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SUSTAINABLE BUSINESS MODELS: THE CONTRIBUTION OF NETWORK ORGANIZATION AND GOVERNANCE MODES

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Abstract: We provide a framework for the design of sustainable business models. While extant literature on business models focuses on unlocking positive externalities, we propose a business model framework that effectively addresses negative externalities. A taxonomy - based on trans-organizational models and governance modes - classifies instruments that counsel behaviour patterns. Sustainability strategies that deal with externalities often merge instruments to manage multi-stakeholder responsibilities and exchanges. The framework draws upon three established research themes - network organizational models, governance modes, and instrumental stakeholder theory - to distinguish between six instrument classes. To illustrate its potential for analysis the paper compiles instruments within these classes, contrasts selected instruments, and applies the framework to diverse sustainability examples. We find preliminary evidence for superior performance of plural instruments for sustainability strategies, and identify key areas of research for advancing sustainable business models.

Keywords: Sustainability instruments; network organizations; instrumental stakeholder theory; governance modes; externality.

Competitive Paper

INTRODUCTION

Concerns about the sustainability of business arise when the mutual value exchanged by transacting parties bears potential costs for communities, such as degrading economic resources, undermining social values or causing harm to the environment. Economic theory has revealed collaboration of multiple stakeholders as an effective response to the “tragedy of the commons” (Garrett 1968; Ostrom 1990). The bundling of property rights to common pool resources and public goods, and the allocation of these rights and associated responsibilities among multiple stakeholders is a key function of regulators charged with sustainability (for instance, Panayotou 1995; Yandle 2006). Sustainable development strategies guide stakeholders to use these rights and responsibilities to control resources in line with interests of the community. Public agencies and policy makers recognize that all stakeholders - including socially responsible corporations, non-commercial private groups, and public agencies - should participate in this process (for instance, Vandenberg & Cohen 2010; Epstein 2008).

The purpose of this paper is to show how network organizations and governance modes contribute to sustainable business models. Both have positive effects on the corporation’s sustainability and financial performance. In strategic management, the emerging literature of business models has shown evidence that a business can unlock positive externalities by interacting with stakeholders such as partners, suppliers, or non-governmental organizations (Chesbrough et al. 2006; Henkel & Maurer, 2010). Therefore, contrary to intuition, research has demonstrated that investing in public goods - improving corporate social performance and sustainability performance - can show positive effects on financial performance (see Orlitzky *et al* 2003; Luo & Bhattacharya 2009; Epstein 2008). Yet orchestrating social and private benefits remains a challenge (Margolis & Walsh 2003), and the role specific instruments play in this orchestration remains under-researched. In this paper we contribute to this complementary view, on how business models can provide an effective response to potential negative externalities with instruments that link organizational models with governance modes.

This paper draws from three streams of research to propose a framework for sustainability strategies: network organizational models that differentiate between the network and the dyad-character of relationships; governance modes for inter-organizational exchange, namely contracts, markets, or relationships; and instrumental behavior that relates exchange and other behaviors to specific economic and non-economic organizational objectives, based on stakeholder theory. The paper’s main contribution is a framework for instruments based on interactions among the two- way and three-way classifications of business models and governance modes. Most instruments for governance modes are designed for dyadic exchanges rather than true network exchanges. The paper elaborates on complementarity between incentive contracts and syndication, representative of two important cells in the framework for sustainability governance. It applies this framework to diverse examples that demonstrate network instruments have different effects than dyadic instruments on sustainability value creation. Plural governance is a mix of instruments from all classes in the framework, which the paper illustrates with examples of success and failure in sustainability. The examples indicate that failures in sustainability occur in part when projects lack plurality in instruments, while success draws upon all instrument classes. The main conclusion is that

multi-stakeholder organizational models for sustainability require property rights to be managed with plural governance instruments.

The paper is organized as follows. The next section outlines the perspective of sustainability concerns as stakeholder externalities that require a system of property rights and responsibilities. The following three sections draw upon the three research streams to argue that open business models support two distinct classes of exchanges, either network or dyadic; that each of three governance modes, contracts, markets or relationships, have limitations; and that responses are instrumental behaviours for economic and non-economic ends. The subsequent section presents the two-by-three framework for instrumental responses, and the following section contrasts syndication and incentive contracts as two representative instruments. The penultimate section discusses examples as applications of the framework and a final section concludes with suggested future research directions.

NEGATIVE EXTERNALITIES & PROPERTY RIGHTS INSTRUMENTS

Consequences of development impose an unwanted and unintended social cost that most traditional business models fail to recognize. A true cost to society that does not show up in a firm's profit and loss statement is termed an external cost - or externality. One major class of external costs is environmental degradation: mismanagement of common pool resources; under-investment in public goods; and depletion of non-renewable resource (Ostrom 1990). These have economic and social consequences, and result in long run damage to livelihoods, incomes and community systems. The producer and the recipient of the externality may be different stakeholders, as in an upstream paper mill and a downstream water supply system, or the same stakeholder as in global greenhouse gas emissions (Field & Field 2009: p. 74). Externalities are difficult to deal with since they are driven by individual motivations, such as self-interest when the recipients are different stakeholders and free-riding when recipients include the same stakeholder, but such motivations are the source of collective disasters. Almost three decades ago sustainable development was defined by a UN Commission that grappled with these externalities on a global scale. The Brundtland Commission, formally the World Commission on Environment and Development (WCED), was convened by the United Nations in 1983. This often cited definition is: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Why must commercial organizations find ways to engage with negative environmental externalities in their business models? What if sustainability externalities continued to be ignored? The Stern Review Report on The Economics of Climate Change (2007) estimates the direct and indirect costs to consumption, environmental services and health to be 11-14 % of GDP. The costs of stabilization would be about 1% of GDP by 2050, according to the Stern Review, although it is a considerably higher percentage at this time. The obvious conclusion is that a small cost to the GDP could prevent ten times as much in lost value. Not many investments in the "business-as-usual" approach can boast of such returns (May 2008). Some portion of these negative externalities for a given business results in lost value for other businesses. Debates in the literature on whether there is tension between a firm's responsibility toward its own shareholders for economic profit and to other shareholders of other businesses, or other stakeholders in general for social welfare must, therefore, account for negative externalities and the returns from such activity.

Many reports identify two kinds of risk from climate change due to GHG emissions. One type of risk is from natural calamities or deterioration of the resource base. Swiss Re, an insurance firm, estimates that weather damage, pollution, industrial and agricultural losses and other expenses could amount to \$300 billion annually. Leading companies now report environmental risks in annual statements. A different type of risk arises from mandatory compliance pressures. Regulations, fines, taxes, and caps on GHG emissions will impose financial burdens unless prior plans on emission reduction are put into place. The electricity utility industry alone is estimated at exposures of \$60 billion annually. To ignore this risk is fiscal irresponsibility by the firm's governing board. Self-regulation and self-imposed compliance measures are necessary but insufficient, as competitive pressures demand industry wide compliance. Leading corporations universally acknowledge the non-sustainability of business-as-usual since the Stern Review Report (2007). The UN sponsored Millennium Ecosystem Assessment of 2005 found that approximately 60 percent of ecosystems services that supported life on earth were being used unsustainably. A measure of economic value of such services at the time was GBP 30 trillion in 1996. Vandenberg & Cohen (2010) observe that financial stakeholders are individuals and citizens, and include public pension and socially responsible investments funds.

The literature is beginning to recognize the link between corporate social responsibility and externalities. While an early and influential review of corporate social performance and corporate financial performance finds no mention of negative externalities (Margolis & Walsh 2003), more recent research does. For instance, O'Higgins (2010) proposes a framework of normative and instrumental stakeholder concerns that reveals inadequate corporate responses to externalities.

Business models employ instruments that package a system of incentives to guide exchange behaviour patterns. Panayotou (1995) defines an economic instrument as any instrument that "aims to induce a change in behaviour of economic agents by internalizing environmental or depletion cost through a change in the incentive structure that these agents face (p.7)". The author observes that different instruments have advantages or severe limitations depending on the application, and much of the experience with instruments comes from their uses as sources of government revenues, much less as incentives to alter behaviour in sustainable development. Systems may not exist for stakeholders to accept and to alter their behaviours. Young (2004) makes an argument for shared responsibility and collective action, but notes that institutions need to be reformed through mediated actions of all stakeholders to better regulate harmful outcomes.

One instrument to address the institutional reform process is to create a system of property rights that bundle responsibilities along with rights. Ehret & Wirtz (2010) review property rights theory from the viewpoint of private asset ownership strategy, and conclude that crucial advantages can accrue to firms from acquisition of rights and responsible management of these rights. By extension, crucial common pool resources can be allocated with property rights and responsibilities to stakeholders. Rajagopal & Zilberman (2007) acknowledge enforcement of property rights and trading mechanisms as a successful policy tool in addition to price-based incentives and direct controls. Panayotou (1995) discusses property rights as a major economic instrument. Yandle (2006) provides further references and reviews the property rights policy approach, and evaluates its success in a marine sustainability management context. Hoffman (2006) studies the impact where Germany introduced a carbon tax as well as an emissions trading scheme, a property rights approach,

while New Zealand has not made serious attempts to employ these instruments so far. As it appears, both approaches lead to different outcomes, with Germany on a good way to achieving its reduction target, while New Zealand's carbon emissions are still rising. Plurality of instruments is a relevant concern.

OPEN BUSINESS MODELS: NETWORKS OR DYADS

A primary dimension of our framework is that of organizational models. Strategic success is contingent on the appropriate design of organizational models. For instance, Zott & Amit (2008) argue that optimal strategy for a firm is linked to its administrative structures. Organizational networks consist of complex alliances, supply chains, markets, franchises or syndicates with large numbers of parties entering into multi-lateral exchanges and have been discussed in the literature for more than two decades (Hakansson & Johanson 1988; Larson 1992; Dyer & Singh 1998; Gulati *et al* 2000; Graebner & Eisenhardt 2004). Achrol & Kotler (1999) distinguish type of networks and propose research to determine how marketing strategies are contingent upon network model types such as internal, vertical, market, and opportunity networks, and structures such as weak and strong ties, and flexibility. Other authors document the evolution, range and scope of network business models (Chesbrough and Appleyard 2007; Ehret and Wirtz 2010; Day 2011). A crucial distinction for the purpose of the present paper is that the decisions in networks are made by teams consisting of multiple organizations whereas in dyads they are made by a pair of organizations.

DYADS OR STAKEHOLDER PAIRS

The parties are typically two businesses, or a business and a regulatory authority, or a corporation and an NGO. Two parties may develop bilateral contractual agreements in order to govern their exchange in a manner that does not require recourse to courts or arbitrators. The contracts usually are self-enforcing and specify what penalties will occur if terms are breached. Bilateral contracts recognize that complexities of modern business render third parties incapable of understanding the relevant details and the best parties to govern exchanges are the concerned parties themselves. Contracts that are not self-enforcing need a third party to enforce the contract, and perhaps adjudicate and penalize breach of contract. The third party is usually the presiding court, relevant government body such as a Pollution Control Board, or industry association.

STAKEHOLDER NETWORKS

Here, many parties are simultaneously involved in decision making. Some decision makers who are involved are customers, NGOs, research universities, policy makers, community representatives, investors, employees, and managers. Achrol & Kotler (1999) provide an operational definition of the network organization, stressing several common aspects to the present paper's concept of stakeholder networks such as non-hierarchy, specializations, shared value systems, and shared responsibilities. Berghman et al (2006) argues that companies should build three types of competencies: marketing practices for external knowledge absorption, general organizational competences and supply chain/network competences. Of these, the third competency contrasts dyadic and network approaches.

Larson (1992) discusses network dyads as a non-hybrid alternative to markets and hierarchies (see also Powell 1990). The present paper's governance modes include contracts and relationships in addition to markets as non-hierarchies based on exchange between

organizations. Moreover, the trans-organizational network in the present paper is distinct from the sets of dyads concept, and are more like ‘poly-ads’ of multiple stakeholders in joint exchange. Achrol & Kotler (1999) also distinguish between networks of single-source partners and multiple partners, which our distinction between dyads and networks echoes.

GOVERNANCE MODES AND THEIR LIMITATIONS

A complementary dimension of our framework is that of governance modes. Keast *et al* (2006) propose the working definition that governance modes are alternative ways of organizing society, each “... underpinned by a set of ideological assumptions and principles that guide its operation and optimal operating conditions.” The authors defend hybrid governance modes – mixing hierarchical, market and network modes - for complex policy regimes aimed at environmental protection. Self-governance enhances democratization and participation in contexts of environmental externalities (Stavins 1995). Over four decades of research in organizational and marketing theories has addressed self-governance of inter-organizational exchanges. Contracts, markets and relationships are three basic constituent modes of self-governance that underlie more complex governance mechanisms. This section highlights reasons why plural self-governance modes are needed to compensate for the failures of each (as also argued by Cannon *et al* 2000; Seshadri & Mishra 2004).

PLURAL GOVERNANCE

Contracts, Markets, and Collaborative Relationships are complementary mechanisms (for instance, see Cannon *et al* 2000). Sustainability efforts are governed by, for example, tradable discharge permits in cap-and-trade exchanges (markets); vendor-purchaser agreements that specify emission targets to reduce carbon footprints (contracts); and associations between firms in many sectors for standards setting (collaborative relationships). Markets provide a baseline for contracts, and parties can enter contracts to improve upon what they can clearly achieve on spot markets. Better contractual agreements, where they can be drafted, support deeper and more complex relations (for instance, see Seshadri & Mishra, 2004). Contracts provide a lowest common ground for building relationships, and shore up trust and commitments.

Markets: The elegant Theory of Markets establishes the optimality of open market trades that deliver what people want and satisfy needs by employing an enforceable price system. Yet market failures are widely noted and have many sources. It was recognized early that the Arrow-Debreu model of efficient markets is incomplete in accounting for institutional economic behaviour and the scope of organizations (Arrow 1974). Significant market failures are due to society’s inability to fully account for costs or enforce collection of due revenues. There is wide agreement that the market mechanism cannot deliver the curtailment of consumption required for sustainability without additional incentives (Salzman 1997; Sachs 2008).

Contracts: Contracts between a principal and one or many external agents can be designed as mechanisms that help resolve divergent interests of the parties (see Jensen & Meckling 1976 for the agency theory of contracting). Contracts allocate and shift the balance of risks and obligations in the supply chain. Information asymmetries between organizations, such as those encountered in sustainability life cycle assessments, introduce agency problems in the design of contracts (Connelly *et al* 2011). These problems often need recourse to third parties such as courts to adjudicate disputes, and rely on theories of justice. Legal theory has recently

re-interpreted how covenants in contracts on sustainability gain acceptance. Castro (2012) identifies mediating systems that are needed to communicate and legitimize new laws through an extended psychosocial process. This process is necessary also because of contractual incompleteness. Some sources of contractual incompleteness are failures to anticipate contingencies and situations; devise joint courses of action; write explicit clauses for contingencies; and monitor and enforce agreements (Hart 1988). Transaction Cost Economics takes a descriptive approach to incomplete contracts and focuses attention on costs of contracting (Williamson 1996). The quest to reduce these costs provides the rationale for extra-contractual approaches. For instance, Kashyap *et al* (2012) investigate incentives beyond *ex ante* contractual agreements derived from agency theory in franchise distribution systems.

Collaborative Relationships: Several authors have studied relationships and value creation over the last three decades (for example, Berry 1983; Dwyer, Schurr & Oh 1987; Morgan & Hunt 1994; Sheth & Parvatiyar 1995; Gundlach, Achrol & Mentzer 1995; Grönroos 1997; Day 2000). Among the several benefits of inter-organizational relationships are long term collaborative partnerships. The more general construct of collaboration has been defined in early work as the degree to which partners are able to work together in a joint fashion toward their respective goals (Frazier 1983), which can be facilitated by relationships. Jap (2001) argues that unique joint competencies emerge from heterogeneity of capabilities from collaborations. Many authors closely link collaboration performance with financial performance (for instance, Spekman & Carraway 2006; Paulraj *et al* 2008; Nyaga *et al* 2010; Claro & Claro 2004). Meta-analysis reveals a sales growth advantage with innovation and inter-organizational collaboration (Bahadir *et al* 2009). Crittendon *et al* (2011) note that many companies treat sustainability as a single level rather than an end-to-end supply chain issue. They argue for a proposition (P4a: p. 77) that “a sustainability strategy will be associated with a collaboration culture among supply chain members.” Collaboration relationships can and must include non-commercial stakeholders. Epstein (2008) discusses collaboration between firms and non-governmental organizations (NGOs) for sustainability. Despite the benefits of collaboration, partners cannot assure continuity in relationships. Low expectation of future exchange is one reason (Crosby *et al* 1990). Wilson (1995) observes that even well-established and mature relationships may terminate for a variety of reasons.

INSTRUMENTAL STAKEHOLDER THEORY AND ORGANIZATIONAL BEHAVIORS

Stakeholder theory has held been a mainstream subject for organizational research (for instance, Freeman 1984; Donaldson & Preston 1995; Clarkson 1995; Mitchell *et al* 1997; Jones & Wicks 1999; Margolis & Walsh 2003; Bhattacharya *et al* 2009; Smith *et al* 2009; Vandenberg & Cohen 2010; Sheth *et al* 2011). Instrumental Stakeholder Theory argues against a reductionist approach, such as narrow self-interest, to explain behaviour and posits that outcomes are contingent on a wide range of possible behaviours that balance economic and non-economic ends (Jones & Wicks 1999; Brickson 2007; O’Higgins 2010).

Stakeholder theories have been linked in the literature to organizational exchange models and governance modes. Margolis & Walsh (2003) in their extensive review of corporate social performance (CSP) and stakeholder theory raise the question of whether there is a tension of ‘to profit or to serve’ in organizational purpose. Put differently, can companies be agents of social repair while being agents of economic efficiency? The authors point to several reviews that

acknowledge the close positive connections between CSP and corporate financial performance (CFP), while leaving important questions unanswered making it a vexed problem in the literature. They propose a descriptive research agenda to investigate how firms internally control, monitor and discipline their social actions. In the last decade sustainability problems have gained in significance in CSP approaches, and could serve to drive a wedge between CSP and CFP. Our concern in the present paper on governance modes for stakeholder networks aimed at sustainability echoes this call for research, while incorporating the role of externalities. Brickson (2007) proposed an organizational identity orientation framework that distinguishes between stakeholder organizations connecting dyadically (labelled Relational in their paper) and organizations connecting to a larger group of members (Collectivistic). He notes that organizational identity orientations aid in instrumental stakeholder theories since it explains how organizations engage in certain sets of behaviours. The author's two categories – Relational and Collectivist - correspond to what we call dyads and networks respectively in the present paper's framework.

Instruments are formal connections between stakeholders organizations intended to generate desired responses as behaviours. O'Higgins (2010) distinguishes instrumental stakeholders as those that have a role in determining organizational behaviour upon which the desired outcome is contingent (see also Post *et al* 2002). This paper classifies instruments by the intersection of organizational models and governance modes. For instance, instruments of dyadic contractual modes will differ from those of network collaborative relationship modes. This means that specific sets of behavioural responses of specific stakeholders will also differ among the two, and instrumental stakeholder theory suggests that the outcomes contingent on the behaviours will also differ. The next section describes the framework, instruments and their classification.

INSTRUMENTAL TRANS-ORGANIZATIONAL GOVERNANCE FRAMEWORK

The framework classifies instruments of governance by a two-way dimension of trans-organizational models and a three-way dimension of governance modes. The six cells allow us to distinguish instrumental behaviors in trans-organizational governance. The six classes of instruments are:

(A) Network-Contract: Contractual agreements in value chains between multiple stakeholders can be based on performance measures that address externalities.

(B) Network-Market: A market allows buying and selling of tradable discharge permits and emission credits. Price discovery follows from this process.

(C) Network-Relationship: Performance management requires recognition of all instrumental stakeholders and the necessity of securing their collaboration for shared responsibilities in sustainability.

(D) Dyad-Contract: Single-agent contracts use instruments such as royalties, fees, shares of cost-over- and -under runs, and the like to share risks and provide incentives for sustainability efforts subject to moral hazard.

(E) Dyad-Market: As markets involve large numbers of buyers and seller, a dyad here has special meaning. It implies a broker intermediates, or a market index is used to adjust forward pricing in contractual agreements on derivatives associated with permits. It could also refer to reverse auctions for selection of dyadic partners from a pool of qualified bidders.

(F) Dyad-Relationship: Relational instruments subjugate short term self-interest to long term or enlightened self-interest (Feinman 2000; Macneil 2000). Learning, commitment, and

reputation are processes that separate the two forms of self-interest behaviours. Bilateral relational instruments can help reduce large transaction costs in high contingency situations (Nordberg *et al* 1996). Table 1 is a summary of the framework. A further summary of representative instruments that qualify for these classes is in Appendix 1.

TABLE 1: A FRAMEWORK FOR INSTRUMENTS OF PLURAL GOVERNANCE

		Governance Modes		
		Contracts	Market	Collaborative Relationships
Organizational Model	Network	Syndicates Franchising Systems	Brand Clubs Exchanges/Markets for Permits, Credits Labels/Footprints	Board Reviews Standards, Certification
	Dyads	Property Rights Liability Laws Taxes, subsidies, fees, licenses Incentive Contracts Yardstick Contracts Quotas, Allowances	Brokerage Reverse Auctions	Equity Investments Cooperative Bargaining & Negotiation

SYNDICATION AND INCENTIVE CONTRACTS

Instruments of governance that belong in different cells may be contrasted by examining how they deal with rights and responsibilities, contribute to joint production and revenue, apportion risk, and share the benefits of exchange. Syndication is a trans-organization business model that enables instruments in the network contract mode. Syndicates encourage participation of multiple stakeholders in joint production, and assign complementary claims and responsibilities. For instance renewable energy companies join together in a syndicate to build high voltage direct current transmission lines for power distribution. Members have territorial rights for transmission and responsibility for interconnections. Revenues are jointly obtained in the competitive power supply market over the grid. Uncertain costs are borne individually but uncertain revenues are common in the syndicate, and therefore profit risks are lower than for non-members. Members agree to sharing rules and joint revenues are distributed in accordance when the period of the contract expires.

The incentive contract is primarily an instrument for the dyadic contract mode. The incentive contract is between a principal who designs and offers the contract, and an agent who has responsibility to expend effort and use resources, subject to supplier moral hazard that arises from shirking of costly effort of uncertain value. Rights to finished product or consumption of service are transferred from agent to principal for compensation determined by the contractual incentives. An example of the incentive contract is procurement by branded

knitwear of eco-friendly clothing that specifies a discharge target and a cost target. This instrument shares the financial burden of risk between the brand and supplier in order to control moral hazard in water use for textile dyeing. The supplier meets the discharge target but the audited cost at the end of the procurement contract may either over-run or under-run the cost target. The brand links the compensation to the amount of under- or over-run by an incentive formula.

Syndication and incentive contracts differ in several ways. (i) Property rights are pooled among members of a syndicate. In contrast, property rights are transferred for compensation in incentive contracts. (ii) Responsibility for joint production and revenues is shared in the syndicate. Responsibility for compensation is the principal's and for production is the agent's in the incentive contract. (iii) Syndication shares risk between members in order to reduce the financial burden of uncertainties, and zero risk would be ideal. Incentive contracts trades of risk versus incentives for suppliers, and zero risk would mean no incentive and no means to control moral hazard. (iv) Syndication reduces barriers to entry into larger projects as members pool their resources. Agents in incentive contracts have initial endowments that may restrict their ability to benefit from economies of scale. (v) In quality differentiated markets, syndicates have the ability to provide incentives for efficient quality choices among members. Incentive contracts are restricted to meeting quality standards set by the principal. (vi) As there are networks of members in syndicates, there are ample opportunities for improved flow of ideas and opportunities. Incentive contracts rely on a single agent for innovations and flow of opportunity. In sum, network contracts deliver superior outcomes than dyadic contracts although they may be more difficult to administer.

APPLICATION OF THE FRAMEWORK

The goal in the remainder of this paper is to make a case for stakeholders to mix instruments of all types - from all possible cells of the framework – for a comprehensive approach to sustainability strategy. It proposes that the deliberate mix will lead to superior results. Previous research in policy analysis argues that using hybrid governance modes lead to superior policies (Keast *et al* 2006). Research on product markets supports the conclusion that a mix of instruments from differing governance modes is likely to provide greater flexibility in safeguarding inter-firm exchanges (Cannon *et al* 2000). However, a similar conclusion for the other dimension of the framework is not available in the literature. There is little research on whether stakeholders prefer dyadic models over network models of organization for sustainability strategies, or whether a mix is more effective. Three diverse examples with mixed experience in governance help illustrate the framework, and make a case for a comprehensive mix – across network and dyadic exchanges, as well as across all governance modes.

MARINE PRODUCT CO-MANAGEMENT IN NEW ZEALAND

Marine products have had a long history of failed approaches to management of a public good. Tietenberg (2003) discusses policy approaches involving tradable permits which have emerged as a last resort when other approaches have failed, and presents evidence of improvement. Permits involve the assignment of property rights. A legal framework now exists in most regions for this, such as the US Magnuson–Stevens Fishery Conservation and Management Act. Individual transferable quotas (ITQs) are ways to bundle property rights and allocate them among fishing organizations in such regulated regimes. The stakeholders, including industry groups, fishing communities, and environmental non-governmental organisations, seek involvement in this process. Péreau *et al* (2012) address conflicts and

tradeoffs that arise between conservation, the drive for economic efficiency and social objectives in ITQ managed fishery. Stakeholders then use plural instruments including syndication to govern exchange. Yandle (2006) describes co-management of common pool marine resources. Her study concludes that for fishery co-management to work efficiently characteristics of the property rights bundle (including rights of access, management, extraction, transfer, and exclusion and their associated responsibilities) must be carefully matched to the regime's biological, social, and regulatory setting. There is a long evolutionary process for this to happen. Her study of New Zealand's experience in co-management of Rock Lobster fisheries tracked evolving roles over decades from loose stakeholder groups as providers of management advice to that of a multi-sector user/stakeholder group forum involving syndicates engaged in policy-making. While the study supports overall success it identifies some remaining governance failures.

Our framework explains two core failures identified in the study: (i) Rock Lobster co-management omits to balance contractual incompleteness with network relationship instruments. This is one reason why gaps in stakeholder responsibilities remain on aspects of fishery management not directly related to quotas of catch output, such as port management. (ii) Stakeholders spontaneously change from network to dyadic instruments. In this case owners of property rights unbundled some responsibilities and rights, and disassociated rights to extraction and management for easier sale of their ITQs to large commercial organizations. This unbundling failed to assign the entire set of responsibilities that come with the original bundle of property rights.

MINING FOR IRON-ORE IN INDIA

The global market for high quality iron ore is growing rapidly, and the Bellary region in southern India is a major exporter to world markets. A non-governmental organization, Samaja Parivartana Samudaya (SPS), monitoring environmental impact recently moved the Supreme Court of India, which then ordered the Indian Council of Forestry Research and Education (ICFRE), an autonomous body under the Ministry of Environment and Forests to carry out a macro-level environmental impact assessment (EIA). While the ICFRE findings emphasized that mining was "unscientific" and reported widespread impact, it was criticised by SPS as deficient on two counts. First, even scientific mining may well be unsustainable or unacceptable to other stakeholders; and second, the economic impact on stakeholders had not been quantified. To correct these shortcomings an accelerated EIA was conducted by Cerana Foundation (CF) on behalf of SPS (Cerana Foundation EIA Report 2012).

The findings of the CF report are summarized in a balance sheet that calculates annual profits at INR 3,500 crores (\$660 million) from sale of about 14 million tonnes of ore, while agriculture / primary production annual income losses to other stakeholders in the region, and sequestration of carbon losses amount to INR 470 crores (\$89 million). In addition, the report's quantified health effects due to asthma and cancer incidence rates were found to be significant and not included in these financial loss figures. The report concludes that externalities have not been addressed in either the short or long-run, and that regulating agencies at the State and Central level have failed to protect the environment and people of the region. Clearly, a very large surplus exists for welfare investments and compensation that is denied given the current bundle of property rights in iron-ore and its manner of allocation by regulators. In the light of the framework this indicates there is excessive reliance on global iron-ore markets and none on local non-mining stakeholder relationships. Our framework reveals an institutional loophole, due to missing relationships between the local community

and the mining corporations, as well as regulators. Mining firms and global ore processors dyads are connected through markets that do not price externalities of mining. The report, now submitted to the Supreme Court of India, recommends empowering a committee consisting of representatives of local self-governments to decide on how stakeholder involvement should be organized and governed.

BIOFUEL SECTOR GROWTH IN USA

The biofuel (non-fossil fuels, mainly ethanol and biodiesel) product market is an immature sector but is growing rapidly. One estimate has its size growing to US \$139.6 billion globally by 2016, a growth rate of 16% (Lucintel 2012). Efforts to produce and market biofuels depend on national energy policies that have sent mixed signals to producers and marketers in recent years. Risks abound on the supply side such as adequacy of feedstock and obsolescence of processes, as well as on the demand side such as mandates and policies on renewables. The limited numbers of biofuel producers are represented by associations, such as the National Biodiesel Board (NBB) in the US, that attempt to influence policy. Global biofuel chains and networks have participants of widely varying capabilities and subject to very different regulatory environments. Therefore, stakeholders in biofuel markets are forced to routinely grapple with information problems in uncertain, imperfectly perceived conditions. Markets for energy crops as feedstock for biofuels unlike field crops are particularly risky as their futures are not traded. Confidence level in markets can ride upon how well the market deals with risks. The market's performance therefore determines participation decisions, expansion of markets, and prices that commodity biofuels will fetch.

Moreover, the emission savings from use of biofuels do not get monetized in permit markets. An FSA report (2008) lists several market risk classes, including those of market foundation, integrity and liquidity for emission credits. FSA cautions participants to perform their own due diligence on emission credit market risks. Kumarappan & Joshi (2009) point out that savings in emissions in substituting fossil fuels with biofuels is based on lifecycle assessments but proposed emission credits trading rights, a form of property rights to multi-stakeholder effort, would be vested with only one stakeholder who trades the credit – the manufacturer. This will cause incentive problems. The framework's network contract instruments like syndication are necessary for incentives to share private information and assign property rights in biofuel emission credits trading. The problems in biofuel product and emission credit markets illustrate the importance of the framework's market instruments. Growth is risky and restricted when market instruments are weak or unable to compensate for contractual and relationship limitations.

Appendix 2 summarizes the framework analysis of these three examples.

CONCLUSION & FUTURE RESEARCH

Several organizations must jointly participate in strategies for sustainable development and share in responsibilities as damaging externalities are caused by complex collective interests. A property rights approach to sustainability strategies is rooted in responsibilities for managed use of resources and exchange behaviours. The paper used three research streams to propose a discriminating framework: network organizational models, exchange governance modes, and instrumental stakeholder theory. The framework has two dimensions: (i) a 'trans-organizational model' dimension with either Dyads (bilateral stakeholder organizations) or Networks (multi-lateral stakeholder organizations); and (ii) a 'mode of governance'

dimension, whether Contract, Market or Relationship. The framework is useful in that it describes differences and therefore recognizes what constitutes plurality in instruments and associated instrumental behaviors. Application of the framework to diverse examples of marine products in New Zealand, mining in India, and biofuel in USA illustrate its potential for analysis.

The rich research streams used to develop the framework hold promise for future development of the framework. Descriptive approaches to instrumental stakeholder theory can drive empirical generalizations and further grounded research. Margolis & Walsh (2003) discuss related normative and descriptive research agendas, but omit to raise the issue of economic externalities. Recent work by Kashyap *et al* (2012) in plural governance modes offers guidelines for similar research in sustainability contexts. Aftab *et al* (2010) evaluate a “mixed approach” of economic instruments and management standards when two environmental objectives need to be met simultaneously and show that mixed instruments outperform stand-alone economic incentives or managerial controls under certain conditions. Future empirical research is called for that qualifies generalizations about instruments by specifying conditions of success. A similar descriptive research approach for trans-organizational models – whether dyadic or network – is another research direction.

The inclusion of causal effects of externality as mediating corporate social and financial performances is a promising direction for conceptual and empirical research. There is a dearth of integrative case studies, and the framework could help define dimensions and designs for sustainability case study research. Further evidence is needed, but a preliminary conclusion is that the plural instrumental approach to management of property rights and responsibilities is likely to lead to superior sustainability outcomes.

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APPENDIX 1: INSTRUMENTS AS SETS OF BEHAVIORS

Type of Instrument	Description of instrumental behaviours in the organizational model-governance mode framework.
DYADS CONTRACTS	
Property Rights	Public administration assigns rights, using either allocation or auctions, to secure, exclusive and transferable titles to resources so that the owner will not engage in resource extraction unless the price of the resource commodity covers not only the extraction cost but also the foregone future benefit as a result of present use. Rights are restricted through liens, easements, and other caveats on use and disposal.
Liability Laws	The organization is responsible to a public authority under Public Law. For instance, Extended Producer Responsibility (EPR) laws, such as take backs, require the producer to assume responsibility for post-consumer disposal of waste.
Taxes, penalty fees, licenses, subsidies	Pollution has financial burdens as a social policy directly where possible. Output from dirty technologies is taxed at a higher rate than clean technologies which may even receive a subsidy. This modifies consumption of technological processes to favour clean technologies and reduces pollution.
Linear Incentives	A target level of pollution is established and under-runs or over-runs are rewarded or penalized in accordance with a linear sharing formula agreed upon between the supplier and the buyer in the contract.
Yardstick incentives:	Contests and tournaments between suppliers for business rewards are useful when common uncertainties and moral hazard are involved. Pollution abatement can become an effective learning race between agents.
Quotas/Allocations	Resources are rationed based on the ability of natural processes to regenerate. Forestry and fisheries have long been subject to such quota limitations. Energy supplied over the grid has positive quotas for renewable sources that must be exceeded. Caps restrict the quantity of emissions allowed.
DYADS MARKETS	
Brokerage	Intermediation by professional services to match two parties to an exchange agreement, in order to improve upon search costs and provide superior access and more efficient conclusion of agreements.
Bidding/Reverse Auctions	Agents bid for public agency or bid-taker contracts for sustainability services. Hidden information on agent competencies and types are revealed by the reverse auctions special price discovery mechanisms.
DYADS COLLABORATIVE RELATIONSHIPS	
Equity Investments	Dyads may internally finance investments in clean technology with loans and equity shares between buyer and seller. Financial benefits can accrue to the dyad by lowering the cost of working capital and ensuring investments go to mutually beneficial clean technologies.
Cooperative Bargaining & Negotiation	Process of offers and counteroffers, with possible expansion of issues on the table, leading to agreements that enhance joint payoffs among negotiating partners while improving each partners best alternatives to agreement.
NETWORK CONTRACTS	
Syndicates	Team production leading to joint payoffs, revenues and incomes, which are shared among members of the team in accordance with pre-determined rules.

Franchising	Distribution systems designed by a franchisor as a principal, and where services are rendered for consumers at the point of consumption by franchisees as agents.
NETWORK MARKETS	
Brand Clubs	Brands for green clubs and enhance branding through demanding criteria for membership, communicate to their audiences and extend the reach of networking.
Permit Exchanges	Market Exchanges create settings for exchange of tradable discharge permits (TDPs) and promulgate standards that sellers must meet for TDPs. Market making and execution of trades is possible when large numbers of buyer and sellers register on such exchanges.
Labels/Foot prints	Information is provided to the customer at the point of purchase that influences purchase and use behaviour. The usual labels for sustainability are carbon footprints, and a variety of Green Marks.
NETWORK COLLABORATIVE RELATIONSHIPS	
Board Reviews	Accreditation boards conduct reviews on specific processes required to qualify and maintain membership, which are held periodically by boards constituted from representatives of member organizations.
Standards & Certification	Global consortiums such as Global Reporting Initiative (GRI) influence reporting by member firms and use such initiatives to set standards.

APPENDIX 2: EXAMPLES OF GOVERNANCE INSTRUMENTS
(missing instruments are in caps)

		FRAMEWORK CELL					
		A Network- Contract	B Network- Market	C Network- Relationship	D Dyad-Contract	E Dyad- Market	F Dyad- Relationship
EXAMPLE	<i>Marine Product Co-Management in New Zealand</i>	Syndicates- such as groups of Rock Lobster fishing companies	Permit Exchanges – of ITQs through auctions	MISSING STANDARDS FOR TRADITIONAL NON-QUOTA RELATED WORK PROCESSES	Quotas/Allowances- for catch of specific species. Property Rights – of bundle of rights and responsibilities with Individual transferable quotas (ITQs)	Brokerage, reverse auctions of unbundled ITQs	MISSING EQUITY ARRANGEMENTS OR NEGOTIATED RESPONSIBILITY FOR UNBUNDLING OF EXTRACTION RIGHTS
	<i>Mining for Iron-Ore in India</i>	MISSING GROUPS OF STAKEHOLDERS IN NETWORK	Export markets MISSING MINERAL & DISCHARGE PERMIT EXCHANGES	MISSING STANDARDS FOR EIA AND POLLUTION CONTROL BOARD REVIEWS	Property Rights on surface minerals MISSING COMMUNITY STAKEHOLDERS IN MINERAL & DISCHARGE PERMITS RIGHTS ALLOCATIONS	Brokerage, auctions of mineral extraction rights	MISSING EQUITY OR NEGOTIATED COMPENSATION FOR INCOME, CARBON OR HEALTH LOSSES
	<i>Biofuel Sector Growth in USA</i>	MISSING RESOURCE POOLING AND RISK SHARING SYNDICATES	Global market for commodity biofuel products MISSING PERMIT & FUTURES EXCHANGES	MISSING STANDARDS FOR LAND USE ELEMENTS OF LIFE CYCLE ASSESSMENTS	Supply chain contracts for feedstock, manufacture, blending, and sales MISSING CERTIFICATES OF EMISSION REDUCTION RIGHTS	Brokerage, and reverse auctions for commodity fuel blends	MISSING EQUITY OR NEGOTIATED COMPENSATION FOR LIFE CYCLE EMISSION REDUCTIONS