

**The Engagement of Firms in Environmental Collaborations: Existing Contributions and
Future Directions**

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Abstract

The engagement of firms in environmental collaborations has become a ubiquitous phenomenon in today's business landscape. Yet much of the research to date is fragmented across multiple disciplines and lacks a clear framework to support future study. We consolidate and synthesize existing contributions into a conceptual map comprised of antecedents, consequences, and contingencies to better understand environmental collaborations. This map offers a perspective on how firms develop strategies, structures, and capabilities to manage and balance environmental and economic performance and increasing demands for environmental sustainability from multiple stakeholders and society. We then highlight existing gaps in the extant literature and outline a future research agenda including key questions and issues needing additional study.

Keywords

Environmental sustainability, environmental collaborations, natural environment, research agenda

Since the 1992 United Nations Conference on Environment and Development (*Rio Earth Summit*) and the 2002 World Summit on Sustainable Development (*Johannesburg Earth Summit*) environmental sustainability has become a prominent concern for private, public, and civil society sector actors. As a consequence, firms have increasingly sought out environmental¹ collaborations (*ECs*) as a way to exploit opportunities and neutralize threats related to environmental issues.

Scholarly interest in *ECs* has grown tremendously in recent years, yet the research landscape remains fragmented, making it difficult to synthesize and evaluate the cumulative impact of this work. This likely stems from the fact that researchers from a broad range of domains such as strategy, organizational theory, entrepreneurship, marketing, public policy and administration, operations management, and industrial ecology have tackled domain specific *EC* research issues using only the specific theories and methods dominant in their respective domains. Moreover, recent review efforts in research areas important to the understanding of *ECs* have not painted a clear picture of existing contributions, current debates, and future research opportunities concerning the *EC* phenomenon. For example, Kale and Singh's (2009) review on strategic alliances identifies some future research challenges, but does not include alliances with an environmental scope. Selsky and Parker's (2005) review offers insight into cross-sector social partnerships, but provides little on partnerships with an environmental scope. Meanwhile, Etzion's (2007) review on organizations and the natural environment contributes to the strategy and organizational theory literatures, but largely ignores the role of *ECs* within these domains. Likewise, review efforts on firm—government collaborations remained silent on the *EC* phenomenon (Hodge & Greve, 2007; Schaeffer & Loveridge, 2002).

The fact that the number of scholarly publications on *ECs* has increased in recent years suggests that the time is ripe to reflect on and integrate existing contributions and develop some directions for future research. Thus, the purpose of this article is to (a) identify, review, and organize key conceptual and empirical findings from *EC* research, and (b) establish a research agenda by identifying key research issues and questions in areas where further research is required. This study contributes to the literature on inter-organizational collaboration and environmental sustainability in at least two ways. First, we develop a cohesive foundation and conceptual map for understanding *ECs*. This helps further our understanding of how firms develop strategies, structures, and capabilities to manage environmental and economic performance to accommodate increasing stakeholder and societal demands on environmental issues. Second, we suggest a future research agenda that includes some key issues and questions for the *EC* domain.

For this study, we define *ECs* as arrangements between a firm and one or more other organizations with the goal of reducing negative or generating positive environmental impact in domains such as climate change, energy and resource efficiency, forestry renewal, clean water, reducing desertification, and natural resource depletion (Arts, 2002; Clark & Woodrow, 2007; Crane, 1998; Dutton, 1996; Glasbergen & Groenenberg, 2001; Gotschall, 1996; Hartman et al., 1999; Hartman & Stafford, 1998; Mendleson & Polonsky, 1995; Steger et al., 2009). As we are applying a firm-focused perspective, our efforts address the four dominant inter-organizational collaboration forms through which firms implement *ECs*: (1) inter-firm collaborations, (2) firm—NGO collaborations, (3) firm—government collaborations, and (4) firm-university collaborations. Figure 1 depicts these four *EC* implementation forms and the boundaries of this review.

[Insert Figure 1 about here]

The remainder of this paper is structured into four primary sections. First, we review the four dominant *EC* implementation form attributes identified above. In the second section, we describe the methods used in conducting our extensive survey, review, and literature categorization. We close this section by introducing the conceptual map used to organize this literature. Next, we review and map scholarly findings concerning the antecedents, consequences, and contingencies related to *ECs* and highlight how they apply to the four *EC* implementation forms. We conclude by identifying and discussing future research opportunities.

EC IMPLEMENTATION FORMS

ECs often form in response to increasing political, economic, and social forces demanding environmental action (Austin, 2000; Delmas & Montes-Sancho, 2010; Hartman & Stafford, 1997; Long & Arnold, 1995). From a firm level perspective, *ECs* represent a melding of market, non-market², and environmental strategies; and occur through four dominant inter-organizational collaboration types³: (1) inter-firm collaborations, (2) firm—NGO collaborations, (3) firm—government collaborations, and (4) firm-university collaborations. Table 1 summarizes their key attributes.

[Insert Table 1 about here]

Inter-Firm ECs

Inter-firm collaborations are voluntary collaborations between two or more firms involving the exchange, sharing, or co-developing of resources and capabilities as part of a project or business operation (Dussauge, Garrette, & Mitchell; 2000; Gulati, 1999). Their main objective tends to be

economic value creation through jointly exploiting opportunities and/or neutralizing threats in the market environment (Chan et al., 1997; Hagedoorn & Schakenraad, 1994). However, firms increasingly implement *EC* type inter-firm collaborations to combine economic and environmental objectives (Ammenberg & Hjelm, 2003; Amundsen, 2000; Andersen & Lund, 2007; Glasbergen & Groenenberg, 2001; McEvily & Marcus, 2005); involving suppliers (Crane, 1998; Vachon & Klassen, 2006), customers (Vachon & Klassen, 2006), and competitors (Crane, 1998). Alliances that develop more environmentally sustainable products fall into this category; they seek to create economic value by exploiting new market opportunities, while simultaneously seeking to generate positive environmental impacts. The General Motors—Dow Chemical partnership to jointly develop commercial hydrogen fuel cells for power generation provides one example (Daily, 2004). While such a positive environmental impact provides public benefits⁴ (i.e. reduced carbon emission), traditional interfirm alliance research has focused mainly on the common and private benefits accruing to alliance partners (Khanna, Gulati & Nohria, 1998) with much less attention paid to the potential public benefits. We return to this point in our discussion of future research. To conclude, *ECs* implemented through inter-firm collaborations can be seen as vehicles to realize economic value through addressing environmental problems.

Firm—NGO ECs

Firm—NGO collaborations are voluntary formal and informal collaborative arrangements between firms and NGOs concerning a broad range of social and environmental issues (Austin, 2000; Berger, Cunningham, & Drumwright, 2004, 2006; Le Ber & Branzei, 2010; Rivera-Santos & Rufin, in press; Sagawa & Segal, 2000; Seitanidi & Crane, 2009; Selsky & Parker, 2005) and

may be considered a sub-set of cross-sector partnerships more broadly (Gray, 2000; Selsky & Parker, 2005). The objectives of firm—NGO collaborations often involve social, environmental, and economic value creation with private economic benefits accruing to partners and public benefits accruing to actors that are beyond traditional organizational boundaries (Waddock, 1988).

Similar to the muddling of CSR and sustainability in the literature (May, Cheney, & Roper, 2007; Sharma & Rudd, 2003), firm—NGO collaboration research tends to view social and environmental collaborations as somewhat the same (Austin, 2000; Berger et al., 2004, 2006; Le Ber & Branzei, 2010). Yet, we found a lot of firm—NGO collaboration work with an environmental scope (e.g., Ählström & Sjöström, 2005; Arts, 2002; Arya & Salk, 2006; Austin, 2003; Crane, 1998; Dutton, 1996; Glasbergen & Groenenberg, 2001; Gunningham, 2001; Hartman & Stafford, 1998; King, 2007; Livesey, 1999; Rondinelli & London, 2003; Stafford & Hartman, 1996). Our review distinguishes this work clearly from work on social collaborations⁵ more broadly. Examples of firm—NGO *ECs* include firms licensing NGOs' names, sponsorships of NGOs' work and/or specific projects, and NGO endorsements of firms' products (Hartman & Stafford, 1997; Mendelson & Polonksy, 1995). In summary, firm—NGO *ECs* can be seen as vehicles to create economic and broader societal value by addressing environmental issues.

Firm—Government ECs

Building on Delmas and Toffel (2008: 1034-35) we view firm—government *ECs* as voluntary “[...] collaborative arrangements between firms and regulators whereby firms voluntarily commit to actions that might improve their environmental performance (Delmas and Terlaak, 2001). These programs are designed by policy makers to associate private benefits with the

voluntary provision of public goods (Delmas and Terlaak, 2001).” Firms engage in collaborations with government organizations for a number of reasons including signaling positive environmental behavior to stakeholders, reducing regulatory pressures, and learning new skills. For firms, these *ECs* fall into the domain of non-market and political strategy (Baron, 1995; Bonardi & Keim, 2005); their scope ranges from pre-empting regulatory threats to shaping future regulations (Delmas & Marcus, 2004; Delmas & Terlaak, 2001)⁶. Such collaborations frequently aim to influence government policy and norms through proactive collective political action (Delmas & Montes-Sancho, 2010; Oliver & Holzinger, 2008). Firm—government *ECs* tend to be an effective approach when certain environmental issues challenge firm boundaries (Delmas & Terlaak, 2001). Research has found that firm—government *ECs* occur both at regional (Ammenberg & Hjelm, 2003; von Malmborg, 2004) and industry levels (Amundsen, 2000). Often firm—government *ECs* occur as multi-partner alliances and participating firms demonstrate three different types of behaviors - non-cooperation and free-riding (Delmas & Keller, 2005), symbolic cooperation, and substantial cooperation (Delmas & Montes-Sancho, 2010). Government actors participate in these *ECs* as a way to build environmental capabilities and strengthen regional inter-firm environmental networks or clusters (von Malmborg, 2003, 2004). Local authorities, in particular, can play critical supporting roles for inter-firm learning and knowledge transfer, and becoming knowledge repositories which firms can leverage to improve their own actions over time (Gombault & Versteeg, 1999; von Malmborg, 2003, 2004, 2007).

Firm-UniversityECs

Firm-university collaborations are agreements between firms and university-based research organizations (public or private) focused on collaborative R&D; university- provided contract research and consulting; development and commercialization of technology through a firm owned partly by the academic inventor; employee training; and/or transfer of university-generated intellectual property to firms (Agrawal 2001; Perkman & Walsh, 2007). Increasingly, firms collaborate with universities to address environmental issues and foster green innovations. One example is the 2008 BP - University of California, Berkeley alliance to develop renewable energy solutions (www.dailycal.org). The BP - UC Berkeley example demonstrates that firm-university *ECs* are similar in nature to inter-firm *ECs* except that one partner comes from the higher education sector.

METHODOLOGY

This review follows a method similar to other recent reviews (Kourula & Laasonen, 2010; Wassmer, 2010). First, we performed an extensive search of peer-reviewed journals in management, marketing, public policy, political science, economics, finance, sociology, operations, environmental sciences, and industrial ecology using prominent research databases (EBSCO Academic Search Premier, the JSTOR Arts and Science Collection, and ABI/INFORM on ProQuest) and journal websites.

We searched from 1989 to present, beginning three years prior to the 1992 Rio Earth Summit, when broad-based interest in *ECs* was first generated (Glasbergen, Biermann, & Mol, 2007). This time frame also captures research generated from public and academic events such as the 1998 *Greening of Industry Network (GIN)* conference with the theme “Partnership and leadership: Building alliances for a sustainable future” (Hartman et al., 1999), subsequent UN

sponsored environmental conferences, and special journal issues and academic conferences related to *ECs* – e.g., 1999 and 2005 *Business Strategy and the Environment*'s special issues on partnerships around sustainable development (Hartman et al., 1999; Young, 2005); 1995 *Academy of Management Review* and 2000 *Academy of Management Journal* special issues on organizations and the natural environment (Starik & Marcus, 2000).

To search for individual articles, we developed a two-dimensional search matrix combining collaboration and sustainability-related search terms. We supplemented this with additional individual journal website searches for in-press articles. We refined our list of potential articles by culling those with titles and abstracts relevant to this review. When the title and abstract proved inconclusive, we read the articles in more detail to determine their relevance. Next, we searched the reference sections of key articles to identify additional sources, such as books and other articles, not found in our original article search. We read and summarized the selected articles highlighting key characteristics such as study type (i.e. theoretical or empirical, practitioner or scholarly), research issue/s and question/s, theoretical underpinnings, research design, variables, empirical setting, findings, and implications. We categorized each study using keywords and concepts, which helped identify emerging research issues and themes in the literature. Given our firm-focused perspective on *ECs*, we excluded studies focused primarily on NGO—governmental collaborations (e.g., Selsky & Parker, 2005; Sinh, 2002) and community-level collaborations aimed at formulating and implementing policy change (e.g., Hills & Man, 1998; Regeczi, 2005). Based on our reading of these articles, we found the categories antecedents, consequences, and contingencies of *ECs* provided a parsimonious conceptual map, depicted in Figure 2, to view this diverse literature.

[Insert Figure 2 about here]

EC RELEVANT ANTECEDENTS, CONSEQUENCES, AND CONTINGENCIES

EC Relevant Antecedents

Our analysis of the extant literature revealed that antecedents relevant to *ECs* can be understood best at three levels of analysis: (1) the focal firm-level, (2) the inter-organizational-level, and (3) the external environment-level.

Focal firm-level antecedents

A key focal firm-level antecedent for all four *EC* implementation forms can be classified as ‘*resource and capability gaps*’. As no one firm possesses all the necessary resources to exploit every opportunity and neutralize every threat in its external environment, firms frequently use non-traditional market mechanisms such as inter-organizational collaborations to obtain preferential access to resources they do not possess (Gulati, 2007). The extant literature shows that firms often seek out *ECs* to access resources and capabilities required to green their operations and business practices (Glasbergen & Groenenberg, 2001; Gotschall, 1996; Perez-Aleman & Sandilands, 2008; Rondinelli & London, 2003; Roy & Whelan, 1992; Sarkis, 2003; Vachon & Klassen, 2006; Vermeulen & Ras, 2006), identify and exploit market opportunities (Arts, 2002; Hartman & Stafford, 1998; Mendelson & Polonksy, 1995; Rangan et al., 2006; Rondinelli & London, 2003; Stafford et al., 2000), develop a greener marketing mix (Crane, 1998; Glasbergen & Groenenberg, 2001; Mendelson & Polonksy, 1995; Polonsky & Rosenberger, 2001), develop solutions to their environmental problems (Fischer & Schot, 1993; Tombs, 1993), develop contingencies for environmental disasters (Stafford & Hartman, 1996);

and formulate more proactive and sustainable strategies and business models (Hart & Sharma, 2004; Hartman & Stafford, 1998; Livesey, 1999; London & Hart, 2004).

More specifically, firms tend to engage in firm—NGO *ECs* (Clarke & Roome, 1999; Crane, 1998; Hartman & Stafford, 1997, 1998; Rondinelli & London, 2003; Steger et al., 2009) and firm—government *ECs* (Delmas & Marcus, 2004; Delmas & Montes-Sancho, 2010; Delmas & Terlaak, 2001; Helby, 2002; Videras & Alberini, 2000) when seeking to access critical network resources required to tackle the opportunities and threats described above. For firm—NGO collaborations, access to complementary resources is an especially important determinant as firms often provide tangible rent-generating resources in exchange for NGOs' intangible resources such as specialized environmental expertise, awareness of social forces, reputation and legitimacy, and access to distinct networks (Arts, 2002; Hartman & Stafford, 1998; Yaziji, 2004). Interestingly, the extant literature reveals that firms use firm—NGO *ECs* not only for addressing specific environmental problems (Crane, 1998; Tombs, 1993; Fischer & Schot, 1993; Steger et al., 2009) but also to become more responsible overall (Arya & Salk, 2006; London, Rondinelli, & O'Neill, 2005). Although research evidence is limited, it appears that firms use firm-university *ECs* specifically to bridge the gap between the research base and the market in order to develop green product innovations (Steward & Conway, 1998).

Another key focal firm-level antecedent can be classified as '*reputation issues*'. Here, the literature shows that firms engage in firm—NGO *ECs* and to a lesser extent, firm—government *ECs* (Videras & Alberini, 2000) as a way to improve their reputations. More specifically, the extant literature indicates that firm—NGO *ECs* where NGOs serve as champions for firms' environmental actions (Hartman & Stafford, 1998) allow firms to gain (or regain) public trust and improve their reputations around environmental matters (Arts, 2002; Crane, 1998; Griesse,

2007; Hartman & Stafford, 1997; LaFrance & Lehmann, 2005). For example, Stafford and colleagues (2000) analyzed the Foron-Greenpeace *EC* finding that such collaborations can help firms to create consumer credibility through product endorsement by a powerful NGO. Although firm—NGO *ECs* tend to involve a substantial resource exchange, firms also use them strategically as rhetorical mechanisms in an environmental discourse to gain reputational benefits (Livesey, 1999).

Inter-organizational-level antecedents

A desire for managing ‘*stakeholder relationship issues*’ is a key antecedent for firm—NGO *ECs* as firms seek to develop and strengthen stakeholder relationships through mitigating conflict and addressing stakeholder concerns (Clarke & Roome, 1999; Rondinelli & London, 2003; Stafford et al., 2000; Steger et al., 2009; Wesley & Vredenburg, 1991). Firm—NGO *ECs* seem to play a particularly important role in helping firms improve their standing with environmental NGOs, pre-empt potential attacks, and build strategic bridges to other societal stakeholder groups (Arts, 2002; Dutton, 1996; Livesey, 1999; Stafford & Hartman, 1996). For example, firm—NGO *ECs* can be used to align different stakeholder groups to drive the adoption of an environmentally friendly technology (Stafford et al., 2000). However, such collaborations do not guarantee success as they can be thwarted by individual concerns of trust, loss of control, and misinterpretation of partners’ motivations and intentions (Long & Arnold, 1995). The level of conflict that exists between firm—NGO *ECs* partners prior to the collaboration is also an important factor. In fact, many *ECs* emerge to address prior conflict and deepen the dialogue between partners as well as to incorporate other stakeholders into the decision making processes (Arts, 2002; Dutton, 1996).

External environment-level antecedents

With the growing importance of the environmental sustainability discourse (Livesey, 1999), public and civil society actors have pressured firms increasingly towards self-governance (Arts, 2002; Hartman et al., 1999; Starik & Heuer, 2002). Increasing NGO engagement around policy formulation and implementation may have also contributed to the increased external pressure on firms (Hendry, 2003; Hoffman & Bertels, 2010; Starik & Heuer, 2002).

At the external environment-level of analysis, two key antecedents exist - *government failure* and *institutional pressures*. Firm—government *ECs* are one response to overcoming previously failed interventions by governments and multilateral institutions in developing meaningful regulations (Andonova, 2010; Bäckstrand, 2006; Glasbergen & Groenenberg, 2001; Kolk et al., 2008; Steger et al., 2009). Such *ECs* develop “a specific type of private environmental policy arrangement” (Arts, 2002: 30) to address particular situations. In other words, firms come together to create self-regulation in the absence of existing formal government or multilateral action.

‘*Institutional pressures*’ include pressure from a variety of sources – NGOs, stakeholders, governments, and industry (Arya & Salk, 2006; Harrison, 1995; Sharma & Vredenburg, 1998). Firms use *ECs* to address environmental issues proactively before government imposed threats can be made or carried out (Delmas & Montes-Sancho, 2010; Hartman & Stafford, 1998) or competitive pressure from industry peers weaken their market position (Delmas & Montes-Sancho, 2010). Firms may also use *ECs* reactively as a defense against such regulatory threats (Stafford & Hartman, 1996; Stafford et al., 2000). Firm—government *ECs* are a dominant implementation form in these instances, because of their effectiveness in influencing and/or pre-

empting impending regulations (Christmann & Taylor, 2006; Hartman & Stafford, 1998; Howard-Grenville, 2002; King, Lenox, & Terlaak, 2005; Stafford & Hartman, 1996) and shaping potential future environmental regulations (Delmas & Marcus, 2004; Delmas & Terlaak, 2001).

EC Relevant Consequences

Consequences of *ECs* can be best understood by classifying them at the level of the focal firm and the external environment. While *ECs*, by definition, seek to develop environmental benefits, research reveals that they also generate economic and political benefits.

Focal firm-level consequences

The key focal firm-level consequence for all four *EC* implementation forms is the potential to create some level of ‘*competitive advantage*.’ Competitive advantage results from decreasing costs through efficiency improvements and/or increasing revenues from new products and markets (Hartman & Stafford, 1997; Rondinelli & London, 2003; Sharma & Vredenburg, 1998; Yaziji, 2004); through jointly developed and operated environmental systems and technologies (Ammenberg & Hjelm, 2003; Stafford et al., 2000), greener supply chain practices (Perez-Aleman & Sandilands, 2008; Vachon & Klassen, 2006; Zhu & Cote, 2004), compliance with industry and/or international environmental standards, training on energy efficient procurement (Helby, 2002; McEvily & Marcus 2005), increased internal information sharing (Amundsen, 2000; Mendelson & Polonksy, 1995), changes in human resource management (Austin, 2000), and broader structural and technological changes (Helby, 2002). However, this work also shows *ECs* can have potentially negative consequences when set up and managed poorly, and may even destroy firm value (Westley & Vredenburg, 1991). Thus, firms should consider possible negative

impacts while forming and managing *ECs*. We return to this point in the contingencies section below.

For small and medium size enterprises (SMEs), in particular, research shows that *ECs* can enhance competitiveness, environmental reputation and credibility (Mendelson & Polonksy, 1995; Stafford et al., 2000) by increasing reach and access in the marketplace (Gombault & Versteeg, 1999; Gunningham & Sinclair, 2002), and better engaging and educating consumers through product and organizational endorsements. For example, through inter-firm *ECs*, SME combined heat and power plants competed more effectively in regulated energy markets by offering services through their *ECs* similar to those that their larger competitors offered on their own (Andersen & Lund, 2007).

Moreover, firm—government *ECs* can help firms enhance environmental performance and reputation through improved operational efficiency. The potential benefits include increased flexibility in dealing with existing and deterring future regulations, enhanced learning around developing solutions to their environmental problems, and improved public recognition and goodwill (Arora & Gangopadhyay, 1995; Delmas & Terlaak, 2001). Still, research shows free-riding can be a problem as firms not involved or only symbolically involved may nevertheless benefit from the overall improved industry reputation from particular collaborations (Delmas & Montes-Sancho, 2010; Delmas & Terlaak, 2001).

External environment level consequences

ECs, particularly firm—NGO or firm—government *ECs*, can also create ‘*broader societal benefits*’ (Amundsen, 2000; Sharma, Vredenburg, & Westley, 1994) by influencing environmental legislation and policy-making (Gulbrandsen & Andresen, 2004; Koontz et al.,

2004). Examples include industry-level and international standards and certifications, and the adoption of new practices and technologies (Yaziji, 2004). This may occur through setting, adopting, and enforcing agreed upon practices and standards within an industry (e.g., Responsible Care adopted by the chemical industry) or at a broader level (e.g., ISO certifications or Global Reporting Initiative metrics) (Arya & Salk, 2006). Research shows that larger-scale *ECs*, especially implemented as firm—government *ECs*, can potentially have regional-level impacts, serving as a marketing tool for attracting new investments among environmentally responsible firms (Amundsen, 2000; von Malmborg, 2004).

EC Relevant Contingencies

The extent literature has identified focal firm-level, partnership-level, and partner-level contingencies that influence the consequences of *ECs*.

Focal firm-level contingencies

A firm's '*collaborative capability*' is the key success factor for *ECs*, irrespective of the implementation form (Austin, 2003; Dyer, Kale, & Singh, 2001). This capability includes a firm's ability to adequately screen, assess, and select partners (Dyer, Kale, & Singh, 2001; Gray, 1985; Gray & Wood, 1991) in light of supporting an *EC's* particular objectives (Mendelson & Polonsky, 1995). Among the aspects of *collaborative capacity* that firms need to consider are whether potential partners have the requisite resources and credibility to support the *EC* (Hendry, 2003; King, 2007; Rangan et al., 2006) and have established or can establish and maintain common values and approaches for collaborating effectively (Glasbergen & Groenenberg, 2001; Rondinelli & London, 2003).

Importantly, *collaborative capability* in the *EC* context differs from what more traditional inter-firm collaboration literature discusses as alliance capability (Kale, Dyer, and Singh, 2002) and their success relies on a different treatment and approach (Rondinelli & London, 2003). In particular, firms need to engage and manage their *ECs* and *EC* partners beyond the confines of traditional inter-firm collaborations (Austin, 2003), supporting the likely more diverse types of *EC* partners involved in ways that leverage prior experience to support new collaborations (Rondinelli & London, 2003; von Malmborg, 2003). For technically-oriented *ECs* this might require leveraging specialized expertise or infrastructure, as demonstrated by *ECs* between small- and medium-sized combined heat and power plants (Andersen & Lund, 2007).

Partnership-level contingencies

At the *EC* partnership-level a number of important factors influence the outcomes of *ECs*. First, the ‘*governance structure*’ is essential to *EC* success (King, 2007; Rangan et al., 2006). Governance of *ECs* runs a continuum from more informal knowledge-sharing arrangements on particular environmental issues (Arts, 2002; Glasbergen & Groeneberg, 2001; Milne et al. 1996) to formalized joint R&D and product development (e.g., Greenpeace and Foron *EC*, Stafford et al., 2000). In particular, firm—NGO *ECs* appear to have relatively high levels of formalization (Milne et al., 1996), perhaps due to the longer-term perspectives of these partnerships, and/or that firm-NGO *ECs* often develop into more in-depth relationships over time (King, 2007; Vachon & Klassen, 2006).

‘*Common vision*’ and ‘*shared values and common ways of working*’ are also important determinants for *EC* success particularly among firm—NGO, firm—government, and firm—university *ECs*. Partners’ ability to balance their varied goals and motivations due to their

different backgrounds (including different economic, environmental, and political goals) is critical for *EC* success (Crane, 1998; Hartman & Stafford, 1997, 1998; Polonsky & Rosenberger, 2001). An obvious though often difficult aspect of this involves balancing firms' profit-seeking motives with more environmentally-focused motives of partners from other sectors (Hartman & Stafford, 1997, 1998). Von Malmberg (2004) provides an example of such goal diversity in his work on local authorities in Sweden, where public actors sought environmental value creation mainly, while private actors sought economic value creation. Success here may mean *EC* partners become intentionally inclusive to better understand the goals and motives involved in an *EC*. As Newig and Fritsch (2009) found with firm—government *ECs*, greater inclusiveness of actors from within governmental agencies tended to improve the quality of environmental policy outcomes developed from *ECs*. Failing to overcome such conflicting objectives may doom *ECs* particularly firm—NGO or firm—government *ECs* (Westley & Vredenburg, 1991). However, actively managing and overcoming these conflicting (and sometimes adversarial) viewpoints can also help avert failure of an *EC* and support developing more in-depth future collaborations (Hartman & Stafford, 1998; Rondinelli & London, 2003). From a different perspective, among inter-firm or firm—NGO *ECs* collaborating with partners of similar size may reduce resource and power asymmetries that might otherwise destabilize an *EC* (Arts, 2002).

It is also important that *EC* partners are willing to accept input and advice from one another when developing and managing *ECs* (Dutton, 1996; Glasbergen & Groenenberg, 2001; Rondinelli & London, 2003). Doing so, likely helps align an *EC's* objectives among partnering organizations and may be necessary in several areas including developing a collaboration's market positioning (Hartman & Stafford, 1997); transparent and defensible environmental objectives (Stafford & Hartman, 1996); agreed upon rhetorical justifications (Livesey, 1999);

and result-oriented focus around specific ‘win-win’ outcomes (Hartman & Stafford, 1998; Glasbergen & Groenenberg, 2001). For *ECs* implemented through firm—NGO collaborations in particular, it is necessary to develop agreeable means to compensate NGO partners for their contributions (Pratt, 2001). As successful *ECs* tend to evolve and deepen over time, partners need to ensure continued open communication and partner independence to ensure continued success (Glasbergen & Groenenberg, 2001; Stafford & Hartman, 1996).

The above insights come primarily from studies on dyadic firm—NGO *ECs*, though these points likely hold for multi-partner *ECs* as well. While less work exists on multi-partner *ECs*, we found ideas similar to those discussed above in terms of input legitimacy (i.e., balanced representation of various stakeholders, accountability, and transparency within the partnership) and output legitimacy (i.e., ways of measuring a partnership’s attainment of its goals and targets) (Bäckstrand, 2006). This work also suggests that leveraging existing institutional, industry-level, and/or other multilateral agreements linked to established measurable targets, such as industry or international certifications and outcomes, enhances success. Doing so likely supports more effective leadership, improved accountability and a more systematic review, reporting and monitoring of outcomes (Bäckstrand, 2006).

Partner-level contingencies

The bulk of the extant literature on this subject has focused on firm—NGO *ECs* with partners’ (usually NGOs) ‘*capabilities and reputation*’ and ‘*prior experience*’ in the partnering firm’s domain of interest particularly critical for success (Glasbergen & Groenenberg, 2001; Hartman & Stafford, 1997; Mendelson & Polonksy, 1995). In these situations, successful NGOs engage as liaisons or bridging organizations among collaborating partners by clearly articulating the

collaboration's vision to all parties; balancing its own needs and interests with those of the involved partners and other stakeholders; and having internal support and capability to manage partner relations and cope with threats to the partnership itself (Sharma, Vredenburg, & Westley, 1994; Stafford et al., 2000; Westley & Vredenburg, 1991).

DIRECTIONS FOR FUTURE RESEARCH

Having reviewed the literature on *ECs* from 1989 forward, we draw two general conclusions about the state of this research. First, firm—NGO and firm—government *ECs* have received the most attention. Consequently, future research should broaden its focus to other *EC* forms. Specifically, little work has been done on inter-firm *ECs* or as firm-university *ECs*, despite the relatively large and diverse literatures (albeit not focused on environmental alliances) in both of these domains (e.g., George, Zahra, & Wood, 2002; Kale & Singh, 2009) which would likely contribute to and benefit from exploring *ECs* in more depth. Of particular interest and relevance for these two *ECs*, and still underexplored, are the public benefits created by them. As stated earlier, inter-firm *ECs* or firm-university *ECs* can, besides the private and common benefits that accrue to the partners, create public benefits that accrue to stakeholders beyond organizational boundaries such as civil society (Waddock, 1988). One interesting aspect pertains to how creation of such public benefits affects the governance of these two *EC* forms. Lastly, research on trisector *ECs* is surprisingly absent and future research should, therefore, examine this particular *EC* form in more detail. Issues of particular interest include the alignment of incentive mechanisms among three partners with different objectives and a comparison of the governance complexity between trisector and more simplistic *EC* forms (Delmas & Young, 2009).

Second, future research needs to become more rigorous theoretically and methodologically to develop greater insight into and connection with other facets of the organizational literature. Most existing work involves descriptive and relatively atheoretical single case studies and practitioner oriented research (Bäckstrand, 2006, Crane, 1998; Glasbergen & Groenenberg, 2001; Hartman & Stafford, 1998; Livesey, 1999; Mendleson & Polonsky, 1995; Perez-Aleman & Sandilands, 2008; Steger et al., 2009). While this approach provides necessary insight into *ECs* as a phenomenon, future research needs to extend this work through more systematic and theoretically grounded research to establish greater generalizability of conclusions. In particular, future work could investigate and extend this work through the lenses of existing management theories - e.g., institutional theory, transaction cost economics, resource-based view, or social networks. While available databases, such as SDC platinum contain data focused mainly on market-based inter-firm collaborations, press *EC* announcements from sources such as *Factiva*, *Lexus-Nexus*, firms' annual reports, or even managerial surveys seem to be the most promising avenue to gather data and construct proprietary datasets on *ECs* for such studies. Large sample size research will help establish generalizability. Given the wide scope of alliances discussed in this article, survey-based research can be conducted across industries rather than within single industries to address the challenge of a obtaining a large "n" suitable for reliable statistical analysis. In addition to these general conclusions, we discuss a more detailed agenda for future research below, extending our conceptual map of *EC* antecedents, consequences, and contingencies.

***EC* Relevant Antecedents**

In our review, we found the extant literature has examined only a relatively small number of antecedents influencing whether and how firms choose to engage in *ECs*. Given this, we feel relatively little is still known about what influences firms to enter into an *EC*. Below, we discuss a few relevant possibilities, which are highlighted in Figure 2.

While it seems obvious that a firm's environmental strategy would influence its engagement in *ECs*, little of what we reviewed studied this relationship explicitly. We know firms engage in a continuum of environmental strategic actions from 'proactive' to 'reactive'; and proactive firms are more likely to engage others to acquire necessary resources and capabilities (Aragon-Correa, 1998; Aragon-Correa & Sharma, 2003; Sharma, 2000). Yet, little research explores the role of a firm's environmental strategy in determining 'why' and 'how' firms engage in *ECs*. Although some support exists for this point (Judge & Douglas, 1998), we found little empirical research investigating this issue in depth. Thus, a promising avenue for future research would be to develop more insight into the link between a firm's environmental strategy, its *EC* behavior, and its overall competitiveness. Specific questions to ask here are: What factors influence the type of *EC* in which firms choose to engage? How do these initial choices influence the types of benefits (value) created through the *EC* and to which actors do these benefits accrue? From a theoretical perspective, the relational view (Dyer & Singh, 1998) and the resource-based view (Barney, 1991; Wernerfelt, 1984) seem well-suited to develop new insights. Despite our critique, exploratory case studies would provide insight into developing propositions that could be tested through survey-based research.

Our review showed that the extant literature has researched *ECs* largely as stand-alone transactions instead of viewing them as elements of a collaboration portfolio. Recent work in strategy shows firms engage in multiple simultaneous collaborations with different partners

(Wassmer, 2010); and firms' existing collaborations affect the formations of new collaborations and create interdependencies which must be managed together rather than in isolation (Wassmer & Dussauge, 2011a). The idea of an *EC* collaboration portfolio, i.e., the engagement in multiple simultaneous *ECs* with different partners (Wassmer, 2010), suggests firms with such portfolios are likely to deal with unique trade-offs balancing various *EC* forms across their portfolio (Wassmer & Dussauge, 2011b). Yet, we found *EC* research largely ignores these broader 'portfolio' issues of collaboration. Thus, future work might shed light on why and how firms build *EC* portfolios, including what may influence the configuration of *EC* portfolios - i.e. balancing various *EC* implementation forms, and broader issues around portfolio strategy, composition, and management. Some specific questions that are worth asking are: What are the performance implications of *EC* portfolios? How are *EC* portfolios constructed and managed? How does managing multiple *ECs* in a portfolio enhance firms' performance and/or ability to meet its environmental strategy objectives? What are the complementarities of managing multiple *ECs* as a portfolio and how can firms manage them for competitive advantage? In this instance, collecting fine-grained data, survey-based research is a promising avenue to pursue as data from databases may not provide the necessary insights or may be difficult to obtain (as mentioned earlier).

Another finding of our review is that *institutional pressures* primarily drive firms' *EC* engagement. Building on this, future work might explore how institutional forces may cause firms to change how and whether they engage in *ECs* over time. Hoffman's (1999) study of the chemical industry, which showed the chemical industry moving from stonewalling to embracing environmental concerns over time, provides a useful foundation for such research. Extending this by taking a field-level view, future work might examine how diverse communities of

organizations within and across institutional fields (Scott, 2000) influence the emergence and evolution of *EC* as a legitimate action for firms and actors from other sectors seeking to create environmental benefit. Doing so, may in turn provide insight into how *ECs* as a broader inter-organizational action form and change over time, and how organizational fields themselves may change such collaborative action. Network analysis is the prominent analytical method. Some question to ask are: How does the legitimization of *ECs* overtime influence how firms manage their environmental performance and relationships? What impact does the increased prominence of *ECs* among firms have on how they conceive of and manage their environmental actions and strategies?

In a related vein, we know relatively little about how a firm's *network position* (e.g., in its industry, supply chain, regional cluster, with stakeholders) may impact its *EC* behaviour, nor the likely iterative relationship between a firm's *EC* behaviour and its network position over time (Paquin & Howard-Grenville, 2012). As well, taking a network perspective may generate greater insight into how stakeholder relationships influence firm *EC* behaviour and subsequent outcomes. Given prior work suggesting that *ECs*, once established, often develop into more deeply integrative and impactful collaborations over time (Ehrenfeld & Gertler, 1997; Jacobsen & Anderberg, 2005), it is likely important to understanding the changing network dynamics that facilitate this deepening of relationships.

More broadly, future research might consider some of the following questions. What is the influence of initial collaboration decisions on an *EC's* subsequent evolution? How do these decisions influence future *EC* behaviour? What is the lifecycle of relationships as *EC*-partners repeatedly engage with each other or new actors over time? What are the factors enabling and inhibiting the evolution of more integrative relationships over time? In addition, future work can

help to understand better how the competitive behaviour rivals, e.g., *competitive dynamics* (Gimeno, 1994), may influence a firm's *EC* behaviour. Network analysis may help elucidate the interaction of partnering organizations within their broader inter-organizational environments. In-depth longitudinal case studies could provide insight into the changing natures of relationships and interactions within an *EC* over time.

***EC* Relevant Consequences**

A key conclusion of our review is that much of the work exploring the consequences of *ECs* is descriptive, providing little insight beyond identifying broad types of benefits, making it another area in need of attention. Future work could develop some explanatory insight into the relationship between *EC* antecedents, implementation forms, and their outcomes. More rigorous work in this area would be greatly beneficial. One approach to this may be to extend related work studying linkages with economic performance (Chan et al., 1997; Hagedoorn & Schakenraad, 1994), environmental performance (Russo & Fouts, 1997), innovation and competitive imagination (Hart & Sharma, 2004), and expanding it to include linkages to social performance and other, non-market, outcomes such as license to operate (Hart & Sharma, 2004), reputation, and legitimacy. We found little work systematically measuring and analyzing the likely varied *EC* impacts in any great detail. As work in industrial ecology shows, capturing such data is not always straightforward (Chertow & Lombardi, 2005), but it is necessary for this research to progress. Leveraging and extending existing performance frameworks, such as the United Nations' Millennium Development Goals, offer one approach towards more robust systematic measures (Kolk et al., 2008). Lastly, future work is needed to explore and capture the broader impacts - regional, industrial, societal - of *ECs* as one way of creating more

environmentally responsible organizations across sectors (c.f., Amundsen, 2000; Sharma, Vredenburg, & Westley, 1994). To do this, large sample size quantitative research designs seem to be among the most promising avenues. Another avenue to pursue is survey-based research that includes actors from all sectors: civil society, private sector, and public sector.

EC Relevant Contingencies

Much of the work we reviewed is practitioner-oriented and lacks strong theoretical foundations for hypothesis development and testing. Thus, as a way to continue to develop this literature, we feel future work needs to focus explicitly on developing more rigor around theoretical underpinnings, analyses, and conclusions of *ECs*.

One approach can be to clarify, operationalize and begin testing the conceptual relationships underlying this work. Doing so might involve creating new or leveraging existing performance measures (e.g., partnership, firm, economic, environmental, political); and would likely support a stronger theoretical foundation for this literature. Moreover, such an approach might leverage related work from inter-firm collaborations, cross-sector partnerships, or other literatures to provide insight on particular research designs. In particular, future work might leverage a common approach from the strategy literature to establish a large sample-size dataset for developing and testing hypotheses from existing case-based work.

Lastly, at the partnership-level, there is considerable interesting work focused on *governance structure* issues (King, 2007; Rangan et al., 2006; Rondinelli & London, 2003; Steger et al., 2009). An opportunity for future work lies in how actors engage each other over time, how governance decisions are revisited and adapted over time, and the impact of such decisions on future *EC* development.

CONCLUSION

We began this review by noting the importance of *ECs* in today's business landscape. We found interest in *ECs* has become increasingly prominent among practitioners and scholars. Yet this research comes from a variety of domains, building an interesting but fragmented body of literature. To address this, we organized the literature on *ECs* along antecedents, consequences, and contingencies; highlighting existing gaps and proposing a number of opportunities for future research. Our organizing framework, shown in Figure 2, represents the key *EC* relevant antecedents, consequences, and contingencies from the literature as well as areas not yet covered in that literature, which we feel could provide additional insight into the areas we identified. Among our findings is that, while interest has grown significantly in recent years, many of the most theoretically and empirically relevant aspects of *ECs* have been addressed only peripherally, if at all. Thus, we feel it is time to build a solid empirical and theoretical foundation for future research, which we have begun to do through this review. We contribute a future research agenda and explore a number of research questions to move this literature forward. In doing so, we have begun to lay a foundation for future *EC* research that allows for the development of additional insights and theoretical extensions.

In conclusion, this review contributes to our conceptual understanding of *ECs* in various ways. First, it identifies and reviews key *EC* research that has accumulated to date. Second, our conceptual map provides a better understanding of *ECs*. Finally, we develop a research agenda, with a number of promising avenues for future study. In bridging the literature on organizations and the natural environment with inter-organizational collaboration, *ECs* represent an exciting and promising research area rich with opportunity.

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NOTES

- (1) By environment we refer to the 'natural' environment.
- (2) Although the market/non-market categorization is useful to distinguish different strategy types in a firm, it is less useful to distinguish different collaboration types. For example, inter-firm collaborations and firm-university collaborations tend to be market-based while firm—NGO collaborations and firm—government collaborations may fall into either category.
- (3) In their review of the cross-sector social partnership literature, Selsky and Parker (2005: 863) identify so-called "trisection partnerships", i.e. firm—NGO—government collaborations, as one collaboration type. While trisection *ECs* certainly exist, we did not include them in this review because we did not identify any trisection collaboration research that has an environmental scope.
- (4) We thank one of the reviewers for pointing this out to us.

- (5) Social collaborations tend to focus on issues such as local economic development, education, health care, human rights, corruption, poverty alleviation, community capacity-building, etc. (Kolk, van Tulder, & Kostwinder, 2008; Steger et al., 2009).
- (6) In the domain of firm-government collaborations, voluntary agreements (VAs) represent a specific collaboration between firms and government organizations. Technically, VAs are two-staged multi-partner collaborations involving cooperation amongst firms in an industry and cooperation between those firms and government (Delmas & Montes-Sancho, 2010). Thus, from a focal firm perspective VAs create collaborative ties to other firms as well as government organizations (Figure 1 depicts these two ties through the dashed lines). VAs with an environmental scope are “[...] collaborative arrangements between firms and regulators in which firms voluntarily commit to actions that improve the natural environment” (Delmas & Terlaak, 2001: 44).

FIGURE 1

EC Implementation Forms

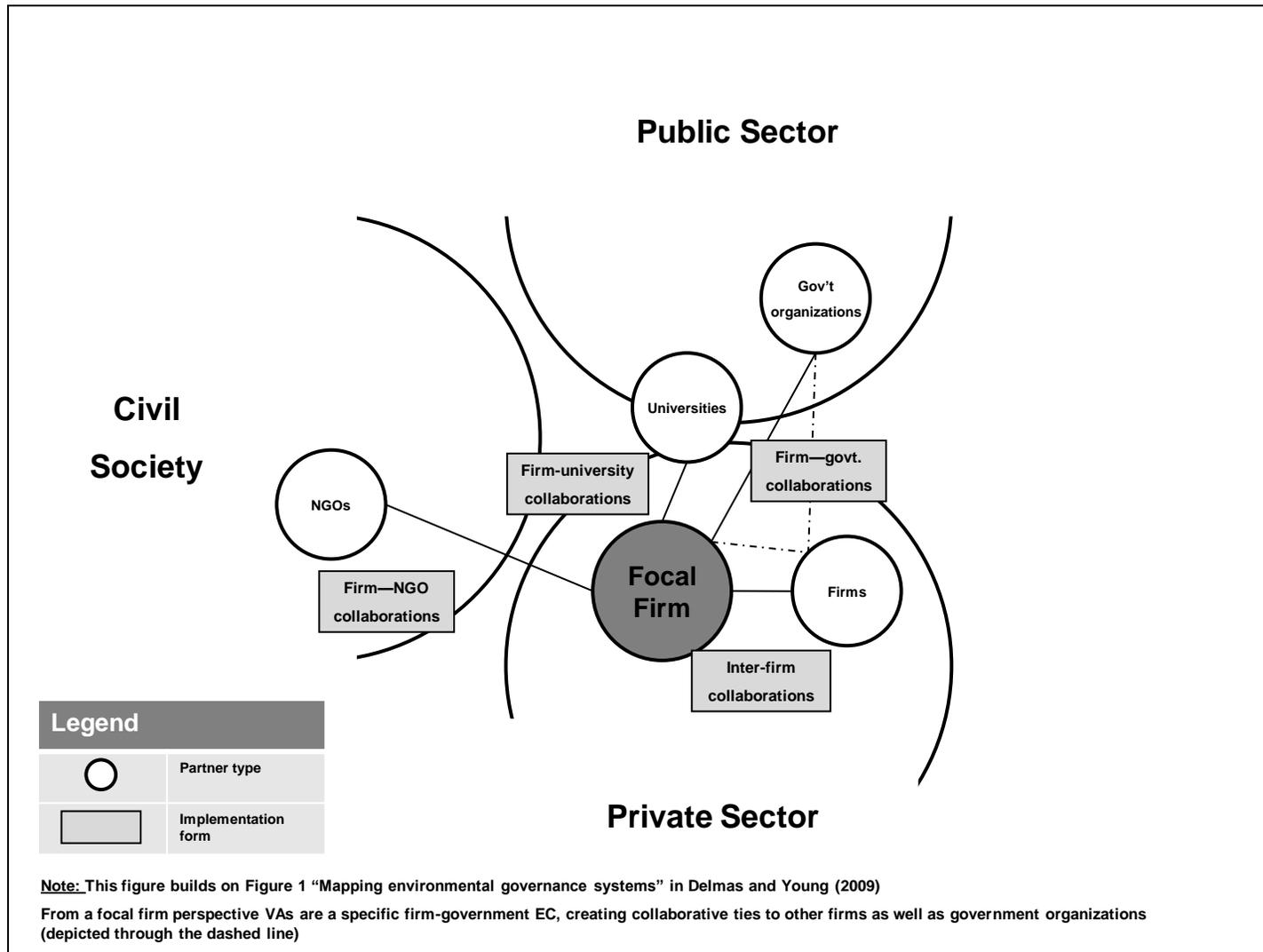


FIGURE 2

Conceptual Map for Understanding ECs

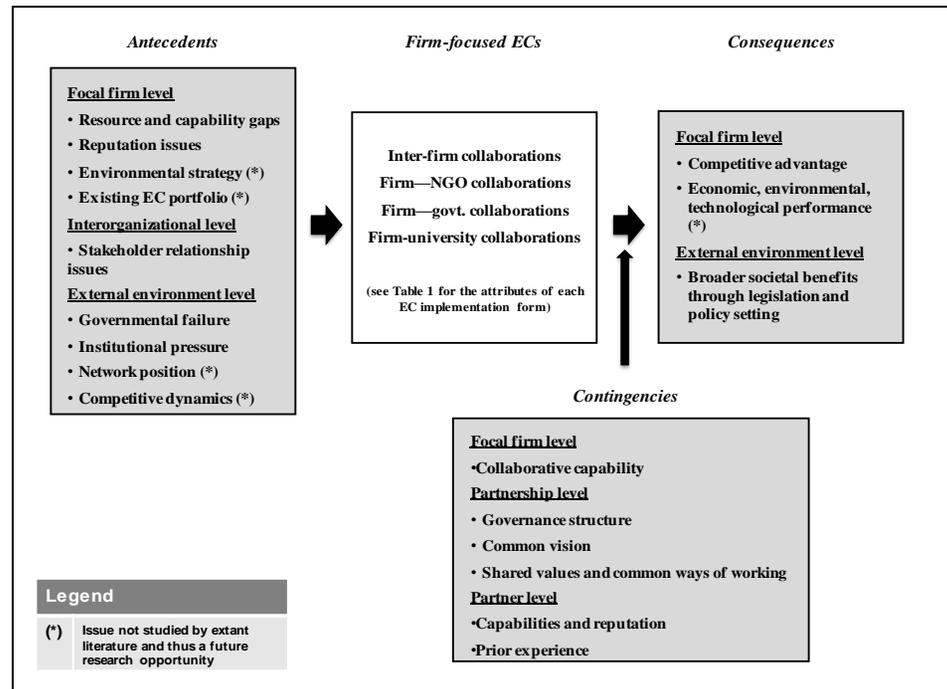


TABLE 1

Attributes of EC Implementation Forms

Attributes	Inter-Firm ECs	Firm—NGO ECs	Firm—Government ECs	Firm-University ECs
<i>Types of Participating Actors</i>	Firms	Firms and NGOs	Firms and government organizations	Firms and universities/research centers
<i>Primary Objective/s</i>	Economic	Environmental and economic	Political but to some extent also economic	Economic
<i>Main Use</i>	Exploit economic opportunities surrounding natural environment related issues, e.g. need for greener products	Improve firm’s reputation	Pre-empt regulatory threats and shape potential future regulations	Exploit economic opportunities, e.g. need for greener products, by bridging gap between research base and market
<i>Types of Benefits Sought by the Partners</i>	Private benefits, i.e. benefits accruing to the firms	Private and public benefits	Private and public benefits	Private benefits, i.e. benefits accruing to firms and the university partner
<i>Exemplary Studies</i>	<ul style="list-style-type: none"> – Co-develop new environmental products and processes (Glasbergen & Groeneberg, 2001; Hartman & Stafford, 1997) – Implement economically feasible environmental systems (Hartman & Stafford, 1997; von Malmborg, 2003) – Develop new businesses focusing on new technologies, products or services, and market domains (Steger et al., 2009) – Develop, test, and apply best practices (Steger et al., 2009) 	<ul style="list-style-type: none"> – Firm license of NGO name (Hartman & Stafford, 1997; Mendelson & Polonksy, 1995) – Corporate sponsorship of NGO project/s (Hartman & Stafford, 1997; Mendelson & Polonksy, 1995) – NGO endorsement of firm’s product/s (Hartman & Stafford, 1997; Mendelson & Polonksy, 1995) – Conflict resolution round tables (Glasbergen & Groeneberg, 2001) 	<ul style="list-style-type: none"> – Public policy alliances (Hartman & Stafford, 1997) – Advocacy of new legislation (Steger et al., 2009) – Public involvement in management of internal environmental practices (Glasbergen & Groeneberg, 2001) – Develop a certifiable standard (Steger et al., 2009) 	<ul style="list-style-type: none"> – Research projects (Glasbergen & Groeneberg, 2001; Steward & Conway, 1998)