J Bus Ethics
DOI 10.1007/s10551-014-2053-7

Strategic Alliance Formation and Structural Configuration

Haiying Lin · Nicole Darnall

Received: 16 May 2012 / Accepted: 11 January 2014

Abstract While previous research considering the emergence of strategic alliances has typically viewed their formation through a single theoretical lens, we suggest that multiple theoretical perspectives are needed to understand their complexity. This research conceptually integrates the resource-based view and institutional theory to assess variations in firm-level motivations to form strategic alliances. Applying these ideas to the context of complex environmental problems, we propose that strategic alliances typically are either competency- or legitimacy-oriented, and that four structural dimensions characterize both types of alliances—organization learning, partner diversity, governance structure, and partner relations. We present research propositions that describe how alliances differ along these dimensions, and offer an important broader perspective on alliance formation that is applicable towards understanding their strategic and social outcomes.

Keywords Institutional theory · Resource-based view · Strategic alliances · Alliance orientation · Alliance structure · Complex environmental problems

H. Lin (✉)
School of Environment, Enterprise and Development, University of Waterloo, 200 University Avenue West, EV1 231, Waterloo, ON N2L 3G1, Canada
e-mail: h45lin@uwaterloo.ca

N. Darnall
School of Public Affairs, School of Sustainability, 411N. Central Ave. Suite 400, Phoenix, AZ 85004-0687, USA
e-mail: ndarnall@asu.edu

Introduction

Strategic alliances are voluntary collaborations between organizations that involve product exchange, sharing or co-development, technology development or the provision of services that pursue a common set of goals (Gulati 1998). Businesses are increasingly participating in these alliances for a variety of reasons that include undertaking joint innovations and organizational leaning (Grant and Baden-Fuller 2004), accessing new markets (Kogut 1991), sharing risks and costs (Eisenhardt and Schoonhoven 1996), and enhancing public visibility and recognition (Baum and Oliver 1991). In general, these alliances emerge as a means to manage increased uncertainty and complexity in the business setting. For instance, between 2000 and 2002, firms participated in over 20,000 strategic alliances that were designed to mitigate risk and explore new business opportunities (Martin 2002). These alliances include ownership agreements (e.g., joint ventures, minority equity alliances), contractual agreements (e.g., joint research and development, production, and marketing and promotion) or licensing agreements, and are made with suppliers, distributers (Yoshino and Rangan 1995; Dacin et al. 2007), industry associations and consortia, government agencies, interest groups, and research universities and labs.

Many studies have emerged to consider alliance formation more generally. Most have typically viewed their emergence through a single theoretical lens—either the resource-based view (RBV) (e.g., Eisenhardt and Schoonhoven 1996; Das and Teng 2000; Grant and Baden-Fuller 2004) or institutional theory (Baum and Oliver 1991; Dacin et al. 2007; Gulati 1999; Sharfman et al. 1991). However, some researchers have argued that multiple theoretical perspectives are needed to more appropriately reveal firms' motivations to engage in various organizational relationships (Barringer and Harrison

Published online: 28 January 2014

2000; Parmigiani and Rivera-Santos 2011). We posit that firms' decisions to form strategic alliances are influenced by resource-based and institutional factors—to take advantage of opportunities to extend existing capabilities and to address institutional pressures. While other theories might be relevant toward explaining alliance formation (e.g., transaction cost economics), we anchor our arguments in RBV and institutional theory for two reasons. First, these theories have significant relevance in prior research that assesses alliance formation (e.g., Eisenhardt and Schoonhoven 1996; Das and Teng 2000; Grant and Baden-Fuller 2004; Baum and Oliver 1991; Dacin et al. 2007; Gulati 1999; Sharfman et al. 1991). Second, RBV and institutional theory are widely used theories to explain firm strategy (e.g., Bansal and Roth 2000; Bansal 2005; Darnall and Edwards 2006; Darnall et al. 2008; Delmas and Toffel 2004; Hoffman 1997; Hart 1995). In addition, the juxtaposition of these two theories creates a parsimonious framework for explaining firms' differing motivations to participate in strategic alliances that is readily supported with examples in practice. We suggest that these differing motivations lead to fundamental variations in the resulting structural dimensions of these alliances.

We apply these theories to the context of complex environmental problems. Since 1990, over 500 alliances have been formed in the United States and Canada[1] (SDC 2011) to address these complex environmental problems. These alliances affect a broader array of stakeholders than typical business concerns, and involve multiple jurisdictions. They also have an undetermined regulatory trajectory and typically lack technical solutions. Addressing these concerns requires significant coordination among multiple organizations. While the framework we develop is applicable to the formation of all strategic alliances, we focus on this setting because while previous research has recognized the importance of strategic alliances in the general business context (e.g., Mitchell and Singh 1996), we know little about firms' use of them to address complex environmental problems. In addition, because of their heightened social context, firms that form strategic alliances to address these complex environmental problems are likely to have more varied motivations to do so. This setting allows for greater richness in our exposition.

[1] To search for environmentally related alliances in Thomson's Securities Data Corporation (SDC) database, we use two search elements: alliance venture economics and industry codes (VEIC) and alliance activity codes. These codes depict the business characteristics of the alliances, as well as their primary activities. Including both search items allowed for a wider collection of alliances related to energy, recycling, waste management and disposal, environmental services, manufacturing services, industrial maintenance services, consulting services, educational services, water utility services, exploration services, and marketing services. We then undertook a content analysis to validate that the alliance was related to a complex environmental problem.

This research conceptually integrates the resource-based view of the firm and institutional theory to assess variations in firm-level motivations to create strategic alliances. We propose that within this setting, strategic alliances form because of competency- or legitimacy-oriented motivations. These alliances differ along four structural dimensions: organization learning, partner diversity, governance structure, and relationship with alliance partners. We articulate eight research propositions and offer conceptual support for how variations in firms' ex-ante motivations affect these structural dimensions. Knowledge of these issues offers new insight on alliance formation and structure, and is likely to inform the alliance's subsequent ability to achieve its strategic goals and improve social outcomes.

Complex Environmental Problems

Hardin (1968) refers to certain environmental problems as being a tragedy of the commons. The tragedy occurs when organizations or people seek to maximize their individual benefit by overusing common-pool resources, such as oceans, lakes, forests, irrigation systems, and grazing lands (Hardin 1968; Ostrom et al. 1999). The outcome is that the resources are seriously impaired or destroyed, which reduces society's overall benefits associated with that resource, and ultimately the individual gains as well (Hardin 1968). These problems tend to arise when property rights related to common-pool resources are not well defined (Ostrom et al. 1999).

Some commons problems related to the environment are small in scale in that they affect a limited number of people and have a restricted geographical and jurisdictional scope. These are non-complex environmental problems. By contrast, complex environmental problems have profound impacts to the natural environment and affect many people, across multiple jurisdictions and countries. Such scope makes instituting multijurisdictional controls a challenge since addressing these issues requires collective action among numerous individuals who often have different value systems, and may be affected differently by the same problem. Complex environmental problems generally also have an undetermined regulatory trajectory with variations in political will (either at the state, national, or international levels) to regulate these concerns. The absence of regulatory policy instruments encourages corporations, nongovernment organizations (NGOs), and policy-makers to develop strategic alliances (especially cross-sector partnerships) as alternative platforms for firms to address these complex environmental issues (Sharma and Vredenburg 1998). These alternative governance mechanisms typically encourage firms to go beyond compliance and adopt innovative environmental solutions in the absence of regulatory mandates (Russo and Fouts 1997).

Limited or untested technological solutions also enhance the uncertainty related to complex environmental issues. In response, firms often voluntarily partner with diverse actors and private partners as a strategic means to gain access to complementary and critical assets in order to develop technical alternatives to solve these problems. Since the economic returns from these alliances may occur only in the long-term, endorsement and support from cross-sector partners like environmental NGOs and government partners are especially important to motivate corporate managers to commit resources to proactively tackle these environmental problems. Addressing complex environmental problems therefore cannot be achieved by any individual organization (Selsky and Parker 2005), but rather necessitates significant coordination among various parties.

Numerous examples of complex environmental problems exist. They include controlling toxic chemicals in the natural environment, biodiversity and ecosystem preservation, reducing pollution in sensitive water bodies, mitigating illegal hazardous waste dumping, and addressing transnational air pollution. However, perhaps the most significant is climate change, because of its impact to the entire biosphere and regulatory jurisdictions worldwide. Related to multijurisdictional controls, while the European Union (EU) ratified the Kyoto Protocol—a unique international regulation that attempts to reduce global GHG emissions—implementation and compliance among participant countries has varied significantly. EU countries, Japan, and several other developed nations have implemented regulations that mandate carbon reductions across specific industrial sectors, however, most developing counties and the United States (US) have rejected implementing the Protocol. Such a situation has increased regulatory uncertainty, especially within these countries, although there are increasing pressures for regulation. For instance, in 2009 the US underwent serious discussion about the potential promulgation of mandatory regulation to control carbon emissions (Samuelsohn 2009), and some states had already enacted their own climate regulation policies. In addition, like other complex environmental problems, the technological solutions for addressing climate change are limited, and in many instances do not exist. This setting imposes increased business risks, insurance costs (Hertin et al. 2003), and pressures for innovation. Moreover, recent destructive climate-related events (e.g., Hurricane Katrina, extreme flooding in Central Europe) has enhanced public awareness of climate change and heightened societal expectations about business' role in mitigating its effects. Firms that fail to adhere to these pressures risk obtaining unwanted negative media attention, community scrutiny, consumer complaints, and public boycotts. However, undertaking measures to address these environmental problems can also increase business risk since such actions often add complexity to production or delivery processes (Russo and Fouts 1997; Sharma 2000). As such, firms must weigh the varied risks associated with societal pressures to address complex environmental problems. In order to do so, they must engage in sensemaking during which they interpret social events related to complex environmental problems and select appropriate coping strategies.

Firms' Motivations to Form Strategic Alliances

Managers make sense of a confronted event by employing schema to categorize information. The categorization process helps managers reduce the ambiguity and unpredictability surrounding the event thus generating predictable action (Dutton and Jackson 1987). One of the most relevant of these cognitive categories involves the interpretation of events as either an opportunity or a threat (Dutton and Jackson 1987). In undertaking this sort of cognitive categorization, managers draw on knowledge related to their organization's internal competencies, capital investments, technology development, and other factors to place parameters around their subsequent strategic options.

Related to complex environmental problems, the link with managerial interpretations is similar. Complex environmental problems (and the enhanced societal expectations that come with them) create decision-making risk that brings about either positive or negative emotional associations, in addition to gain and loss considerations (Sharma 2000). Interpretations of these factors lead some managers to regard complex environmental problems as being a strategic business opportunity, while others view them as being a threat to business (Larson 2000; Sharma and Vredenburg 1998). This sort of cognitive categorization guides some firms to form alliances that are either proactive (opportunity driven) or reactive (threat driven) (London 2005; Arya and Salk 2006). We suggest that *how* firms make sense of complex environmental problems, and the sort of strategic alliance they subsequently form is borne out of their resource- or legitimacy-based motivations.

Resource-Based Motivations

A firm's motivation to form strategic alliances exists at the time partner organizations come together to formalize their alliance agreement. One of the primary anchoring theories that previous scholars have used to characterize firms' motivations to form strategic alliances is the resource-based view (RBV) (e.g., Eisenhardt and Schoonhoven 1996; Das and Teng 2000; Grant and Baden-Fuller 2004). RBV focuses on the access or development of idiosyncratic resources and competencies that lead to competitive advantage (Barney 1991). Resources can be tangible (including financial and physical resources), intangible (including reputation, technology, and organizational resources), or human-based

(including culture, training, and employee expertise) (Grant 1991). These idiosyncratic resources are assembled to perform some task or activity and give rise to organizational competencies (Grant 1991) and competitive advantages (Das and Teng 2000; Prahalad and Hamel 1990).

Applied to complex environmental problems, we posit that there are at least two salient resource-based motivations for firms to engage in strategic alliances. The first motivation is to combine their complementary idiosyncratic resources (Hagedoorn 1993). These pooled resources can be used to develop valuable organizational competencies, especially tacit knowledge-related competencies that can lead to competitive advantage (Das and Teng 2000). For instance, in 1992, Ballard Power Systems Inc., Daimler-Chrysler AG and Ford Motor Corporation formed a strategic alliance to pool their resources and idiosyncratic knowledge to research and develop new fuel-cell technology. The goal for entering into their strategic alliance was to establish competitive leadership in their industry related to alternative energy storage options that help reduce greenhouse gasses.

In other instances, the idiosyncratic resources that are pooled among alliance partners may be political in nature. Political resources relate to an understanding of nonmarket environments, access to decision makers and opinion makers, and an ability to bargain (Boddewyn and Brewer 1994). Other political resources are financial (Frynas et al. 2006). Firms that possess these resources are likely to have an enhanced political reputation and greater ability to build coalitions; they also are recognized political entrepreneurs (Frynas et al. 2006).

Applied to complex environmental problems, firms may seek to form a strategic alliance to gain access to political resources that could not be acquired independently. The acquisition of these resources can be leveraged to force industry-wide changes by way of influencing the environmental policy agenda (Darnall et al. 2008) and supporting the promulgation of more stringent regulatory mandates that put competitors at a disadvantage (Etzion 2007). One example is when BP Chemicals, DuPont, Rohm and Haas, Air Products and Chemicals, and other three firms formed a strategic alliance to develop alternative energy solutions to mitigate greenhouse gas emissions. The alliance was also formed to lobby environmental regulators for "early crediting" of firms' voluntary proactive reductions of carbon dioxide and other greenhouse gases (SDC 2011). By pooling their resources, these firms increased the likelihood of achieving their political goal because they elevated their visibility and enhanced their capacity to influence the policy making process. In pushing for more stringent climate-related policies, alliance members put their competitors at a disadvantage. Indeed, their efforts forced ExxonMobil and other competitors to soften their more defiant stances toward climate change and consider how alternative energy technologies can help address the problem (Kolk and Levy 2001).

A second resource-based motivation that firms have for participating in strategic alliances is the ability to increase their organizational learning (Kogut 1988; Hamel 1991; Gulati 1998). Organizational learning is the development of insights, knowledge, and associations between past actions, the effectiveness of those actions, and future actions (Fiol and Lyles 1985). In forming a strategic alliance, firms may seek to acquire critical knowledge from other partners to develop new ideas and ways of doing business (Kogut 1988; Hamel 1991). Related to complex environmental problems, strategic alliances can facilitate the flow of valuable information among participating firms, thus promoting higher order organizational learning. Such learning involves the development of different interpretations of new and existing information (Sharma and Vredenburg 1998), which enhances partnering firms' abilities to create, acquire, and utilize their knowledge-based capabilities in a more effective way. For instance, in 1992, 16 US corporations formed the Buy Recycled Business Alliance to develop and expand business demand for recycled products and product inputs. In so doing, members offered seminars and workshops to managers to promote organizational learning related to recyclables (SDC 2011). Participants acquired specific knowledge that helped them to convert their manufacturing processes in a way that utilized more recycled products. Equipped with this knowledge, participants were able to critically assess their purchasing practices, and the practices of their suppliers. They learned how to examine their suppliers' use of recycled materials as product inputs, such that they could require their suppliers to provide them with higher volumes of recycled raw materials and greater recycled content in finished goods (SDC 2011).

Other sorts of organizational learning may be more radical in form. This sort of learning poises partners to collectively examine emerging technologies and trends in the product market, with an eye towards identifying and developing radically new alternatives to existing products. These strategic alliances can shift existing business practices toward creating fundamental changes that lead to the next-generation (Hamel 1991) of business models and technology development. Fundamental repositioning of this sort is referred to as "creative destruction" (Schumpeter 1934), and differs from incremental enhancements of existing technologies and business practices because it renders them obsolete.

Related to complex environmental problems, the social need to address these collective action concerns may be catalysts for a new round of creative destruction that offers unprecedented business opportunities (Hart and Milstein 1999). This setting creates incentives for firms to come

together and pool their information and knowledge to develop radically improved innovations, which preempt existing technology to address environmental issues (Kemp 1994). Since the competencies that are developed through creative destruction tend to be rare, idiosyncratic and difficult to imitate (Hart and Milstein 1999), strategic alliances that develop the next-generation of business models and technologies can enhance competitive advantages for alliance partners.

When confronted with complex environmental problems managers make sense of them by drawing on knowledge related to their organization's existing internal competencies and capacities. This understanding helps them to assess their subsequent strategic options. Firms that have strong internal competencies therefore are more likely to regard complex environmental issues as strategic business opportunities (Larson 2000; Sharma and Vredenburg 1998) because they have the foundational capabilities to address them in a proactive way.

In sum, RBV offers one basis to understand why some firms participate in strategic alliances related to complex environmental problems. It illustrates how firms can enhance their resources and internal competencies, thereby creating knowledge and organizational learning. We refer to these sorts of strategic alliances as *competency-oriented alliances*.

However, not all firms regard complex environmental problems as opportunities. Managers who make sense of these complex problems by drawing on their organization's existing capital investments and technologies and industry standing are more likely to regard them as strategic business threats (Larson 2000; Sharma and Vredenburg 1998). In such instances, strategic alliances many be developed primarily to enhance the external legitimacy of alliance partners. We suggest that firms' motivations for developing these sorts of alliances are better articulated using institutional theory.

Institutional Motivations

Institutional theory posits that (within a common setting) rules, norms, and values exert pressures on firms to adopt similar practices and structures (DiMaggio and Powell 1983) in an effort to gain social legitimacy and enhance survival prospects (Meyer and Rowan 1977). In some instances, these pressures are exerted on firms by other organizations upon which they are dependent, as well as by the cultural expectations in which they function (DiMaggio and Powell 1983). In other instances, professional norms encourage businesses within the same industry to behave similarly to appear legitimate in the eyes of their competitors, and to mimic other organizations that they perceive as being more successful (DiMaggio and Powell 1983).

Within complex environmental settings, institutional pressures arise from at least three sources: the regulatory system, industry norms, and community constituents (Hoffman 2000). Regulatory pressures involve coercive legal mandates for organizations to adhere to regulations, rules, and norms (Oliver 1991). Firms that fail to yield to regulatory pressures risk obtaining non-compliance penalties, revocation of permit approvals, and unwanted media attention (Henriques and Sadorsky 2006). In an attempt to reduce these regulatory pressures, firms may react by forming strategic alliances (Baum and Oliver 1991; Dacin et al. 2007). For instance, some energy intensive firms have strategically aligned in an effort to lobby against the passage of more stringent climate policy. Doing so has helped justify these firms' current business practices, avert the promulgation of more stringent climate policy, and avoid penalties that would have accrued in the event that they failed to adhere to the stricter environmental requirements. Rather than viewing the risks associated with the passage of these climate change policies as being an opportunity to reorient their business practices, these firms regard regulatory pressures as a threat to their existing business practices that is best met with political opposition.

In other instances, firms may form strategic alliances to enhance the industry's social legitimacy and preempt regulatory pressures through some incremental behavior change (Davidson and Worrell 2001). For example, in 1991, the U.S. Environmental Protection Agency threatened to tighten regulation on the production of polystyrene production, a petroleum-based plastic that is a significant source of toxic waste. In response, Amoco Chemical, Atlantic Richfield, Chevron Chemical, Dow Chemical, Fina, Huntsman Chemical, Mobil Chemical, and Novacor Chemicals signed an agreement that formed a joint venture, which they called "National Polystyrene Recycling Corporation." This strategic alliance was created to produce recycled postconsumer polystyrene (SDC 2011). Formation of this alliance signaled to politicians, regulators, and the public that chemical companies could voluntarily self-regulate their environmental impacts thus preempting more stringent polystyrene regulations.

While regulatory pressures also have the potential to foster creative thinking, and competence acquisition (Porter 1991), rather than simply justify existing practices, such potential is contingent upon the design of these regulations (Porter and van der Linde 1995) and managers' interpretations (Sharma 2000) of them. In instances where firms respond to regulatory pressures by acquiring competencies (e.g., Sharma and Vredenburg 1998; Sharma 2000; Sharma and Henriques 2005) such response is informed by their existing resources and capabilities (Blum-Kusterer and Hussain 2001; Delmas and Toffel 2004; Shrivastava 1995; Darnall and Edwards 2006). That is, firms that possess

existing capabilities are more likely to develop complementary capabilities to address regulatory pressures (Darnall and Edwards 2006) as strategic business opportunities. Taking this logic a step further, we suggest that firms' competency-oriented responses to regulatory pressures (and the sense making involved in these responses) are what lead to the acquisition of new capabilities, rather than simply the regulatory pressure on its own.

Alliances that are borne out of regulatory pressures therefore tend to differ from the competency-based alliances described earlier. On one hand, competency-based alliances seek to pool idiosyncratic political resources to support the promulgation of more stringent environmental regulatory mandates, or radically redesign their existing business practices in an effort to make competitors' products and processes obsolete. On the other, firms that are motivated by regulatory pressures may strategically align to legitimize their existing business practices, products and processes. These firms wish to safeguard their present operations, which typically meet (rather than exceed) current environmental requirements, and utilize political resources to do so.

Industry norms are a second type of institutional pressures that motivate firms to form strategic alliances. Firms operating within similar industries and their professional associations exert normative pressures to collectively improve an aspect of their operations, thereby enhancing the industry's overall legitimacy (Hoffman 1997; Etzion 2007). For instance, in 1994, 124 electric utilities came together to participate in the US Department of Energy's Climate Challenge Program to collectively improve the their public image and reduce the climate emissions for the utility sector as a whole (Delmas and Montes-Sancho 2010). In so doing, allied firms were able to ameliorate normative pressures from their professional networks, and conform to values and social norms exerted by the industrial associations.

Other industry pressures arise in response to competing firms that seek more stringent regulatory codes or standards for the entire industry (Hoffman 1997). In response, some firms may choose to form a strategic alliance in an effort to imitate their competitors' successful business practices. Doing so can help them maintain legitimacy within the industry or regain standing, both of which help ensure their long-term survival. For example, after leaders in the energy industry formed the Responsible Energy Codes Alliance to establish a more aggressive energy standard, other firms felt normative pressure to align with the initiators of this alliance to imitate their successful energy conservation practices and maintain legitimacy among industry peers (SDC 2011).

Community constituents (including environmental NGOs and societal groups) are a third source of institutional pressure that motivates firms to form strategic alliances. As public concerns about environmental degradation increase, community constituents increasingly are imposing pressures on companies via environmental activism and lawsuits (Delmas and Toffel 2004). These constituents can mobilize public sentiment, alter accepted norms, shift firms' environmental perceptions, and impose new roles on the firms, especially when they manage to align with influential regulators and investors to advance their agenda (Hoffman 2000). In an effort to improve their legitimacy with these constituents, firms may be motivated to form a strategic alliance to justify their collective environmental approach. For instance, in 1997, the Environmental Defense Fund published a report entitled Toxic Ignorance, which identified a lack of publicly available data on the chemicals produced in the highest production volumes. This report (and the public attention it created) put significant pressure on the chemical industry to respond. The pressure motivated the industry's trade association, the American Chemistry Council, to initiate the High Production Volume Chemical Challenge Program. This alliance sought ways to encourage chemical companies to voluntarily collect, summarize, and evaluate their existing chemical data, in addition to undertake additional testing (Kent 2004). The alliance's goal was to reduce community constituents' concern about high production volume chemicals, and improve the chemical industry's overall community standing rather than modify its routine business practices (Kent 2004).

When confronted with complex environmental problems, some managers make sense of them by drawing on knowledge related to their existing capital investments, technological development and industry standing to inform their subsequent strategic options. Firms that have relatively large investments in capital and existing technologies are more likely to respond to institutional pressures by regarding them as strategic business threats (Larson 2000; Sharma and Vredenburg 1998). Institutional theory therefore offers an important basis to understand how business threats from regulators, industry norms, and community constituents motivate some firms to participate in strategic alliances. Responding to these pressures can improve the social legitimacy of partnering firms, which in turn may enhance their chance of survival (Dacin et al. 2007). We refer these sorts of alliances as *legitimacy-oriented alliances*.

Relationship Between Alliance Orientation and Structure

Firms' motivations to participate in strategic alliances—either competency- or legitimacy-oriented—are likely to influence alliances' subsequent structural configurations. Competency-oriented alliances are typically borne out of firms' desires to enhance their resources and internal competencies, thereby creating knowledge and organizational learning. Legitimacy-oriented alliances tend to form from

firms' desires to maintain or increase their social legitimacy. We suggest that these distinctions affect four structural dimensions. More specifically, we posit that competency-oriented alliances tend to have structures of learning that are more explorative, partners that are more diverse, governance structures that are more flexible, and partner relationships with stronger ties. By contrast, legitimacy-oriented alliances tend to have a structure of learning that is more exploitative, partners that are less diverse, governance structures that are less flexible and partner relationships with weaker ties. The four structural dimensions are discussed fully in the sections that follow.

Alliance Learning: Exploration vs. Exploitation Learning

Learning is an organization-wide continuous process that enhances the firm's collective ability to accept, make sense of, and respond to internal and external change (Cyert and March 1963). Many scholars categorize alliance learning into exploration learning for the development of new opportunities, and exploitation learning for the deployment of an existing capability (e.g., Koza and Lewin 1998, p. 256; Rothaermel and Deeds 2004). Exploration learning tends to stimulate radical behavioral changes through risk-taking, experimentation, flexibility, discovery, and innovation, while exploitation learning facilitates incremental changes through refinement, production, implementation, and execution (March 1991).

Alliances that emphasize exploration learning encourage firms to acquire novel understandings, investigate new technologies and markets, and adapt to technological discontinuities (Lin et al. 2007). We suggest that this sort of learning is borne out of alliances that form from competency-oriented motivations. Firms that implement exploration learning tend to perceive the uncertainty and unpredictability related to new competency development as an opportunity to pool resources among alliance partners to pursue alternative business models and advance technological leadership. These firms are more likely to make investments in risky, long-term partnerships that involve experimentation and innovation (Park et al. 2002; Levinthal and March 1993; Lin et al. 2007). Through the promotion of exploration learning and innovation, these alliances are likely to encourage firms to make far-reaching, radical and transformative changes. The outcome of these sorts of innovations include the development of new products, the formulation of new markets, and the identification of a sustainable new means of servicing existing markets (Etzion 2007). For instance, in 1999, Honda Motor Corporation, General Motors Corporation, and Bayerische Motor Werke AG combined resources to develop hydrogen fuel cell vehicles with an aim of taking a lead in developing fuel cell vehicles (SDC 2011). This alliance focused on exploration learning since it developed a new line of business and established stronger market leadership for partnering firms. Because this sort of learning structure is more focused on developing new competencies, novel business opportunities, and technological innovations, we posit that firms that are motivated to form competency-oriented alliances are more likely to conduct exploration learning.

Proposition 1a Competency-oriented alliances are more likely to be associated with firms' explorative learning.

By contrast, firms perceiving the heightened societal pressures of complex environmental problems as being a threat are more likely to implement exploitation learning to increase their stability, certainty and conformance. Exploitation learning focuses on refining existing business activities so as to obtain approval from regulatory, industry and community constituents, thereby enhancing their survival aspects. We suggest that this sort of learning is borne out of alliances that form from legitimacy-oriented motivations.

Unlike competency-oriented alliances, which develop structures that promote the development of new technologies, legitimacy-oriented alliances develop learning structures that promote what Barringer and Harrison (2000) described as the replication or expansion of existing practices. This sort of learning encourages strategic alliance partners to imitate legitimate practices, refine or standardize their current routines, and reduce risks and costs (Barringer and Harrison 2000; Lin et al. 2007).

In many instances, exploitation learning also helps alliance partners demonstrate to the public that their current business practices have merit, thus reduce public scrutiny over their existing business operations. In addition, this sort of learning assists partnered firms with commercializing their established technologies through large-scale manufacturing or disseminating existing successful models and practices through licensing. For instance, Thermal Energy International (TEI) entered into a strategic alliance with American Electronic Power, with the goal of deploying TEI's existing Thermalonox nitrogen oxide emissions control technology in coal-fired power generating stations. By doing so TEI was able to expand applications of its existing technology (SDC 2011) and increase credibility of TEI's current business practices among key constituents. This example illustrates how exploitation learning helps alliance partners reap unclaimed benefits from existing technologies and enhance legitimacy associated with firms' existing business practices, which may improve their prospects for long-term survival.

Proposition 1b Legitimacy-oriented alliances are more likely to be associated with firms' exploitation learning.

Partner Diversity: Heterogeneous vs. Homogeneous Partners

A second structural dimension that differentiates competency- and legitimacy-oriented strategic alliances is partner diversity. Partner diversity refers to organizational participation from multiple industries and sectors (Kotabe and Swan 1995; Powell et al. 1996) such as firms, universities, research laboratories, suppliers, and customers (Powell et al. 1996), in addition to regulators and NGOs. Aligning with diverse partners increases the prospects for variability among partnering firms' complementary capabilities. It also enhances innovation opportunities, since the locus of innovation often originates from outside the base industry (Kotabe and Swan 1995; Powell et al. 1996). We suggest that firms with competency-based motivations are more likely to form a strategic alliance with a partnership structure that involves diverse partners.

One type of diverse partnership involves multiple firms that operate in a variety of industries. Heterogeneous partnerships such as these pool the complementary assets of diverse members towards innovation and new market entry (Sakakibara 1997). By their very nature, these alliance structures are less likely to have overlap among the competencies of alliance partners. By combining their complementary assets alliance partners can enhance their innovative productivity (Sakakibara 1997; Teece 1992). For instance, the Buy Recycled Business Alliance (mentioned previously) was a partnership whose goal was to develop and expand markets for recycled products, and address the distribution bottlenecks and regional gluts of recyclable materials (SDC 2011). The alliance combined the complementary competencies of 16 firms from a variety of industries, and sought to create a new integrative market for recycling products.

In other instances, firms' heterogeneous partners may include a cross-sector (non-corporate) entity, such as NGOs, government agencies, or quasi-governmental organizations (Rondinelli and London 2003). These partners typically have organizational missions that diverge significantly from the profit-making motives of private business, in that they focus on improving societal welfare (Darnall and Edwards 2006). Cross-sector partners therefore tend to view social challenges as opportunities for creating new service models (Selsky and Parker 2011). Collaborating with these partners creates a sensemaking platform (Selsky and Parker 2011) wherein managers may conduct higher-order organizational learning (Christmann 2000) and become more forward thinking in addressing complex environmental problems. The cross-sector partnership also promotes innovation because of the unique expertise that varied alliance partners bring into the discussion. Like alliances that include firms from heterogeneous industries, these partnerships generally do not have redundant capabilities. As a consequence, they have a greater propensity to push innovative boundaries towards investigating creative business solutions (Lin 2012). For instance, the Pew Center on Global Climate Change and the World Resource Institute are environmental NGOs that are working closely with firms to promote and disseminate environmental solutions/technologies. By exploring win–win solutions that benefit business and society, these cross-sector partnerships encourage partner firms to shift their corporate mindsets toward the adoption of innovative business models or technologies to proactively address complex environmental problems.

Other cross-sector alliances involve universities or labs (Rondinelli and London 2003) that help partner firms innovate, develop upstart companies (Rothaermel and Deeds 2004), and create new competencies that sustain their market leadership (Powell et al. 1996; Rothaermel and Deeds 2004). For instance, in 2007, BP partnered with University of Berkeley in a cross-sector alliance, with the goal of co-developing new bio-fuel technologies. BP's hope was that by participating in this cross-sector alliance, it would further the company's industry position by producing innovative bio-fuels that mitigate climate change. Similarly, in 1994, Allied Signal aligned with the US Department of Energy's National Renewable Energy Laboratory (NREL) to develop technologies for recycling carpets. In this alliance, NREL contributed its process knowledge to convert carpets made of nylon-6 fiber into caprolactam (the raw material used to make nylon 6). By acquiring NREL's process knowledge, Allied Signal was able to recover and reuse caprolactam, and recycle approximately 1.8 million tons of nylon carpet sent to landfills each year (OIT 2001). The partnership also helped Allied Signal gain a competitive foothold in the recycling business. These examples illustrate how heterogeneous partners can work together to combine their complementary capacities toward developing novel competencies and market opportunities. They also suggest that competency-oriented alliances are more likely to be associated with firms' alignment with more diverse partners.

Proposition 2a Competency-oriented alliances are more likely to be associated with firms' alignment with more diverse partners.

On the other hand, firms may align with homogeneous partners from the same industry. We suggest that legitimacy-oriented alliances are more likely to involve homogeneous partners to collectively improve their legitimacy and avoid potential future regulations on an entire industry. In seeking legitimacy, firms tend to adopt reactive postures (Oliver 1991, 1997; Bansal 2005; Rivera et al. 2009). More specifically, to avoid future penalty and improve the credibility for the whole industry, firms with legitimacy-

oriented motivations are more likely to align with same-industry partners to defensively lobby for less stringent regulation or standards. An industry-wide alignment of this sort may strengthen partners' bargaining power and enhance opportunities for them to reshape their regulatory contexts (Oliver 1991), in favor of their existing business practices. For instance, in the mid-1990s, many oil companies perceived that regulatory pressures to address climate change were increasing. This pressure encouraged a large number of firms within the industry to establish an alliance—the Global Climate Coalition in Washington—to aggressively challenge climate science and collectively lobby against mandatory emissions regulation. In doing so, these firms successfully thwarted the threat of climate change-related regulations and their associated business risks, thus legitimizing the petroleum industry's existing practices to policymakers.

In other instances, firms that form legitimacy-oriented alliances are likely to develop alliance structures that involve homogeneous partners to signal their attempt to improve the industry's standing. For instance, in the mid-1980s, public concern about safety and environmental issues related to the chemical industry's operations (largely due to the Bhopal chemical explosion) pushed industry firms to develop the Responsible Care Program to signal to the public the industry's attempt to proactively manage its toxic environmental chemicals. By imitating the observable aspects of successful competitors (Mauri and Michaels 1998), some firms were able to reduce what Alchian (1950) refers to as the uncertainty and cost associated with developing their own specialized internal competencies. Other firms with weaker environmental records were able to partner with greener industry firms in an effort (either sincerely or symbolically) to improve their environmental image (Delmas and Montes-Sancho 2010), and reduce scrutiny from critical stakeholders.

Firms that form legitimacy-oriented alliances also tend to involve homogeneous partners to replicate and expand their successful business practices. For instance, in 2007, Covanta Holding Corporation aligned with Guangzhou Development Industry (Holdings) Corporation Ltd to provide waste-to-energy management and disposal services. This partnership with Guangzhou Development Industry allowed Covanta Holding Corporation to draw on its existing businesses models and replicate them in the global market (SDC 2011), thus enhancing its industry standing.

Some firms with institutional motivations may seek out cross-sector partnerships with environmental NGOs and government agencies to reduce stakeholder pressures (Arya and Salk 2006), without necessarily improving their environmental performance. However, these strategic alliances are less likely to materialize or exist over time. Environmental NGOs and government agencies tend to enter partnerships with clear expectations that doing so will achieve a social objective. Since partners retain organizational autonomy while participating in the alliance (Selsky and Parker 2005), cross-sector partners are still obligated to their critical stakeholders. In the event that environmental NGOs and government align with legitimacy-seeking firms that have incongruent social objectives, cross-sector partners risk losing credibility and appearing "captured" by business interests (Carmin et al. 2003). In addition, NGO partners, often enter a strategic alliance with the hope of encouraging radical corporate changes, rather than incremental change (Fineman and Clarke 1996). The differing values and missions of cross-sector partners therefore make it be less likely that strategic alliances founded on legitimacy principles would ever form or exist over time. For instance, the ski industry's trade association joined an alliance with the Sierra Club, The Nature Conservancy, and the National Resources Defense Council, and the U.S. Forest Service in 2000 to reduce environmental impacts at privately operated ski facilities (Rivera and deLeon 2004). However, during the formation of this alliance, all three environmental NGOs withdrew support because they believed that the partnership's environmental goals were too weak and therefore incompatible with their organizational missions that foster environmental protection (Rivera and deLeon 2004).

So while firms may acquire legitimacy initially by partnering with diverse cross-sector organizations (if they can find a partner willing to do so), environmental NGOs and government agencies are less likely to remain committed to the partnership does not yield substantial environmental improvements.

For all these reasons, legitimacy-oriented alliances are more likely to be associated with firms' alignment with less diverse (same-industry) partners. Aligning with these partners can help address external pressures to improve the industry's image, reputation and strategic position, and simultaneously replicate firms' current business, which in turn improves their chances of survival.

Proposition 2b Legitimacy-oriented alliances are more likely to be associated with firms' alignment with less diverse (same-industry) partners.

Governance Structure: Non-Equity and Equity Governance

The third structural dimension that differentiates alliance orientations is their governance. Alliance governance refers to the contractual and control mechanisms that allow alliance partners to coordinate with each other (Kok and Creemers 2008) by way of non-equity (e.g., joint R&D) or equity structures (e.g., joint venture) (Gulati 1995a, b; Dacin et al.

2007; Kok and Creemers 2008). Non-equity governance structures are loosely coupled forms of organizing which involve less formality and joint ownership (Gulati 1995a, b; Dacin et al. 2007). By contrast, equity governance structures are tightly coupled forms of organizing in which participants are linked together by formal structures that often involve joint ownership (Dacin et al. 2007).

Firms that are motivated to form competency-based alliances are more likely to develop non-equity governance structures. These structures tend to emphasize new product development (Kok and Creemers 2008; Kogut 1988; Linnarsson and Werr 2004), and thus have contractual agreements that offer partnering firms greater flexibility, including the ease of termination (Osborn and Baughn 1990). Contractual flexibility facilitates the alliance's continual redefinition as new ideas evolve (Koza and Lewin 1998; Kok and Creemers 2008), and sets the stage for more radical innovations. For instance, the European bank Eurobank and telecommunication operator Eurotel aligned in 1995 to produce a number of significant service innovations, including developing the first Internet bank system in Europe (Linnarsson and Werr 2004) with a novel application to reduce waste by using electronic billing services for European customers. In governing this alliance, the two partnering firms did not put great effort into a detailed contractual commitment or equity agreement (Linnarsson and Werr 2004). Instead, alliance partners informally regulated their activities by way of a simple "letter of understanding" that specified that each party bear its own costs (Linnarsson and Werr 2004). This non-equity structure offered the partnering firms with flexibility to adapt to changes during the R&D process, and continuously modify project design, as needed. This example illustrates why firms that are motivated to form competency-oriented alliances are more likely to pursue governance structures based on non-equity agreements. These agreements increase the flexibility that partnering firms have toward both adapting to change and engaging in innovative activities that lead to innovative product developments and business models.

Proposition 3a Competency-oriented alliances are more likely to have non-equity governance structures.

By contrast, firms that are motivated to develop legitimacy-oriented alliances are more likely to implement governance mechanisms that utilize equity agreements. Equity agreements allocate profits or benefits (and usually decision-making control) in accordance with equity shares (Dacin et al. 2007). They also facilitate knowledge transfer among alliance partners (Kostova and Roth 2002; Dhnanraj et al. 2004), which may lead to greater technological similarities among alliance partners (Mowery et al. 1996).

Equity governance structures are concentrated in the manufacturing sector (Kogut 1988). At the manufacturing stage, the uncertainty related to new product development is reduced greatly because products and processes are beyond the prototype stage and their associated benefits are more apparent. By relying on equity agreements, alliance partners can more readily share in value creation through expanding and leveraging their existing products and processes and the competencies that support them (Koza and Lewin 1998). While the more formal governance structure of equity agreements can hinder creativity in decision-making processes (because of its reduced flexibility), strong control mechanisms facilitate alliance coordination that is required when expanding existing competencies and products (Kok and Creemers 2008; Koza and Lewin 1998) through large-scale manufacturing.

Equity governance structures can also help firms enhance their credibility in foreign markets in response to local regulations (Kogut 1988). This sort of market legitimacy is particularly relevant when there is significant government regulation, and government endorsement is essential for existence in a particular market (Dacin et al. 2007). For instance, in 1996, the Chinese State Planning Commission announced its "wind power development plan," which required that 60–80 % of all large-scale wind turbine fan parts be produced in China (SDC 2011). Many international firms responded to this regulatory mandate by forming legitimacy-oriented alliances. Because these firms had more certainty related to the performance of their existing products (and because they had the necessary competencies in place to develop these products) firms formed alliances with equity governance structures to formalize their alliance agreements. Doing so helped reduce the risks of their engagement with partnering firms and derive market legitimacy for the production of their wind turbines in China.

Proposition 3b Legitimacy-oriented alliances are more likely to have equity governance structure.

Partner Relation: Strong-Tie Versus Weak-Tie Relations

The fourth structural dimension that differentiates alliances is their partner relation. Partner relation refers to the intensity of collaboration and the extent to which trust can be established among alliance partners. It is characterized by the strength of ties (strong vs. weak). Tie strength is defined by the amount of time firms allocate towards achieving alliance goals, partners' intimacy in their interaction, and their reciprocal service among alliance partners (Granovetter 1973). When enhancing information and knowledge flows, firms have a choice of creating a new tie or strengthening a current one (Parmigiani and Rivera-Santos 2011). We suggest that firms which form competency-based alliances are more likely to develop alliance structures with strong ties among

alliance partners, whereas, firms that form legitimacy-oriented alliances are more likely to develop weak ties among partnering firms.

Strong tie structures involve partnering firms developing substantial relational norms and trust (Granovetter 1973), and are especially important to firms that form competency-oriented alliances because of partnering firms' motivations to identify and develop radically new alternatives to existing products. In strong-tie partnerships, partners have more interactive communications (e.g., face-to-face interaction), which may help enhance negotiation processes, mutual commitment, trust, and shared norms (Ostrom 1998). These alliance structures encourage firms to shoulder risks with less fear that their alliance partners will take advantage of them (Ring and Van de Ven 1992). Such a setting encourages partners to commit resources towards both developing new competencies and exploring new business opportunities. Further, strong-tie relations motivate partners to exchange social capital and transfer more complex tacit knowledge to alliance partners (Dhnanraj et al. 2004; Parmigiani and Rivera-Santos 2011), which facilitates the intensity and quality of knowledge sharing (Granovetter 1973) and organizational learning. Firms are therefore more likely to develop competitive competencies with strong-tie relations. Moreover, the reciprocal arrangements associated with strong-ties relations encourage novel ideas to flow in both directions (Marsden and Campbell 1984). This situation helps shape partners' perception of new business opportunities related to complex environmental problems, and encourages the development of new competencies to address these concerns.

For instance, BP partnered with EI du Pont de Nemours and Co (DuPont) in 1997 to develop, produce, and market the next generation of biofuels (SDC 2011). Achieving their goal required that each firm collectively examine emerging technologies, and develop radically new alternatives to existing products. The collaboration necessitated an alliance structure based on strong ties. Such ties involved both companies sharing their tacit competencies, delivering reciprocal services and contributing large amount of resources for bio-fuel development. The trust and shared common ground established by this partnership motivated these companies (along with 8 other US firms and 4 environmental NGOs) in 2007 to form the US Climate Action Partnership. The partnership sought to benefit aligned firms' investments toward emerging environmental technologies by influencing the policy agenda to establish a mandatory US cap-and-trade program for carbon dioxide emissions.

This example illustrates why firms that are motivated to form competency-oriented alliances are more likely to have strong ties among alliance partners. Such ties increase partners' trust and commitment, which is necessary to transfer complex knowledge (Parmigiani and Rivera-Santos 2011) and to encourage organizational learning and innovation.

Proposition 4a Competency-oriented alliances are more likely to be associated with strong tie partner relations.

By contrast, legitimacy-oriented alliances are more likely to develop structures that emphasize weak ties among alliance partners. Alliance structures that have weak tie partner relations have less intensive interactions among partnering firms and therefore do not foster trust to the same extent as strong-tie relations (Gulati 1995a). Since legitimacy-oriented alliances are formed to enhance the credibility of partners' existing business practices, rather than develop novel competencies, weak ties with alliance partners ensure that information sharing among partners is explicit rather than tacit. Explicit information exchange allows firms to imitate the successful business practices of alliance partners. Doing so helps alliance partners improve their legitimacy with key constituents, thereby enhancing their ability to meet social norms and expectations regarding their collective environmental approach.

In addition, while the lack of trust that characterizes weak-tie structures relations is more likely to encourage opportunism among partner firms (Maitland et al. 1985), Oliver (1991) suggests that this opportunism does not necessarily interfere with obtaining legitimacy for aligned companies. For instance, many firms within the US plastics industry are members of the primary industry association, the American Plastics Council, in addition to its environmental programs. Because participation has become an industry norm, Barringer and Harrison (2000) note that it would be concerning for a major plastics producer to not be a member of the association. The same is also true for US chemical firms' participation the chemical industry's primary association, the American Chemistry Council, and its environmental program, Responsible Care (mentioned previously). However, for both strategic alliances, the environmental legitimacy program members accrue may lack merit as the plastics and chemical industries are cited as two of the five most polluting industries in the US (Mani and Wheeler 1999). Moreover, firms that have aligned as part of the chemical industry's Responsible Care Program did so to increase the environmental legitimacy of partnered firms, but failed to improve firms' overall environmental performance (King and Lenox 2002). Yet both strategic alliances were successful at diminishing public concern about their respective industry's environmental practices, which ultimately reduced calls for more stringent regulation of the industry as a whole. These examples illustrate that while weak-tie structures may create avenues for opportunism among member firms, this concern may not diminish with

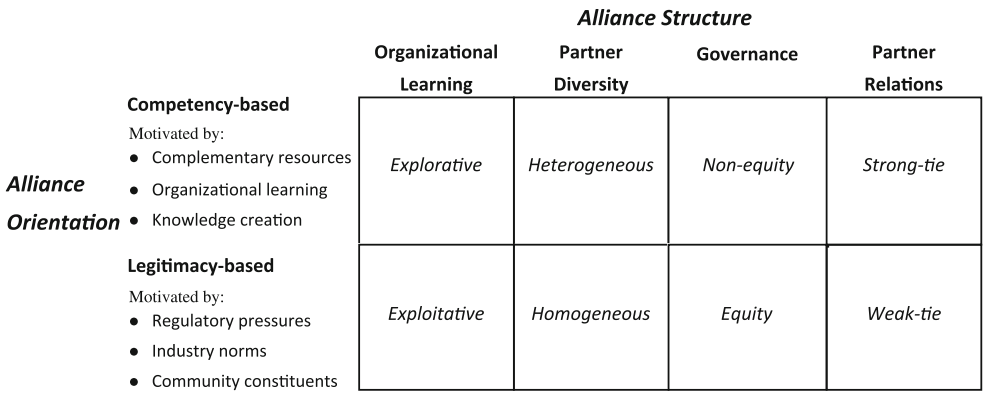

Fig. 1 Relationship between alliance orientation and structure

the alliance's ability to enhance the legitimacy of partner firms.

Proposition 4b Legitimacy-oriented alliances are more likely to be associated with weak-tie partner relations.

In summary, strategic alliances for complex environmental problems (either competency- or legitimacy-oriented) are borne out of resource-based and institutional motivations, and can be characterized along four structural dimensions—organization learning, partner diversity, governance structure, and partner relations. These relationships are summarized in Fig. 1.

While emphasis on these four structural dimensions differs significantly among competency- and legitimacy-oriented alliances, within these alliance orientations, the four structural dimensions are complementary and self-reinforcing. Related to competency-oriented alliances, exploration learning involves value creation associated with upstream activities (Kauppila 2010). Such learning is reinforced by aligning with diverse partners such as research institutes, universities, governments and NGOs. Diverse partners allow firms to gain access to complementary knowledge and assets that are not available in the market place, and expose them to different values and skills, which helps reinforce managers' perceptions that complex environmental problems offer novel business opportunities. The interaction among diverse partners and the access to otherwise inaccessible knowledge that comes with it are also helpful for radical exploration learning and innovation.

Similarly, partner diversity and partner relation are also complementary structural dimensions. Diverse partnership settings allow firms to access to complementary knowledge and assets that are not available in the market place, and simultaneously expose firms to different values and skills, which are helpful for radical organizational learning and innovation. However, such innovative leaning generally requires a greater commitment of resources and sharing of proprietary knowledge, which are sensitive to transactional hazards that lead to losses of value (Li and Ferreira 2008). By drawing on strong-tie relations, partner firms can reduce the likelihood of opportunistic behavior among alliance partners and build commitment and trust in order to better integrate their tacit and idiosyncratic resources and competencies (Parmigiani and Rivera-santos 2011; Simpson et al. 2011).

Other complementarities exist between partner relation and governance structure. While the non-equity structure associated with competency-based alliances provides the flexibility needed for firms to pursue innovation and proactive environmental improvements, such structure also increases opportunism risks due to its relatively weak governance control. By combining, a strong-tie, non-equity structures, firms can enhance partner trust (Gulati 1995b), which diminishes the need for expensive equity-based governance structures (Li and Ferreira 2008). This more relaxed structure also allows partners to commit resources and share risks in the exploration of new solutions for environmental issues. To govern these alliances, firms often rely on bilateral interactions to facilitate their strong-tie relations, and create what Kauppila (2010) refers to as cohesion among explorative relationships that emphasize trust and respect. Doing so facilitates two-way learning (Rondinelli and London 2003) and enhances firms' cognitive and behavior change (Levitt and March 1988; Iyer 2002). In short, exploration learning, diverse partner structure, non-equity structure, and strong-tie relation are complements that reinforce the radical change competency-oriented alliances aim to achieve.

Related to legitimacy-oriented alliances, similar reinforcing arguments exist. Since firms typically have a wider array of responses to institutional pressures (Oliver 1991), legitimacy-oriented alliances are more likely to involve additional strategic positions, which can range from symbolic participation, information sharing, knowledge imitation, to business expansion, etc. In spite of this range, legitimacy-oriented alliances are generally associated with

homogeneous partners, with the goal of signaling compliance, protecting the core business, and improving or expanding on existing competencies, technologies, and products. In instances where homogeneous partners engage in symbolic participation and explicit information sharing, they tend to encourage exploitative learning, which is governed by weak-tie relations. In other instances, homogeneous partners may engage in exploitation learning (by way of knowledge imitation and business expansion) that increases value to alliance partners. Such activities typically rely on equity contracts to exploit partners' existing knowledge and technologies (Rothaermel and Deeds 2004; Kauppila 2010), and guarantee certain benefits associated with business expansion (Rothaermel and Deeds 2004). Enhanced control facilitates income stability and minimizes its associated risks. In summary, like the structural elements of competency-oriented alliances, exploitation learning, homogeneous partners, equity structure and weak-tie relations are complements that characterize legitimacy-oriented alliances. These structural elements are self-reinforcing, and explain alliance partners' varied ranges of superficial or incremental cognitive and behavior changes associated with legitimacy-oriented alliances.

Conclusions

This research considers the proliferation of strategic alliances as a way of managing increased uncertainty and complexity in the business setting. Using the theoretical tenets of RBV and institutional theory, and multiple empirical examples, we articulate why firms participate in strategic alliances. Further, we develop several propositions that explain how differing motivations lead to variations in subsequent alliance structures. This approach offers a broader perspective of observed patterns in firms' participation in strategic alliances. We also provide greater depth for how organizational learning, partner diversity, governance structure, and partner relationships relate to the organizational structure of alliances as a whole.

For management theory, this research extends RBV and institutional theory by providing an important mechanism for identifying competency- legitimacy-oriented alliances, based on firm-specific motivations. We draw on RBV to suggest that firms that participate in competency-based alliances are motivated to enhance their resources and internal competencies, thereby creating knowledge and organizational learning. These firms combine their complementary idiosyncratic resources, and facilitate the flow of valuable information among participating firms, thus developing valuable organizational competencies that can lead to competitive advantage. Related to institutional theory, we extend prior literature by describing how legitimacy-based alliances are borne out of institutional pressures that arise from the regulatory system, industry associations, and community constituents. In responding to these pressures, firms can improve their social legitimacy, thereby enhancing their chance of survival. By considering both theoretical views together, this research responds to calls that utilizing multiple theoretical perspectives more appropriately reveals important variations among organizational relationships (Barringer and Harrison 2000; Parmigiani and Rivera-Santos 2011). Our more integrative approach extends previous alliance literature, which has considered one view in the absence of the other. We suggest that both theoretical views are useful towards understanding why firms form strategic alliances.

We further develop this research area by articulating the theoretical links between the varied intent of alliance formation and their subsequent structural configurations. In exploring these issues, we propose that competency-oriented alliances are typically characterized by exploration learning, diverse partners, non-equity governance structures, and strong-tie partner relations. Additionally we suggest that legitimacy-oriented alliances are generally characterized by exploitation learning, homogenous partners, equity governance structures, and weak-tie partner relations. This broader (yet parsimonious) perspective on alliance formation and structure offers important insights that should be considered when investigating the performance of strategic alliances.

We apply our framework to the setting of complex environmental problems. While our framework is applicable to the formation of all strategic alliances, by focusing on this setting we extend prior research (e.g., Mitchell and Singh 1996) by considering how alliances that address complex environmental problems differ from other sorts of partnerships in they are created in response to social problems that affect many people, involve multiple jurisdictions, have an undetermined regulatory trajectory, and typically lack technical solutions. Strategic alliances that address complex environmental problems also typically require significant coordination among multiple organizations. As such, this setting allows for potentially more varied firm responses, which offers a richer context to explain our arguments.

Finally, we hope that this research will fuel greater interest in understanding the numerous factors that shape strategic alliance formation. Future study would benefit from exploring additional theoretical perspectives that might inform alliance formation. The initial framework developed here is an important starting place for such an investigation in as much as it articulates four structural dimensions that are likely to be relevant in other theoretical settings. In addition, prospective research would benefit from investigating the dynamic interactions among alliance orientations and structures, as well as examining their subsequent environmental performance. Our

position is that the interconnections among the four structural dimensions of strategic alliances are likely to affect alliance outcomes related to improvements in environmental performance, market share, technology development, knowledge creation, and a host of other factors. Assessments of strategic alliances outcomes therefore should consider both the context of why firms align, in addition to the subsequent structure of the alliances themselves.

References

Alchian, A. (1950). Uncertainty, evolution, and economic theory. *Journal of Political Economy, 58*(3), 211–221.

Arya, B., & Salk, J. E. (2006). Cross-sector alliance learning and effectiveness of voluntary codes of corporate social responsibility. *Business Ethics Quarterly, 16*(2), 211–234.

Bansal, P. (2005). Evolving sustainability: A longitudinal study of corporate sustainable development. *Strategic Management Journal, 26*, 197–218.

Bansal, P., & Roth K. (2000). Why companies go green: A model of ecological responsiveness. *Academy of Management Journal, 43*(4), 717–736.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*, 99–120.

Barringer, B. R., & Harrison, J. S. (2000). Walking a tightrope: Creating value through interorganizational relationships. *Journal of Management, 26*, 367–403.

Baum, J., & Oliver, C. (1991). Institutional linkages and organizational mortality. *Administrative Science Quarterly, 36*, 187–218.

Blum-Kusterer, M., & Hussain, S. S. (2001). Innovation and corporate sustainability: An investigation into the process of change in the pharmaceuticals industry. *Business Strategy and the Environment, 10*(5), 300–316.

Boddewyn, J. J., & Brewer, T. L. (1994). International-business political behavior: New theoretical directions. *Academy of Management Review, 19*, 119–143.

Carmin, J., Darnall, N., & Mil-Homens, J. (2003). Stakeholder involvement in the design of U.S. voluntary environmental programs: Does sponsorship matter? *Policy Studies Journal, 31*, 527–543.

Christmann, P. (2000). Effects of 'best practices' of environmental management on cost advantage: The role of complementary assets. *Academy of Management Journal, 43*, 663–680.

Cyert, R. M., & March, J. G. (1963). *A behavior theory of the firm*. Englewood Cliffs, NJ: Prentice Hall.

Dacin, M. T., Oliver, C., & Roy, J. (2007). The legitimacy of strategic alliances: An institutional perspective. *Strategic Management Journal, 28*, 169–187.

Darnall, N., & Edwards, D., Jr. (2006). Predicting the cost of environmental management system adoption: The role of capabilities, resources and ownership structure. *Strategic Management Journal, 27*, 301–320.

Darnall, N., Henriques, I., & Sadorsky, P. (2008). Do environmental management systems improving business performance in an international setting? *Journal of International Management, 14*, 364–376.

Das, T. K., & Teng, B. S. (2000). A resource-based theory of strategic alliances. *Journal of Management, 26*, 31–61.

Davidson, W., & Worrell, D. (2001). Regulatory pressure and environmental management infrastructure and practices. *Business and Society, 40*, 315–342.

Delmas, M., & Montes-Sancho, M. J. (2010). Voluntary agreements to improve environmental quality: Symbolic and substantive cooperation. *Strategic Management Journal, 31*, 575–601.

Delmas, M., & Toffel, M. W. (2004). Stakeholders and environmental management practices: An institutional framework. *Business Strategy and the Environment, 13*, 209–222.

Dhnanraj, C., Lyles, M. A., Steensma, H. K., & Tihanyi, L. (2004). Managing tacit and explicit knowledge transfer in JVs: The role of relational embeddedness and the impact on performance. *Journal of International Business Studies, 35*, 428–442.

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review, 48*, 147–160.

Dutton, J. E., & Jackson, S. E. (1987). Categorizing strategic issues: Links to organizational action. *Academy of Management Review, 12*, 76–90.

Eisenhardt, K. M., & Schoonhoven, C. B. (1996). Resource-based view of strategic alliance formation: Strategic and social effects in entrepreneurial firms. *Organization Science, 7*, 136–150.

Etzion, D. (2007). Research on organizations and the natural environment, 1992-present: A review. *Journal of Management, 33*(4), 637–664.

Fineman, S., & Clarke, K. (1996). Green stakeholders: Industry interpretations and response. *Journal of Management Studies, 33*(6), 715–730.

Fiol, C. M., & Lyles, M. A. (1985). Organizational learning. *Academy of Management Review, 10*(4), 803–816.

Frynas, J. G., Mellahi, K., & Pigman, G. A. (2006). First mover advantages in international business and firm-specific political resources. *Strategic Management Journal, 27*(4), 321–345.

Granovetter, M. S. (1973). The strength of weak ties. *American Journal of society, 78*(6), 1360–1380.

Grant, R. M. (1991). The resource-based theory of competitive advantage. *California Management Review, 33*(3), 114–135.

Grant, R. M., & Baden-Fuller, C. (2004). A knowledge accessing theory of strategic alliances. *Journal of Management Studies, 41*(1), 61–84.

Gulati, R. (1995a). Does familiarity breed trust? The implications of repeated ties for contractual choice in alliances. *Academy of Management Journal, 38*, 85–112.

Gulati, R. (1995b). Social structure and alliance formation patterns: A longitudinal analysis. *Administrative Science Quarterly, 40*(4), 619–652.

Gulati, R. (1998). Alliances and networks. *Strategic Management Journal, 19*(4), 293–317.

Gulati, R. (1999). Network location and learning: The influence of network resources and firm capabilities on alliance formation. *Strategic Management Journal, 20*(5), 397–420.

Hagedoorn, J. (1993). Understanding the rationale of strategic technology partnering: Interorganizational modes of cooperation and sectoral differences. *Strategic Management Journal, 14*(5), 371–385.

Hamel, G. (1991). Competition for competence and inter-partner learning within international strategic alliances. *Strategic Management Journal, Summer Special Issue, 12*, 83–103.

Hardin, G. (1968). The tragedy of the commons. *Science, 162*, 1243–1248.

Hart, S. (1995). A natural-resource-based view of the firm. *Academy of Management Review, 20*(4), 986–1014.

Hart, S. L., & Milstein, M. B. (1999). Global sustainability and the creative destruction of industries. *Sloan Business Review, 41*(1), 23–34.

Henriques, I., & Sadorsky, P. (2006). The adoption of environmental management practices in a transition economy. *Comparative Economic Studies, 48*(4), 641–661.

Hertin, J., Berkhout, F., Gann, D. M., & Barlow, J. (2003). Climate change and the UK house building sector: perceptions, impacts and adaptive capacity. *Building Research and Information, 31*(3–4), 278–290.

Hoffman, A. J. (1997). *From heresy to dogma: An institutional history of corporate environmentalism*. San Francisco: New Lexington Press.

Hoffman A. (2000). Social drivers. Chap. 6: *competitive environmental strategy: A guide to changing the business landscape* (pp. 105–126). Washington, DC: Island Press.

Iyer K. (2002). Learning in strategic alliances: An evolutionary perspective. *Academy of Marketing Science Review*, *10*, 1–14. http://www.amsreview.org/articles/iyer10-2002.pdf.

Kauppila, O. (2010). Creating ambidexterity by integrating and balancing structurally separate interorganizational partnerships. *Strategic Organization, 8*(4), 283–312.

Kemp, R. (1994). Technology and the transition to environmental sustainability. The problem of technological regime shifts. *Futures, 26*(10), 1023–1046.

Kent, D. J. (2004). Status and trends of the HPV program in the USA and Europe. *Regulatory Affairs Bulletin, 94*, 1–7.

King, A., & Lenox, M. (2002). Exploring the locus of profitable pollution reduction. *Management Science, 48*(2), 289–299.

Kogut, B. (1988). Joint ventures: Theoretical and empirical perspectives. *Strategic Management Journal, 9*(4), 319–332.

Kogut, B. (1991). Joint-venture formation and the option to expand and acquire. *Management Science, 37*, 19–33.

Kok, R. A. W., & Creemers, P. A. (2008). Alliance governance and product innovation project decision making. *European Journal of Innovation Management, 11*(4), 472–487.

Kolk, A., & Levy, D. (2001). Winds of change: Corporate strategy, climate change and oil multinationals. *European Management Journal, 19*(5), 501–509.

Kostova, T., & Roth, K. (2002). Adoption of organizational practices by subsidiaries of multinational corporations: Institutional and relational effects. *Academy of Management Journal, 45*(1), 215–233.

Kotabe, M., & Swan, K. S. (1995). The role of strategic alliances in high-technology new product development. *Strategic Management Journal, 16*(8), 621–636.

Koza, M. P., & Lewin, A. Y. (1998). The co-evolution of strategic alliances. *Organization Science, 9*(3), 255–264.

Larson, A. L. (2000). Sustainable innovation through an entrepreneurship lens. *Business Strategy and the Environment, 9*(5), 304–317.

Levinthal, D., & March, J. G. (1993). The myopia of learning. *Strategic Management Journal, Winter Special Issue, 14*, 95–112.

Levitt, B., & March, J. G. (1988). Organizational learning. *Annual Review of Sociology, 14*, 319–340.

Li, D., & Ferreira, M. P. (2008). Partner selection for international strategic alliances in emerging economies. *Journal of Management, 24*, 308–319.

Lin, H. (2012). Cross-sector alliances for corporate social responsibility: Partner heterogeneity moderates environmental strategy outcomes. *Journal of Business Ethics, 110*, 219–229.

Lin, Z., Yang, H., & Demirkan, I. (2007). The performance consequences of ambidexterity in strategic alliance formation. *Management Science, 53*(10), 1645–1658.

Linnarsson, H., & Werr, A. (2004). Overcoming the innovation–alliance paradox: A case study of an explorative alliance. *European Journal of Innovation Management, 7*(1), 45–55.

London, T., Rondinelli D. A., & O'Neill H. (2005). Strange bedfellows: Alliances between corporations and nonprofits. In O. Shenkar & J. Reuer (Eds.) *Handbook of strategic alliances*. Thousand Oaks, Calif.: Sage Publications.

Maitland, I., Bryson, J., & Van De Ven, A. (1985). Sociologists, economists, and opportunism. *Academy of Management Review, 10*(1), 59–65.

Mani, M. & Wheeler, D. (1999). In search of pollution havens? Dirty industry in the world economy 1960–1995. In Fredriksson, P. G. (ed.) *Trade, global policy and the environment*. World Bank Discussion Paper, No. 402. Washington, DC: World Bank.

March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science, 2*(1), 71–87.

Marsden, P., & Campbell, K. (1984). Measuring tie strength. *Social Forces, 63*, 482–501.

Martin, J. (2002). The growing use of strategic alliances in the energy industry. *Energy Law Journal, 27*(1), 28–57.

Mauri, A. J., & Michaels, M. P. (1998). Firm and industry effects within strategic management: An empirical examination. *Strategic Management Journal, 19*, 211–219.

Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology, 83*, 340–363.

Mitchell, W., & Singh, K. (1996). Survival of businesses using collaborative relationships to commercialize complex goods. *Strategic Management Journal, 17*(3), 169–195.

Mowery, D. C., Oxley, J. E., & Silverman, B. S. (1996). Special issue: Knowledge and the firm. *Strategic Management Journal, 17*, 77–91.

OIT. (2001). Office of industrial technologies energy efficiency and renewable energy, U.S. Department of Energy, Washington, DC. February, 2010. http://www1.eere.energy.gov/industry/chemicals/pdfs/nylon.pdf.

Oliver, C. (1991). Strategic responses to institutional processes. *Academy of Management Review, 16*, 145–179.

Oliver, C. (1997). Sustainable competitive advantage: Combining institutional and resource-based views. *Strategic Management Journal, 18*(9), 697–713.

Osborn, R. N., & Baughn, C. C. (1990). Forms of interorganizational governance for multinational alliances. *Academy of Management Journal, 33*(3), 503–519.

Ostrom, E. (1998). A behavioral approach to 9 the rational choice theory of collective action. *The American Political Science Review, 92*(1), 1–22.

Ostrom, E., Burger, J., Field, C. B., Norgaard, R. B., & Policansky, D. (1999). Revisiting the commons: Local lessons global challenges. *Science, 284*(5412), 278–282.

Park, S. H., Chen, R., & Gallagher, S. (2002). Firm resources as moderators of the relationship between market growth and strategic alliances in semiconductor start-ups. *Academy of Management Journal, 45*, 527–545.

Parmigiani, A., & Rivera-Santos, M. (2011). Clearing a path through the forest: A meta-review of interorganizational relationships. *Journal of Management, 37*, 1108–1136.

Porter, M. E. (1991). America's green strategy. *Scientific American, 264*, 168.

Porter, M. E., & van der Linde, C. (1995). Green and competitive. *Harvard Business Review, 73*(5), 120–134.

Powell, W. W., Koput, K. W., & Smith-Doerr, L. (1996). Interorganizational collaborations and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly, 41*, 116–145.

Prahalad, C. K., & Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review, 68*(3), 79–91.

Ring, P. S., & Van de Ven, A. H. (1992). Structuring cooperative relationships between organizations. *Strategic Management Journal, 13*(7), 483–498.

Rivera, J., & deLeon, P. (2004). Is greener whiter? The sustainable slopes program and the voluntary environmental performance of western ski areas. *Policy Studies Journal, 32*(3), 417–437.

Rivera, J., Oetzel, J., de Leon, P., & Starik, M. (2009). Business responses to environmental and social protection policies: Towards a framework for analysis. *Policy Sciences, 42*, 3–42.

Rondinelli, D. A., & London, T. (2003). How corporations environmental groups cooperate: Assessing cross-sector alliances and collaborations. *Academy of Management Executive, 17*(1), 61–76.

Rothaermel, F. T., & Deeds, D. L. (2004). Exploration and exploitation alliances in biotechnology: A system of new product development. *Strategic Management Journal, 25*, 201–221.

Russo, M. V., & Fouts, P. A. (1997). A resource-based perspective on corporate environmental performance and profitability. *Academy of Management Journal, 40*, 534–559.

Sakakibara, M. (1997). Heterogeneity of firm capabilities and cooperative research and development: An empirical examination of motives. *Strategic Management Journal, 18*, 143–164.

Samuelsohn, D. (2009). Climate bill needed to 'save our planet,' says Obama, *New York Times*, February 25. http://www.nytimes.com/cwire/2009/02/25/25climatewire-emissions-bill-needed-to-save-our-planet-oba-9849.html.

Schumpeter, J. A. (1934). *The theory of economic development*. Cambridge, MA: Harvard University Press.

SDC Platinum. (2011). *SDC Platinum TM database*, Thomson Reuters. http://thomsonreuters.com/products_services/financial/financial_products/a-z/sdc/.

Selsky, J. W., & Parker, B. (2005). Cross-sector partnerships to address social issues: Challenges to theory and practice. *Journal of Management, 31*, 849–873.

Selsky, J. W., & Parker, B. (2011). Platforms for cross-sector social partnerships: prospective sense making devices for social benefit. *Journal of Business Ethics, 94*, 21–37.

Sharfman, M. P., Gray, B., & Yan, A. (1991). The context of interorganizational collaboration in the garment industry: an institutional perspective. *Journal of Applied Behavioral Science, 27*, 181–208.

Sharma, S. (2000). Managerial interpretations and organizational context as predictors of corporate choice of environmental strategy. *Academy of Management Journal, 43*, 681–697.

Sharma, S., & Henriques, I. (2005). Stakeholder influences on sustainability practices in the Canadian forest products industry. *Strategic Management Journal, 26*(2), 159–180.

Sharma, S., & Vredenburg, H. (1998). Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities. *Strategic Management Journal, 19*, 729–753.

Shrivastava, P. (1995). The role of corporations in achieving ecological sustainability. *Academy of Management Review, 20*, 936–960.

Simpson, D., Lefroy, K., & Tsarenko, Y. (2011). Together and apart: Exploring structure of the corporate–NPO relationship. *Journal of Business Ethics, 101*, 297–311.

Teece, D. J. (1992). Competition, cooperation and innovation: Organizational arrangements for regimes of rapid technological progress. *Journal of Economic Behavior & Organization, 18*(1), 1–25.

Yoshino, M. Y., & Rangan, U. S. (1995). *Strategic alliances: An entrepreneurial approach to globalization*. Boston, MA: Harvard Business School Press.