

Innovation and Achieving Market Acceptance: Genetically-Modified Organisms in Agribusiness

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Abstract

Though some markets are relatively free of profit-blocking restrictions, most markets impose strong barriers to the introduction of genetically engineered crops and foodstuffs. Agrochemical firms that have invested significant resources in biotechnology applications encounter varying degrees of market access and acceptance. Some external stakeholders remain skeptical of the technology, with their refusal to accept it hurting innovators' returns on investment. We explore the tension between the social rationality perspective and the scientific rationality perspective on this issue. Critically evaluating the benefits of each perspective to innovation efforts, we make several theoretical and practical recommendations.

Introduction

The ways environmental pressures and business decision-making interact have been much-discussed, as has the more specific relationship between corporate social performance and financial performance (Gray, *et al.*, 1995; Waddock and Graves, 1997; Hoffman, 1999; McWilliams and Siegel, 2000; Payne and Calton, 2002; Subhabrata, *et al.*, 2003; Luxmore, 2005; Vogel, 2005). Luxmore (2005) takes the discussion in an interesting new direction by examining the negative environmental factors that surround certain innovations in agribusiness – factors which have little effect in some markets, but which lead to the innovations being banned in others. The model he develops is suitable for understanding any industry in which companies – or the industry as a group – have found themselves facing extremely negative reactions to a major innovation.

However, his model does not fully account for the reasons for such a negative reaction to potentially beneficial innovation, and such an understanding is necessary to reducing such opposition, and to preventing it in future introductions of radical new technology. Genetically modified organisms (GMOs) and genetically modified (GM) crops, despite their promise of hardier crops with better and more plentiful yields which could do much to feed an ever-growing world population, have received a cold welcome (Barnett and Gibson, 1999; Saigo, 2000; Pew, 2001; Baumuller, 2003; Isaac and Kerr, 2003; Luxmore, 2005). It is our intent to extend our understanding of the problem of extreme hostility to a new technology.

We consider this problem from two perspectives, that of *scientific rationality* and that of *social rationality*.

The scientific rationality focuses primarily on aiding the progress of technology, with some attention to safety and the general welfare, while by contrast, the social rationality perspective focuses on the safety of the technology, its associated processes, and potential side effects of either (Isaac and Kerr, 2003). Scientific rationality advocates the advancement of science and the introduction of new technology. Social rationality advocates the greater good of society. The underlying goals of these perspectives are not, in principle, contradictory, but in practice social and scientific rationality may collide, as has happened in the case of GMOs and the related technology (Isaac and Kerr, 2003).

In the following section, we briefly lay out, in the context of these two perspectives, the issues surrounding the introduction of genetically-modified organisms. We then explore the scientific rationality approach and the social rationality approach and discuss their relative merits in the context of agribusiness in particular and industries introducing radical innovation in general. This discussion is followed by strategic implications and conclusions.

Two Perspectives on Innovation

The genetic engineering of new organisms is a huge change for the agricultural industry, potentially the biggest change in thousands of years. When an industry has rested in relative equilibrium for a long time, a punctuation of that equilibrium produces a major shock that typically eliminates the existing competitors, leaving the industry with an entirely new cast of players (Tushman and Anderson, 1986; Christensen, 1997; Christensen and Raynor, 2003) – not so much because the incumbents lack the resources to compete in the new industry as because they lack the mindset to adapt to the new rules of the game (Hamel and Prahalad, 1994). The immense potential for genetic engineering in the agricultural and pharmaceutical industries (Luxmore, 2005) implies a shock of earthquake proportions extending across multiple industries. The question of whether any of the existing players in these industries will be able to survive this shock and be major players in the resulting new industry is of considerable interest.

The mindset of the existing players can perhaps best be illustrated by the choice of what new organism to introduce to the world. Genetically-modified organisms were first introduced in the form of a new tobacco plant with genes for resisting antibiotics (Monsanto, 2001). From the scientific rationality perspective, this was clearly a reasonable approach: it proved the technology worked by increasing profits for the tobacco industry, and the potential threat posed by releasing genetic codes for resisting antibiotics into the ecosphere could be considered negligible. However, from the perspective of social rationality, the long-term wisdom of the approach may have been questionable.

Consider the social value of increasing the profitability of carcinogens. Consider, also, the effect of linking genetically-modified organisms to tobacco – itself one of the most famous examples of proponents of the scientific rationality perspective deliberately suppressing evidence of the harmful side effects associated with their product. Tarrred with this brush, genetically-modified organisms and the arguments in their favor rooted in the scientific rationality perspective were doomed to a hostile reception. Subsequent, more socially-desirable approaches (Barnett and Gibson, 1999; Pew, 2001; AGBIOS, 2002) have perhaps alleviated the damage somewhat, but it still remains.

The World Trade Organization rules concerning new technology can be boiled down to a single principle with two rather different interpretations (Isaac and Kerr, 2003; Luxmore, 2005). This principle holds that regulators must be cautious in the face of uncertainty and insufficient scientific evidence. In countries which regulate genetically-modified organisms according to scientific rationality, this principle is interpreted much more liberally – an insufficiency of scientific evidence that the technology is harmful might justify lax or no regulation, allowing companies to rapidly develop and deploy radical technology. Countries operating under social rationality may interpret the same principle differently, taking the view that in the absence of scientific evidence for the safety of the new technology, the technology should be closely regulated, or banned outright (Luxmore, 2005).

The potential threats of genetically-modified organisms range from hazards to human health to the destruction of the natural environment, from economic issues to social and ethical ones – and the potential benefits are equally far-flung, from food and medicine for everyone in the world to a vast reduction in the use of toxic pesticides and harmful chemical fertilizers (Nottingham, 1998; Barnett and Gibson, 1999; McHughen, 2000; Pew, 2000; Saigo, 2000; PBS, 2001; Pringle, 2003; Schmid, 2007). But the benefits and threats seem never to be weighed equally by any two parties to the debate.

McHughen (2000) and Luxmore (2005) offer persuasive arguments for genetically-modified organisms and present strong cases for disregarding the arguments against them inspired by the social rationality perspective. However, their arguments depend on the reader sharing the scientific rationality perspective (Isaac and Kerr, 2003; Luxmore, 2005). Given the unfortunate antecedents of such arguments – “scientific proof” that tobacco, asbestos, or radiation is not harmful – it is perhaps unsurprising that despite their eloquence, those who prefer the more conservative social rationality approach remain unswayed.

As long as the social rationality perspective endures and agribusiness maintains its exclusive reliance on scientific rationality, those opposed to genetically-modified organisms will remain active. And they will win. When buyers cancel their wine order for this year from companies which might start offering wine from genetically-modified grapes in fifteen years (Goering, 2006), we know that genetically-modified organisms are in trouble. Luxmore (2005) advocates a public relations campaign to turn the general public away from social rationality and towards a scientific rationality perspective on genetically-modified organisms. We think that a large-scale public relations campaign is called for, but we propose a different objective. Rather than attacking the underlying assumptions of social rationality, companies trying to bring genetically-modified organisms to market must change their own mindsets and incorporate social rationality into their decision-making – and focus the public relations campaign on highlighting their newfound social rationality. It is only by embracing the social rationality perspective, finding arguments for their cause within its framework, and challenging their opponents on their

own ground that GMO proponents will be successful. The alternative, wishing the social rationality perspective would go away, has thus far been remarkably ineffective.

A Pragmatic Approach to Choosing a Perspective on Innovation

Consistent with Freeman (1984) and Shankman (1999), we define stakeholders as those entities affected by or capable of affecting an organization's actions or success. Legitimacy is one of the three major factors to consider in evaluating a stakeholder – how legitimate is that stakeholder's concern with the organization's activities? (Donaldson and Preston, 1995; Szwajkowski, 2000; Harvey and Schaefer, 2001; Jawahar and McLaughlin, 2001). According to the scientific rationality perspective, the anti-GMO forces, while urgent and evidently powerful, lack legitimacy. The social rationality perspective, while also suggesting these forces are urgent and powerful, grants them legitimacy. Thus, the scientific rationality perspective currently employed by the agribusinesses trying to commercialize GMOs suggests dismissing the concerns of these stakeholders, while the social rationality perspective suggests including them in decision-making. Even if one does not consider the social rationalist concerns to be legitimate, it still seems clear that pursuing the scientific rationality perspective is having a detrimental effect on the bottom lines of companies in this industry. It may seem opportunistic to suggest a change in perspective to accommodate the bottom line, but managerial obligations to shareholders may require a shift to the social rationality perspective if the latter is necessary to maximize profit.

Consistent with Luxmore and Shaw (2003), Soule (2003) and Luxmore (2005) we will focus on non-government organizations (NGOs) active against the use and spread of genetically modified crops, foodstuffs, and other potential GM products. Indeed, Teegen, Doh and Vachani (2004) argue NGOs are an increasingly important element to corporate decision-making. Within the context of our study, the legitimacy of NGOs to the GM regulatory issue and strategic management processes varies according to whether one uses the scientific or social rationality perspective.

As they first introduced their innovation, agricultural firms presumably considered external stakeholder groups, but they failed to recognize the determined and organized opposition they were to meet. As noted by Luxmore (2005), anti-GMO stakeholders – NGOs and other hostile organizations – can slow or stop an innovation's entry into a market, yet the companies introducing genetically modified organisms failed to anticipate or even recognize the power, legitimacy, and urgency of these stakeholders who would prove to be so inimical to their success. Recognizing and identifying these stakeholders is crucial to successfully introducing any major innovation, particularly when social rationality may be the perspective from which it is judged in the marketplace – as is very likely. The scientific rationality perspective, under which the concerns of NGOs and the perspective that drives them is inconsequential, appears to have missed a very real concern – and continues to ignore it. Meanwhile we see the opposition enacting agreements such as the September 2003 Cartagena Protocol, which specifies a social rationality interpretation of the WTO principle (Baumuller, 2003; Isaac and Kerr, 2003; Luxmore, 2005).

Companies seeking to introduce genetically-modified organisms want to influence regulations on a national or international scope. To do this, they must convince NGOs and other hostile stakeholders that the social benefits of commercializing their new technology are high, and that they will minimize the associated social costs (Luxmore, 2005). It cannot do this while using the scientific rationality perspective to attack their legitimacy; it would do far better to adopt the social rationality perspective and treat these stakeholders as legitimate.

Implications

Though we have focused our discussion on the major new innovation in the agricultural industry, the implications apply not only to this industry, but to any industry preparing to implement a major new process technology. Any such implementation, even one on a smaller scale, will encounter stiff resistance, perhaps fatally so, if the proper steps are not taken (Prakhya and Hull, forthcoming). The agricultural industry continues to face huge challenges in marketing its innovation, and so will any other industry which follows its example. Radically new technology creates social issues, on which powerful stakeholders will form opinions based on their own perspectives. These perspectives are unlikely to be the same as that of the companies introducing the technology. The companies need to include – not ignore – these potentially hostile stakeholders if they want to innovate successfully. Unfavorable regulations or outright bans in many nations and regions have come about because of an unfortunate approach on the part of the industry to managing its relationships with its external stakeholders.

The issue is legitimacy. Companies introducing radical innovations, even radical process innovations, need to persuade external stakeholders that the new technology is safe and beneficial, and that switching to the new technology will do everyone – not just the companies themselves – good in the long run. The prevalence of the scientific rationality perspective among companies in the agricultural industry to the exclusion of the social rationality perspective has hurt them. Seeking to delegitimize the NGOs and their concerns rather than address and incorporate them, has forced the NGOs in turn to adopt extremely hostile stances to the detriment of the industry. This outcome is particularly ironic given that the most objective scientific analysis to date has concluded that pursuing social responsibility is beneficial to the bottom line (Waddock and Graves, 1997) or at least neutral with respect to firm financial performance (McWilliams and Siegel, 2000).

Overreliance on the scientific rationality perspective has resulted, in many cases, in a complete inability to enter many markets. This problem has not escaped notice, and some solutions have been proposed (Luxmore, 2005). One proposed approach would be to continue providing scientific evidence to all concerned stakeholders. McHughen (2000) and Luxmore (2005) believe that if enough technical knowledge is offered to them, now-wary consumers will change their minds and choose to support the use of genetically-modified organisms based upon rational analysis.

But of course, NGOs mount their own campaigns to persuade based on rational analysis. The difficulty with rational analysis is that it reaches different conclusions depending on initial premises, which may not be chosen logically. No public relations campaign which does not start from the premises of social rationality rather than those of scientific rationality will be successful in persuading social rationalists to change their minds. As the reverse is also true – social rational arguments are unlikely to sway scientific rationalists – it would make strategic sense for agribusinesses to invest some resources in maintaining their existing public relations campaigns, but to put more resources into embracing the social rationality perspective, to use it in their decision-making, and to publicize that shift. Doing so will open new markets and ease outside regulation as the industry becomes more trusted to regulate itself (Cummins and Lilliston, 2000; Sagar *et al.* 2000; Luxmore and Shaw, 2003).

Conclusions

With genetically-modified organisms, the agricultural industry is trying to introduce one of the biggest innovations in the history of humanity – an innovation worth considerable study among academics and society at large. As with any world-shaking technology, the introduction of GMOs has given rise to new issues, and social concern is a natural response. Social concerns have mobilized opposition to genetically-modified organisms because the industry's response to date has provoked intense, passionate, negative attitudes towards GMOs. We propose a solution.

The threat of increased regulations (Miles, Munilla, and Covin, 2002, 2004) under the social rationality approach has been generally disregarded as illegitimate (c.f., Luxmore, 2005). As this disdainful approach has restricted market access worldwide, it should be rejected. To compete and make a profit, agricultural companies commercializing this technology should approach their use of the new technology from a social rationality perspective. Doing so will reshape their strategy, particularly in the short term, but in the end they will reap the rewards of legitimacy.

An industry that remains hostile to the social rationality perspective will not succeed in convincing external stakeholders to change their positions on radical innovations such as genetically modified organisms. Strategies will fail, or fall short of potential, and companies will struggle to subsist while simultaneously trying to explain, within the scientific rationality perspective, what cannot be explained from this perspective. It is by adopting the social rationality perspective that these companies will succeed.

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