results. Similarly, Xie (2015) observes that the effects of centralized governance are dependent upon the strength of the regulatory context: in a weak regulatory context centralized governance leads to lower energy savings. Dong et al. (2014) find that city level material and energy symbiosis coordinated by a dominant focal industry with strong government planning directions have a positive impact on CO2 emissions, waste reduction, raw material use and energy use. All the above allows one to infer that the impact of centralized coordination on environmental performance is moderated by regulatory stringency and enforcement.

Although the relation between economic and environmental performance is not the focus of this paper, an aspect that emerges in the analysis is that trade-offs between them may arise from some collaborative governance configurations. For instance, high intensity of formal assessment has a negative effect on economic performance (Paulraj & Blome, 2017) and highly centralized coordination results in lower economic performance than decentralized (Toptal and Cetinkaya, 2017; Walther et al. 2008; Xie et al., 2012). Figure 5 below summarises our findings.

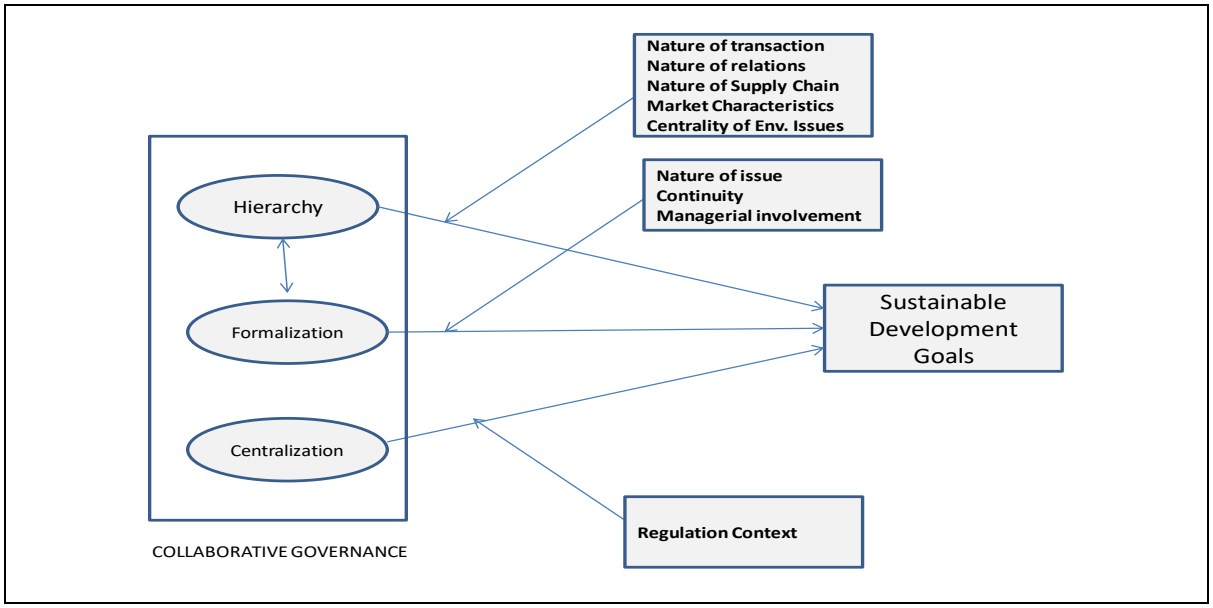

Figure 5. Collaborative Governance and SDGs: a conceptual framework.

Are there any differences in the configurations of governance arrangements leading to better results in terms of specific UNSDGs? For each SDG we can find cases of formal, relational and captive governance. However, the analysis also shows clear differences between groups of SDGs and most frequently used collaborative governance arrangements. Formal governance is distinctly dominant in collaborations for environmental issues related to SDG 6, 7, 11 and 13. Yet, cases of informal collaboration are also found, although they tend to be either a complement or an antecedent for formal collaboration. For instance, Formentini and Taticchi (2016) mention three cases of improvement in energy efficiency (SDG7) obtained through informal collaboration with suppliers including knowledge sharing and supplier development through formative interactions that led to co-developed internal certification in suppliers. Yakovleva and Vazquez-Brust (2018) describe informal collaboration between artisanal miners and multinationals but their findings reveal that from the point of view of the miners the collaboration, although not supported by a contract, was formalized through the approval of customary authorities,

Relational governance is more frequent in collaboration for issues related to SDG 12 and SDG 15. In collaborations related to SDG 12, relational governance is closely followed by formal and captive governance. Collaboration in issues contributing to SDG 15 (e.g. rainforest protection) is first linked to relational governance, with informal and formal arrangements being used with similar frequency. Informal governance collaborations were not found for topics related to either SDG 11 or SDG 12 or SDG 2.

In terms of the less explored modes of governance, centralized governance is observed in collaborations related to SDG 7, and decentralized governance in collaboration related to SDG 7 and 12.

All but one of all the papers analysing collaborations for SDG15 (life on land) refer to collaboration with civil society organizations (NGOs, community associations). In contrast, all the papers analysing collaboration towards SDG 12 and 13 refer to supply chain collaborations.

Differences in the governance arrangement are mainly related to the nature of relationships and in relation to civil society organizations, so the power of firms is constrained and will therefore favour a combination of formal agreement with relational governance as observed in the case of UNSDG 15. The nature of the issue also influences this choice. Issues related to UNSDG 15, such as biodiversity conservation have measurement difficulties because the success of collaboration cannot be easily measured (e.g. establishing whether a species is extinct or not), thus firms have to believe that the partnership will develop the expected results. Collaborative governance is, therefore, built based on *ex-ante* evaluations of the extent to which the partner is trustable and has the right credentials. Captive governance is very unlikely to be successful in this context. Not only the firm faces constraints to monitor and assess the partnering civil society organization but also tends to have less knowledge than its partners about the issue transacted. When it comes to UNSDG 13, the situation is different; firms can anticipate and measure reductions in CO2 emissions, therefore formal and even captive arrangements are feasible. In the case of UNSDG12, most cases are about reverse logistic collaboration. Here, monitoring coordination is costly but very important since focal firms need take back products, therefore firms favour a combination of relational, formal and captive governance, according to their power over suppliers and supply risks.

6. Discussion

We have identified three dimensions of collaborative governance: hierarchy, formalization and centralization. Golini et al. (2018) had identified the first dimension, Formentini and Taticchi (2016) the second, and several researchers had explored aspects related to the third dimension (e.g. Shi & Min, 2013). However, no previous work had analysed these dimensions together and there was in many cases a lack of conceptual clarity on the underlying dimensions in study, its antecedents and moderators. Figure 5, in the previous section summarised our contribution to clarify these aspects.

In contrast to existing work in collaborative governance (e.g. Steele 2009; 2010; Gimenez & Tachizawa, 2012; Golini et al., 2018) that has suggested that one governance mode

poses a substitute, or minimizes the need for an alternative mode, we find that alternative governance approaches (e.g. relational and captive, formal and informal, centralized and decentralized) tend to work better when combined without hegemonic dominance of one over another. This can be explained by drawing on complexity theory which proposes that there are two ways to deal with complexity. One of them is to reduce complexity, for instance with hierarchies, formalization and centralization. The other way is to absorb complexity, for instance, through decentralized network governance based on informal rules and close relationships (Pirson & Turnbull, 2018). While Pirson and Turnbull (2018) propose that decentralized and relational approaches are better to handle CSR complexity, our analysis suggests that a hybrid of both governance approaches works better because it allows handling both complexity and uncertainty, and also allows for the consideration of power and strategy issues. We also found that formal and informal approaches tend to complement each other. Horwitz and McGahan (2019) argue that informal governance enhances intrinsic motivation, which is a powerful driver for sustainable development goals. On the other hand, formal governance compels actors to engage in activities that enact goals even when such goals are not intrinsically motivating.

Most of the papers analysed focused on collaboration initiated by focal companies with their suppliers, and to a lesser extent with civil society organizations. Collaboration with customers is much less explored but results suggest that it requires different governance configurations and neither captive nor formal governance are likely to deal to improved environmental performance. Jabbour (2015) found that collaboration with customers can lead to higher improvements in performance than collaboration with suppliers; however, there is still a lack of research in terms of identifying the collaborative arrangements that favour such a result. The case studied by Jabbour (2015) was a B2C company that had captive and formal governance arrangements with their distributors, which in turn had built strong informal relationships with customers, but the authors did not focus on the nature of collaborative arrangements implemented.

We also found differences in the governance approaches used to collaborate with different UNSDGs. More easily measurable SDG aspects, such as SDG 13 and C02 emissions will favour formal and captive governance (if firms have the power and resources to enforce it). In contrast, less easily measurable issues such as biodiversity conservation (SDG 15) will benefit from closer relational approaches. Barzel (2007) observes biodiversity conservation can be considered a credence good (good with qualities that cannot be observed by the customer after purchase, making it difficult to assess its utility) and related transactions are

credence transactions where an *ex-post* evaluation is challenging. The more difficult the measurement, the more the need to build relations of reciprocity and mutual understanding based on shared experiences and trust.

Finally, an intriguing theme that is emerging in the literature is how governance configurations for sustainability evolve. TCE states that transaction between parties could evolve and one of the dimensions, the uncertainty, could decrease because of increased mutual trust. In the first stage, a formal mechanism and more hierarchic structure is adopted, with fewer incentives and more control. As partners continue to be involved in a mutually satisfactory transaction, the collaboration could evolve into more relational and informal governance modes, with more flexibility and incentives. This kind of pattern is supported, for instance, by the findings of Sallnas (2016) or Brockhaus, Di Gregorio and Mardiah (2014). The latter found that companies could adopt formal mechanisms in the first stage by deploying their market power, which could imply adopting contracts with established requirements and parameters. In the second stage, they could adopt a more collaborative coordination mechanism. However, Alvarez, Pilbeam and Wilding (2010) contradict TCE. The authors highlight the adaptive element of governance mechanisms used to extend sustainability. They present a case of a company which had informal mechanisms in the first stage and formal monitoring in the second. Horwitz and McGahan (2019) have recently shown that formal governance has different impacts when it shapes recently constituted partnerships and when it is introduced in long running informal partnerships. In long running partnerships, formal governance is introduced to solve trade-offs, whereas in new partnerships formal governance compensates for deficiencies in intrinsic motivation.

The topics discussed have implications for research in the governance of CSR; while previous studies (e.g. Husted and Sousa-Filho, 2016) suggest that higher strategic centrality will be associated with internal governance or captive forms of collaborative governance, our findings suggest a more complex and dynamic relation.

7. Limitations

This paper has several limitations. First, by targeting a specific type of more mainstream journals, we risked omitting relevant knowledge generated in niche and specialist journals, Second, our results are constrained by our selection of key words. Third, our initial objective was to quantitatively investigate the influence of collaborative governance modes in sustainability outcomes, grouping sustainability performance indicators in categories in accordance with the UN SDG. However, our quantitative analyses were constrained by the

insufficient literature measuring impacts of business-led collaboration related to sustainability. Further research could extend our results with data collection enabling quantitative studies. Several SDGs did not feature heavily in the literature analysed, and this reduced our scope for exploring differences across SDG. Similarly, some core stakeholder groups were not strongly represented in our sample of articles. A case in point are customers. Research suggests that there are distinctive governance mechanisms related to customers, but more case studies are needed to better understand in what circumstances collaboration with customers leads to improved environmental performance. Conceptually, we restricted our focus to collaborations where companies had a leading role, but further studies could investigate the extent of differences with collaborative arrangements where private companies are minority partners.

More research could also be done investigating the relations between different dimensions of collaborative governance and cognitive and attitudinal aspects of collaboration, for instance, analysing the importance of the type of knowledge involved in the collaboration. If the knowledge is tacit, as in the case of biodiversity, relational collaboration may facilitate knowledge sharing. Heath and Staudenmayer (2000) have highlighted that successful collaboration requires both the ability to collaborate (coordination) and the willingness to collaborate (cooperation). Tee, Davies and White (2019) observe that modular collaboration enhances collaboration but harms cooperation because it emphasizes specialization between modules. Thus, modular collaboration needs to be complemented by relational governance practices promoting integration across modules that favour cooperation. New research could explore the relations between cooperation and coordination with captive/relational, formal/informal and centralized/decentralized forms of governance. We found fewer papers looking at centralized/decentralized collaborative governance which may explain why we could only identify one moderator for the relationship between centralized/decentralized and SDG outcomes. More case studies and surveys are needed to identify a wider range of moderators. Finally, as highlighted in the discussion, more longitudinal studies are needed to improve our understanding of the factors influencing how collaborative governance evolves and how changes in governance configurations influence the outcomes of collaboration for sustainability.

8. Conclusion

This paper carried out a systematic review of literature looking at collaborative governance modes to work towards improved environmental performance. Our results highlight that there is not a one-size-fits-all type of collaboration for progress towards SDG

and that in most circumstances, alternative governance arrangements are not adversarial and should be combined to maximise the contribution towards SDG. We also found that the success of collaboration is contingent not only on governance-specific aspects (hierarchy, formalization, centralization) but also on the type of SDG and the type of partner. The relations between governance configurations and SDG progress are in turn moderated by the nature of transactions, relations between partners, supply chain structure, market factors and strategy and regulation context. The complexity of aspects related to the success of collaborative arrangements and the relative scarcity of research found, highlight the need to open the black box of collaboration and take a contingent approach to better understand what configurations are more likely to lead to improved environmental performance and in what circumstances. In doing so, we respond to calls to better understand the complexity of collaboration.

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