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Innovation and NGOs

A framework of interaction

Stephen R. Luxmore and Clyde Eiríkur Hull

Abstract: *Innovations that antagonize non-governmental organizations (NGOs) will face significantly greater challenges than those that do not. The impact of non-governmental organizations on the commercialization of new technology is evolving from the more traditional indirect approach of lobbying governments. The new NGO approach is to pursue private politics, in which the NGO seeks to exert direct influence over entrepreneurial companies that commercialize radical new technology. The authors use the industry study approach to explore how this new NGO role affects innovation. They present a theoretical framework that encompasses the emerging role of NGOs and set out the practical managerial implications that emerge from their analysis.*

Keywords: *innovation; non-governmental organization; NGO; genetically modified organisms; nanotechnology*

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Employee empowerment and engagement are crucial to the success of innovation (Thomas *et al.*, 2007), but companies cannot innovate without empowering and engaging the world outside the company (Hamel and Prahalad, 1994; Hull and Luxmore, 2007). Innovating companies that neglect the social rationality perspective, which is concerned with the safety and side effects of the new technology (Isaac and Kerr, 2003), do so at their peril. Such concerns, if neglected, are likely to act as a kernel around which resistance to the innovation may coalesce. This resistance often takes the form of hostile action from a non-governmental organization (NGO) (Vachani, Doh and Teegen, 2009). Resistance based on other concerns may take other forms – for example, entrenched companies may oppose innovation if they judge it to threaten their competitive advantage – but these other threats are more obvious to the entrepreneur or innovating corporate leader. NGOs, which are not customers, competitors or suppliers, are often overlooked or discounted (Zyglidopoulos, 2002).

Innovators overlook anti-innovation NGOs at their peril, as these NGOs are growing more effective. More powerful tactics are supplementing the more traditional, indirect NGO approach of lobbying governments for regulations on – or against – innovations (Schurman, 2004; Teegen, Doh and Vachani, 2004; Leverty, 2009; Miller, 2009). NGOs are also growing more numerous – their number has risen from roughly 1,000 in 1914 to hundreds of thousands today (Richmond, 2005; Leverty, 2009). While an NGO may have difficulty making changes that conflict with its cultural norms, adopting more effective tactics congruent with its norms does not pose such difficulties (Brown, 2009; Miller, 2009). Thus, the lobbying continues and the role of NGOs in shaping government regulation is important (Phillips, 2006). But NGOs have found a powerful new approach: that is, private politics, in which the NGO exerts direct influence over entrepreneurial companies that commercialize radical new technology. This direct approach could yield an opportunity for a new venture to gain

powerful allies, but it also presents a strong threat to companies that disregard the potential damage NGOs can do (Deri, 2003; King, 2007; Spar and La Mure, 2003; Waygood and Wehrmeyer, 2003).

Innovation, particularly the commercialization of radical new technologies such as genetically modified organisms or nanotechnology, is an inherently risky undertaking (Covin and Slevin, 1998; Calantone, Garcia and Droge, 2003; Todorovic, McNaughton and Guild, 2005; Zahra, 2005; Simmons, Thomas and Packham, 2009). Yet firms continue to invest in innovation at a rapid pace to create competitive advantage and corporate renewal (Roberts, 1999; Covin and Miles, 2007) to benefit society (Porter, 1990) or simply to survive (Peters, 1999). Innovation may be necessary, but it is helpful to practitioners and academics alike to understand the risks (Simmons *et al*, 2009). It is particularly important to learn about significant risks that exist outside the usual dominant logic of the firm (Pralhad and Bettis, 1986; Prahalad, 2004). NGO activity is such a risk – often ignored – that can blindside a company or an entire industry (Zyglidopoulos, 2002). Minor incremental innovations may not provoke NGO activity, but game-changing innovation, the sort that renews or redefines a corporation (Kim and Mauborgne, 2005; Covin and Miles, 2007) will almost certainly provoke the attention of NGOs (Luxmore and Hull, 2010). The significance of NGO involvement with business processes is further demonstrated by Levy (2008) who notes the:

‘... entanglement of global production networks (GPNs) with charged social and political issues. GPNs are thus characterized by contestation as well as collaboration among multiple actors, including firms, state and international agencies, nongovernmental organizations (NGOs), and industry associations, each with their own interests and agendas.’ (p 943)

Levy (2008) views GPNs as institutional fields with their own norms and constructs, which encompass change and agents of change, including NGOs. Bohm, Spicer and Fleming (2008) indicate that the recognition of the importance of NGOs to multinational enterprise (MNE) behaviour is relatively recent. Our framework, which includes NGOs, may help explain poor performance in innovative firms, and may also help entrepreneurs and corporate entrepreneurs (Covin and Gale, 2008) improve their chances of success.

In this article, we build on earlier work to develop a conceptual framework of how NGOs affect the success of innovation and new ventures built upon innovation (Doh and Teegen, 2002, 2003; Teegen, 2003; Teegen,

Doh and Vachani, 2004). This framework may help explain poor performance in innovative firms, and may also help entrepreneurs and innovative managers (Simmons *et al*, 2009) manage risks more rationally and improve their chances of success.

In the following section, we address NGOs, how they have evolved and their emerging role in the innovation process. We also briefly review the relevant literature. The subsequent section develops the NGO innovation framework, comparing the traditional framework of how NGOs have affected innovation with the emerging framework of how they do so now. The next section includes two industry studies, one of the agricultural biotechnology industry and the other of the emerging nanotechnology industry. We conclude with a discussion of the lessons to be learned from these two industries, and of some practical implications concerning how companies (or new ventures) seeking to commercialize radical new technology can take NGOs into account in ways that will reduce the risk of failure and increase the odds of success.

NGOs

NGOs past and present

The definition of NGOs is evolving to what an NGO is rather than what an NGO is not. Paralleling Phillips’s (2006) discussion of social enterprises, Teegen *et al* (2004) list several characteristics that delineate NGOs, including that NGOs are ‘civil society counterparts of MNEs and governments’ (p 464). Other characteristics of NGOs include that individuals associate with other like-minded individuals, that the association is voluntary, that the association has a primary goal (or goals) not attainable by individuals alone, and that the association competes for resources. NGOs are non-profit organizations that operate by providing services and advocating change through organizing, mobilizing resources and disseminating information (Doh and Teegen, 2003; Spar and La Mure, 2003). Lambell *et al* (2008) define NGOs as including any actor who is not part of the market or governmental sector. Thus, an NGO can be defined as a non-profit organization with one or more goals that is/are desired by individual members, which cannot be achieved by lone individuals, and which are not fully compatible with the goals of corporations or governments.

More recently, the growing power of MNEs and the failure of governments to deal effectively with the externalities MNEs create have driven society to turn to NGOs to voice its concerns (Bohm *et al*, 2008; Phillips, 2006; Teegen, Doh and Vachani, 2004). But NGOs do more than balance the power of MNEs; NGOs may also

(entrepreneurially) fill voids in the supply of goods and services when governments and corporations fail to meet societal needs (Teegen *et al*, 2004). Thus NGO activity is increasingly relevant to government and business (Braithwaite, 2006; Phillips, 2006; Soule, 2003; Teegen *et al*, 2004). Companies may interact with NGOs through collaborative efforts, negotiations or confrontation (Nijhof, de Bruijn and Honders, 2008; Schurman, 2004).

Typology

NGOs may be constructed to advocate a particular issue or issues, to provide service and other operational activities, or for both advocacy and operational roles. Some types of NGO are less relevant to the innovation process – such as club NGOs, which focus on creating benefits for their members. Advocacy NGOs may also benefit their members, but focus on helping external stakeholders, such as the environment or underrepresented people. They endeavour to influence decision makers through lobbying, boycotts, disseminating information, or whatever other means seem likely to produce the desired results (Teegen *et al*, 2004). These are the NGOs that may cause trouble for innovators. Advocacy NGOs serve to ‘give voice and provide access to institutions to promote social gain and/or mitigate negative spillovers from other sectors’ actions’ (Teegen *et al*, 2004, p 476). They can be collaborative or adversarial (Teegen *et al*, 2004), pragmatic or dogmatic (Soule, 2003), but most significantly for innovators, advocacy NGOs can be effective (Luxmore, 2005; Hull and Luxmore, 2007; Hindo, 2007).

One approach to coping with the activities of advocacy NGOs is to include them in the planning and governance of new ventures. Doh and Teegen (2002, 2003), Teegen (2003) and Teegen *et al* (2004) developed a three-sector approach to value creation and governance, which legitimizes including NGOs as institutional participants in the traditional business–government bargaining relationship. Taking this a step further, we suggest that including NGOs in the strategic framing of new ventures that involve radical innovation has huge potential benefits for the innovator. Excluding them, however, appears to provoke difficulties (Isaac and Kerr, 2003; Hindo, 2007).

The influence of NGOs on business has been explored largely through case studies. Several representative studies illustrate the importance of NGOs to decision making, value creation and regulation. Deri (2003) provides several examples of NGOs campaigning to change corporate behaviour. In California, Trader Joe’s grocery chain was pressured not to include genetically modified ingredients in its private label products. Other examples of companies pressured by

NGOs include Starbucks, Talisman Energy and the Gap Inc. Deri (2003, p 27) suggests that NGOs are more trusted than governments, and a large number of NGOs ‘speak out against business strategies that produce short-term profits at the expense of serious consequences to the environment and social systems’, an approach of increasingly questionable utility that is nonetheless pursued all too often by innovators (Rae, 2009).

Hart and Sharma (2004) present a study of Monsanto under attack from NGOs, consumer groups and farmers. In addition to their discussion of the tactics of the antagonistic groups and response by Monsanto, they substantiate the changing role of civil society in the business realm. They note that globalization has increased the power of MNEs as these organizations have allocated their value chain activities across nations, and has decreased the power of national governments to monitor and regulate business activity. This shift in power to MNEs creates a role for civil society, often in the form of NGOs, to fulfil the traditional role of national governments to monitor and assure regulatory enforcement. A tactical result is that NGOs now monitor and lobby MNEs as well as continuing their historic focus on governments. In addition to lobbying the government and staging protests designed to pressure the government, activist NGOs now lobby – and protest against – other companies in the industry value chain to persuade them to boycott offending corporations (Deri, 2003). They also pursue individual consumers directly, raising awareness and shaping perceptions in ways that can kill a new product before it is ever brought to market, however amazing that product might be (Miller, 2009). They may also take direct action, legally or illegally, against an offending corporation, as, for example, Greenpeace has been known to do by stealing genetically modified material or destroying genetically modified crops in the field (Miller, 2009).

Spar and La Mure (2003) discuss many NGO business cases, ranging from the Rosicrucian Order in the sixteenth century to contemporary cases such as Unocal–Burma, Nike and Novartis. The significance of these cases is the direct influence of NGOs on business. Spar and La Mure conclude that NGOs historically focused their activities on the state, but are increasingly directing pressure at ‘non-state actors and particularly at multinational corporations’ (2003, p 80). This direct pressure on the new venture itself and, potentially more critically, on its potential new customers, is the reason that NGOs are becoming a more important factor, particularly when firms are planning and executing the introduction of a radical innovation.

Schurman (2004) studied the agricultural biotechnology industry and the development of genetically modified organisms (GMOs) and derived products,

concluding that the strategic changes implemented by the corporate actors in this industry were primarily due to social movements. She explains that the effectiveness of the NGO campaigns were a result of industry structure attributes and the environmental context of Western Europe. Schurman (2004, p 262) concludes her case study by reinforcing Spar and La Mure's conclusions concerning the influence of NGOs on corporations: 'historical conditions have changed in such a way that we are now seeing more and more direct efforts to challenge and change the behavior of corporations'.

Soule (2003) also presents the case of GMO crops and NGO activism, discussing the direct and indirect effects of NGOs on corporate decision making. Soule makes a parallel argument to that of Schurman (2004) regarding industry structure and vulnerability to NGO activism. Soule's conclusion is that the influence of NGOs is increasing and 'corporations must proactively manage the framing of their concerns *vis-à-vis* a concerned public to counter unfounded, unwarranted, and undesirable claims by NGO activists' (p 153).

We note that it is the emerging methodology of NGOs that is novel, not their existence or goals. Public advocacy as expressed through social movements and collective action is not new. Rao, Morrill and Zald (2000) discuss the formation of consumer clubs in the USA during the early 1900s to combat merchants and rising consumer prices, making the point that social movements influence the creation of new organizational forms. Their focus is not on NGOs *per se*, but their discussion includes the formation of social movements, which have as a goal the resolution of social issues. Social movements may be played out in a variety of forms, such as trade associations, dispute mediation systems, professional organizations or consumer watchdogs, all of which could be activist NGOs. In the following section, we discuss how activist NGOs impact on innovation, present the current framework that represents traditional business and scholarly thought on how social activism affects innovation, then present a new framework based on emerging trends in theory and practice.

NGO innovation framework

Innovation is usually expected to benefit the adopters of the innovation, the innovating firm and society at large (Porter, 1990; Peters, 1999). However, innovations may create externalities or (uncompensated) third-party effects, some of which are costly (Swaney, 1981). A litmus test consistent with Rawls (1971) might suggest that companies should not introduce innovations without ensuring that the positive externalities more than outweigh the negative ones. A more practical approach

is to focus on those entities that may have the awareness, motivation and ability to respond effectively to any negative externalities caused by the innovation (Chen, 1996). Evaluating the likely responses, positive and negative, of the firm's important stakeholders has long been a part of strategy making (Donaldson and Preston, 1995; Freeman, 1984; Frooman, 1999; Jones and Wicks, 1999). The recent evolution of NGO tactics appears to represent an increase primarily in ability, with some concomitant increase in awareness (Deri, 2003; Spar and La Mure, 2003), rather than a change in motivation (Rao *et al*, 2000). This would appear, in fact, to represent a logical response on the part of activist NGOs to their earlier forms largely being dismissed as unimportant.

As noted earlier, a characteristic of NGOs is that they have the resources to do what their individual members could not do alone (Teegen, 2003). The very existence of an NGO focused on a new technology should thus make that NGO a concern for companies trying to commercialize the technology (Frooman, 1999; Miller, 2009). The new, more effective approaches NGOs are using, specifically oriented towards the commercialization of new technology, should make them a top priority (Soule, 2003; Schurman, 2004).

The commercialization of genetically modified organisms provides an excellent example of the dangerous new NGO approach (Soule, 2003; Schurman, 2004), particularly when compared with Rao *et al*'s (2000) description of citizens' actions and corporate responses during the introduction of the automobile. The significance of these two events lies in comparing the methodologies of the groups opposed to the perceived externalities in each case. Rao *et al* (2000), Beloe *et al* (2003), Deri (2003), Soule (2003), Schurman (2004) and Nalinakumari and MacLean (2005) substantiate the increasing role of activist NGOs in affecting corporate outcomes and subsequent decision making. Using the term 'private politics' to identify activists directly pressuring firms, rather than public politics, whereby activists work through government to alter regulations and legislation, Baron (2003, p 34) states that 'activists may increasingly be choosing private politics'. Baron (2003) quotes former Greenpeace head Paul Gilding, who identifies direct action through market participants, the consumer and other firms as superior to public politics in which firm lobbying may effectively negate activist lobbying efforts.

Our study extends the literature on the evolving role of NGOs to the innovation arena. As discussed above, NGOs affect corporate decision making directly and indirectly through the public and government. While NGOs are not new and have directed their activism at business organizations prior to modern business history

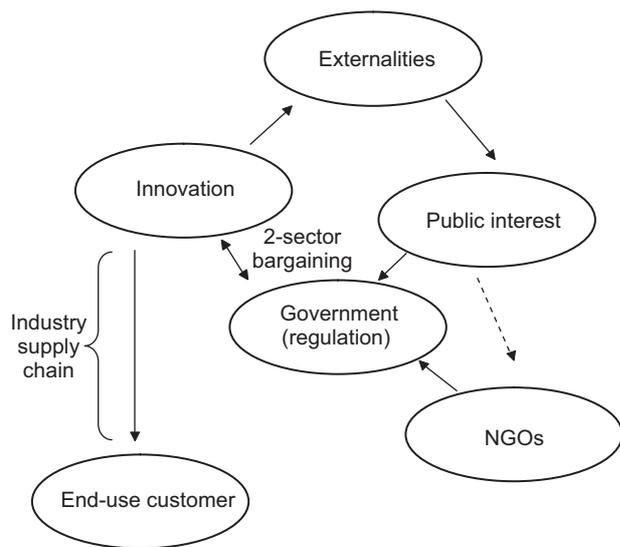


Figure 1. Traditional framework.

(Rao *et al*, 2000; Spar and La Mure, 2003), many studies indicate that the degree of NGO activism, the intensity and effectiveness of their activities and the targeting of business organizations constitute a recent phenomenon (Rao *et al*, 2000; Spar and La Mure, 2003; Doh and Teegen, 2002, 2003; Teegen, 2003; Schurman, 2004; Teegen *et al*, 2004). We first present our conceptual framework of the traditional innovation process prior to modern NGO activism, followed by a conceptual model of the emerging innovation process.

Traditional framework

Teegen *et al* (2004) discuss the two-sector bargaining model, firm–government, as a dominant bargaining framework in international business, in which government defines the institution rules and boundaries of behaviour. Rao *et al* (2000), Soule (2003) and Schurman (2004) support this framework, as their research provides examples of activist NGOs historically focused on governments to influence what those governments consider to be acceptable business behaviour. This framework can be applied to the innovation process. In Figure 1, we present a model of the traditional framework of how activist NGOs affect the innovation process.

We begin with innovation activity, which has an underlying societal expectation – or at least hope – that innovation is beneficial. But again, not all innovation delivers only benefits; innovation may also yield negative externalities. If of sufficient scale and scope, the negative externalities will provoke a response by those affected (Freeman, 1984), perhaps in the form of an organized social response or perhaps in a different, less organized response. In Figure 1, we represent this

public reaction as a solid line from externalities to public interest – negative externalities clearly affect the public interest – and a dotted line from public interest to NGOs, as not all matters affecting the public interest lead to NGO activity; nor is all NGO activity related to the public interest. Again, NGOs are not new, but the number of activist NGOs, the increased social organization and the use of private politics are (Rao *et al*, 2000; Spar and La Mure, 2003; Doh and Teegen, 2002, 2003; Teegen, 2003; Schurman, 2004; Teegen *et al*, 2004; Richmond, 2005; Leverty, 2009). The dominant NGO approach to responding to negative externalities in the traditional framework is to act indirectly through governments and the promotion of regulations (Baron, 2003).

For innovating firms applying the traditional framework, the most significant stakeholder in the case of negative externalities, other than industry-related stakeholders such as buyers, suppliers and competitors (Porter, 1990), is government, which may legislate and regulate the innovation and its industry. As Gilding stated, quoted by Baron (2003), the process of working through governments is slow and the effectiveness is poor, as astute businesses easily counter this sort of activism with their own lobbying. Thus, innovators may dismiss the government and NGOs concerned about negative externalities as relatively easy to manage. Within the traditional framework, innovation – however many negative externalities accompany it – has a better chance of succeeding than under the emerging framework, as we discuss in the next section. However, activist NGOs are goal-oriented organizations and are, like other goal-oriented organizations, unwilling to play by a set of rules that gives them little chance of achieving their goals when a different set of rules allows them a better chance (Miller, 2009). The new rule set is reflected in the emerging framework we discuss next.

Emerging framework

The three-sector bargaining model, which includes NGOs in the bargaining process, is argued to capture the emerging institution rules and boundaries of behaviour in international business (Doh and Teegen, 2002, 2003; Teegen, 2003; Teegen *et al*, 2004). Rao *et al* (2000), Baron (2003), Soule (2003) and Schurman (2004) substantiate this model, as their research demonstrates that activist NGOs have evolved beyond their historical focus on governments to include activism directed at the firms themselves. We present our conceptualization of the emerging interaction framework of companies, NGOs and governments in the process of innovation in Figure 2.

The significant differences between the two frameworks are: (1) the generation of multiple types of

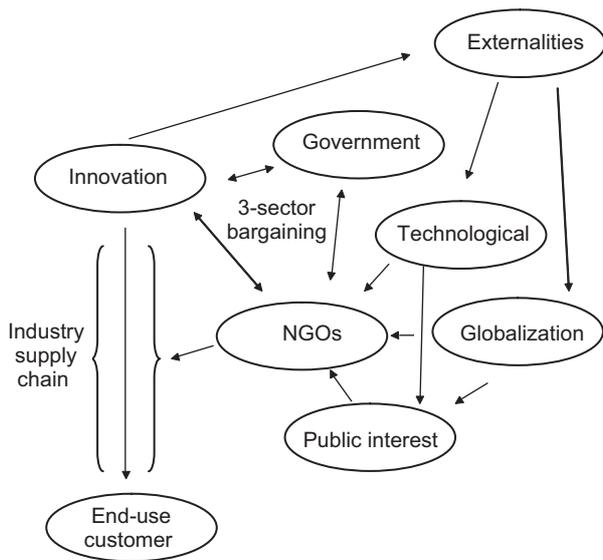


Figure 2. Emerging framework.

externalities (that is, those related to technological issues and those related to globalization issues); (2) the development of new NGOs due to public interest; (3) the existence of established NGOs that might engage in activism ahead of or coincidentally with public interest (for example, Greenpeace); and (4) the means taken by NGOs to confront business organizations (for example, the emerging framework includes, in addition to the indirect approach of lobbying the government, the emerging direct tactic of attacking vulnerable links in the industry value chain).

Two possible categories of negative externalities may exist as a result of innovation. The negative effects of new products and/or processes could include environmental degradation, harm to flora or fauna and biodiversity, health risks, food risks and other direct side effects of developing or using the innovation, all of which we include in the 'Technological' category in Figure 2. The other type of negative externality that innovation may spawn is the creation or strengthening of MNE market power, labelled 'Globalization' in Figure 2, which is being countered by anti-globalization forces (Teegen *et al*, 2004). The two categories of externalities may co-evolve from the same technology, as in the case of the agriculture industry. As Deri (2003, p 28) states, 'a company's global footprint can have a greater impact on environmental and social issues than national legislation or regulations'. Negative externalities of sufficient significance in either category will lead to social movements and collective action. This action may be undertaken by existing activist NGOs that have a vested interest in the issue or in the preservation of their own organization, or new activist NGOs may form to assume

the task. Note that under the traditional framework, still commonly applied (Hindo, 2007), positive externalities that might draw the favour of activist NGOs are not of direct significance, though recent research strongly indicates that creating such positive externalities, particularly if done deliberately, can have significant beneficial effects on firm financial performance (Hull and Rothenberg, 2008). We do not divide externalities into positive and negative, but we note that the effects of externalities can be positive or negative, depending on whether they help or hurt the public interest. NGOs may not naturally be inclined to help innovating companies whose innovations bring positive externalities, though as we discuss below, they can be motivated to do so. However, they do appear to be naturally inclined to hurt companies whose innovations bring negative externalities (Hindo, 2007; Rao *et al*, 2000; Spar and La Mure, 2003; Doh and Teegen, 2002, 2003; Teegen, 2003; Schurman, 2004; Teegen *et al*, 2004).

NGOs may directly confront the innovating firm and/or other firms in the industry value chain, and work through government institutions. NGOs are increasingly displaying a preference for direct confrontation (Rao *et al*, 2000; Doh and Teegen, 2002; Baron, 2003; Doh and Teegen, 2003; Soule, 2003; Teegen, 2003; Schurman, 2004; Teegen *et al*, 2004). However, as we discuss below, NGOs are also discovering the effectiveness of a new indirect strategy: attacking vulnerable links in the industry value chain (Schurman, 2004).

Industry studies

Agricultural biotechnology

The agricultural sector invested in biotechnological innovation activity in the 1980s, with the first genetically modified crop available in 1983 (Monsanto, 2001). During the introduction of GMOs and related feed and food products, it is likely that the innovating and adopting firms faced many of the same market difficulties confronting any innovative products. Similar to other new technologies, GMOs initially avoided the scrutiny of NGOs, were not thought to produce significant negative externalities or were subject to relatively mild and indirect concern (Krueger, 2001; Schurman, 2004). This situation changed and by the mid- to late 1990s, the industry, and in particular Monsanto, was under attack by consumers and in a direct form, by NGOs (Gupta, 2000; Krueger, 2001; Schurman, 2004). The attacks were founded on the real and perceived risks: these included safety risks such as health and environmental concerns, which we label 'Technological' issues in Figure 2; and economic and moral factors, which we label 'Globalization' issues in Figure 2 (Nottingham, 2003; Cummins and Lilliston, 2000;

McHughen, 2000; Sagar *et al.*, 2000; Saigo, 2000; Pew, 2001; PBS, 2001; Pringle, 2003). The industry participants found their strategic plans in disarray as some consumers, industry value chain participants and formal institutional constructs (namely national or regional governments) rejected, restricted and sometimes banned GMOs and derivative food products in many of the world's markets. Some firms exited the industry (Schurman, 2004), while one in particular, Monsanto, found its multibillion-dollar biotechnology strategy in jeopardy (Soule, 2003).

There are multiple contributing factors to this outcome: externalities, industry structure, political differences and in particular regional differences to the regulatory approach to risk assessment, corporate behaviour and NGO activity (Krueger, 2001; Isaac and Kerr, 2003; Soule, 2003; Isaac *et al.*, 2004; Schurman, 2004). Thus there are conditions to the efficacy of NGO activity, but this does not alter the increase in NGO activity or consider changes to the conditions in the future. It is our premise that the increase in NGO activity is a significant and emerging issue for innovation activity.

In the case of GMOs, the industry leader, Monsanto, initially engaged stakeholders, but for some reason then disengaged from stakeholder dialogue (Krueger, 2001). Then the anti-GMO war began in earnest in 1995 and escalated: NGO tactics included targeting consumers, government, technology developers and supply chain participants such as food processors and retail distributors (Soule, 2003; Schurman, 2004). The opportunity successfully to target stakeholders beyond governments and innovators, namely downstream food processors, retail distributors and ultimately consumers, demonstrates the relevance of our emerging framework discussed above and depicted in Figure 2.

The efficacy of NGO activity is due to the industry value chain structure and the disconnection between the benefits and costs of GMO technology (Soule, 2003; Schurman, 2004). The direct financial benefits generated by GMO adoption accrue to the innovator and growers, while the direct costs are borne by downstream users: food processors, retail distributors and consumers (Soule, 2003; Schurman, 2004). Additionally, downstream users do not directly benefit from ancillary factors such as environmental safety or improved agro-management practices (Soule, 2003). The anti-biotech movement was particularly effective in Europe due to the EU approach to risk assessment and management of NGOs (Isaac and Kerr, 2003; Soule, 2003) and cultural differences (Schurman, 2004).

While risk assessment practices differed in the USA and resulted in industry-favourable regulation (Isaac and Kerr, 2003; Soule, 2003), NGO activity still had success,

albeit limited in comparison with the European outcome. Gerber and H.J. Heinz agreed to discontinue GMO ingredients and McDonald's agreed not to source French fries made from GMO potatoes (Soule, 2003). In 2001, Trader Joe's agreed to remove GMOs from its private label products (Deri, 2003). At the state and local level, legislation has been passed in favour of, but also in opposition to GMOs (Pew, 2005).

Nanotechnology

There is evidence of some social movement in opposition to nanotechnology – ePublic Relations (2004) states: 'They're at it again. Activists have launched their next anti-corporate, anti-technology, anti-globalization campaign. Their target: nanotechnology . . . Should the nanotechnology industry fear these activists? Yes!' Compared with the anti-GMO movement, the anti-nanotechnology movement is small, but this could change. Guzman, Taylor and Banfield (2006) report the positions of two NGOs regarding synthetic nanoparticles: one advocates a ban on further laboratory activity and commercialization, and the other a greater emphasis on risk management. One of these NGOs, the Action Group on Erosion, Technology, and Concentration, or ETC Group, states:

'ETC Group today renewed its 2003 call for a global moratorium on nanotech lab research and a recall of consumer products containing engineered nanoparticles. There is particular urgency for those products that are ingested, applied to the body or released in the environment. The need for action is underscored following the decision by German authorities to recall a nanotech bathroom cleaner, "Magic Nano" – purportedly a product of nanotechnology.' (ETC Group)

The ETC Group does caution that the product may not contain nanoparticles, but this press release underscores the type of information that anti-nanotechnology NGOs may employ. Cobb and Macoubrie (2004, p 395) emphasize public perception and acceptance of technological innovations, and argue that 'public fears about technology risks are less about risks directly attributable to a technology than the social and regulatory context in which they are embedded'.

The lessons of biotech activism should not be lost on either innovators or NGOs. NGOs will be able to replicate and improve the anti-GMO tactics. Likewise, innovators should have an intimation of the tactics the NGOs will try and the means by which NGOs will implement their attacks: going directly to the innovating firms and other players in the industry supply chain.

Consumers will be a likely first target of NGO

activism. In a recent survey of American opinion, more than 80% responded that they had little or no knowledge regarding nanotechnology and were not worried about nanotechnology. But regarding the willingness of business to minimize the human risks of nanotechnology honestly, slightly more than 60% indicated a lack of trust (Cobb and Macoubrie, 2004). This is an obvious area of vulnerability that NGOs can pursue to instil fear in the majority of consumers before the companies are able to bring their nascent products to market (Miller, 2009).

Regarding downstream corporate users of nanotechnology, slightly more than 57% of respondents to Cobb and Macoubrie's (2004) survey indicated that medical applications were the most important potential benefit, followed by environmental clean-up benefits. Cobb and Macoubrie (2004) also found that the application of nanotechnology to the survey respondents' choice of greatest benefits was less likely in the immediate future than was the use of nanotechnology in manufacturing consumer products. This scenario parallels agricultural biotechnology, in which the application was used to provide benefits to innovators and growers (Soule, 2003), not to areas such as medicine that would directly benefit society.

This approach, again, creates vulnerability in the industry supply chain. NGOs could target corporate nanotechnology adapters if the application of the technology did not lead to measurable benefits to the buyers of the resulting consumer products. The tension between corporate benefits and consumer benefits (or costs) was used in the fight against GMOs, and Manheim (2001) suggests that the anti-nanotechnology lobby would likewise engage with this issue.

On the other hand, the cause does not appear to be lost for nanotechnology. Rather than the antagonistic approach towards NGOs adopted by Monsanto in 1995 (Krueger, 2001; Soule, 2003; Schurman, 2004), companies in the nanotechnology industry appear to be developing more benevolent relationships with NGOs: Foresight, an NGO focused on nanotechnology, not only appears to be friendly to the technology, it includes corporate members as well as individuals. The nanotechnology NGOs will not be controlled by corporations – the anti-nanotechnology activists will work through NGOs that are not – but they may be influenced by them (Freeman, 1984). By joining the NGOs, by discussing the possible risks and benefits with concerned individual members, by visibly trying to shield the public from the potential negative externalities, by bringing the benefits of nanotechnology to the consumer instead of keeping them at the corporate level – by doing all these things, nanotechnology companies may prevent the NGOs from becoming antagonistic, or may at least

keep them pragmatic rather than dogmatic (Soule, 2003; Teegen *et al.*, 2004). If some maverick nanotechnology firm follows the Monsanto approach, breaks with the NGOs and pursues an option with large negative externalities, it will have handed its competitive rivals a powerful ally: the new NGOs, capable of attacking anywhere in the industry value chain.

Conclusion

Commercializing a radical new technology such as GMOs or nanotechnology has never been easy. Our framework of the emerging mode of interaction between the innovating companies and NGOs is more complex than the older model, but the lesson is simple: innovating firms ignore or antagonize the NGOs at their peril.

A corollary is that these NGOs can be helpful if treated like an important stakeholder, particularly since social enterprises, including NGOs, typically feel excluded, disregarded and misunderstood by the world of business (Phillips, 2006). Freeman's (1984) basic message of managing stakeholders strategically is echoed elsewhere. Hamel and Prahalad (1994) emphasize the importance of listening to different voices and of building passion for your exciting new technology and your proposed direction for it – your strategic intent – in all your stakeholders. A similar message of understanding, incorporating and responding to all relevant forces in the external environment is heard in discussions of market orientation (Kohli and Jaworski, 1990; Narver and Slater, 1990). A variety of strategic approaches to partnering with NGOs are possible, but fully fledged partnerships may not be required (Nijhof, de Bruijn and Honders, 2008). It is certainly possible for innovating companies to seek out relevant NGOs with which to partner, perhaps by framing their new technology as solutions to problems facing those NGOs – designing a GMO to clean up oil spills without harming the environment might be a project that Greenpeace would support. But thinking of NGOs as potential partners and clients does not require formal arrangements. Asking prominent members of the NGOs to serve on a board of advisers for the new technology might serve the purpose. In some cases, the innovating company may have the opportunity to join an NGO focused on technology in its field or on a problem its technology might address. In such cases, companies should think long and hard before choosing not to participate in these NGOs (*Nature*, 2008; Luxmore and Hull, 2010). But regardless of formal or informal alliances with NGOs, active participation in decision making by leaders of NGOs, or even membership in NGOs, innovators may be attacked by other NGOs even if they are doing everything right (Nijhof *et al.*, 2008; Miller, 2009).

Having credible NGOs to support them in such a case will be valuable to innovating companies. Although long-term alliances with the innovator may actually reduce the credibility of a partner NGO (Nijhof *et al.*, 2008), such alliances help the case that the company is doing everything right. But perhaps the most effective solution, particularly given that the new approach of activist NGOs is to pursue weak links in industry value chains, is to target these weak links themselves (Miller, 2009). In short, we recommend a product development focus on all stakeholders, including consumers and the natural environment, even if the target market is limited to large corporations. We also recommend marketing the technology to the public, with full disclosure of the drawbacks of the technology, strong emphasis on the company's NGO support and the basis for that support, and a clear explanation of the benefits offered by the technology to all stakeholders (Isaac and Kerr, 2003, 2004; Hull and Luxmore, 2007; Miller, 2009). Entrepreneurs who start with the support of NGO allies may have an easier time doing this than established companies seeking to innovate with a track record of antagonizing NGOs, but changing to this approach can help the most antagonistic company mend fences with NGOs over time (Hindo, 2007).

The traditional framework might be interpreted to suggest that NGOs and activists lack the awareness and ability to be effective stakeholders. The emerging framework allows no such suggestion. If friendly, NGOs can help provide crucial market information, product endorsements and even legislative assistance. If hostile, NGOs can strike without warning anywhere in the innovating company's value chain. Based on what industry (ePublic Relations, 2004) and academic sources (Miller, 2009) tell us about activist NGOs, it would appear that any externality will be of concern. Since any significant innovation will by its nature change things, creating externalities, it would follow that any significant innovation would draw the attention of NGOs one way or another. Nijhof *et al.* (2008) suggest a variety of ways of approaching NGOs, depending on the company's strategy and the nature of the NGOs, but a common thread in all approaches to NGOs and innovation is that it is best to involve the NGOs proactively as early as possible. Protestors outside the door are not just part of the cost of doing business any more – they are a sign of failed strategic intent, of a lack of market orientation. To commercialize a radical innovation successfully, a company must first invite the protestors in.

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