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**Gaining Societal Acceptance of Biotechnology: The Case for Societal
Engagement**

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Abstract

The acceptance of GMO's by society is critical in terms of the evolution and use of the technology because without it, companies have no social license to operate. But gaining societal acceptance in the new media era may pose special challenges and require unique strategies. Public engagement is one strategy for gaining societal acceptance. Companies that deal directly with the majority of society (e.g. food companies) mount public engagement initiatives. Companies commercializing genetically modified (GM) crops have up till now mounted more traditional corporate affairs initiatives aimed at deregulation goals and not societal acceptance *per se*. Approaches including food democracy, GM labeling and transparency and dialogue will be required to achieve greater societal acceptance of GM crops.

Key words: GM foods, societal acceptance, media

Introduction

Throughout history disruptive technologies from electricity to automobiles have often faced challenges in terms of societal acceptance. These challenges have been driven by a range of factors including fear of the unknown and skepticism of proponents. Biotechnology, and specifically genetically modified organisms (GMO's) are recent examples of this phenomenon. In the past, societal acceptance has come with experience and use of the technologies and a direct realization of costs versus benefits. With GMO's, the societal acceptance equation may be different for a variety of reasons. First, most of society (aside from farmers) does not use GMO's and so they have no way to directly assess their value or costs. Secondly there is effective activist opposition to GMO's that has been tremendously facilitated by the advent of social media, the decentralization of media and society's new relationship with media. The acceptance of GMO's by society is critical in terms of the evolution and use of the technology because without it, companies have no social license to operate. But gaining societal acceptance in the new media era may pose special challenges and require unique strategies. Public engagement is one strategy for gaining societal acceptance. Companies that deal directly with the majority of society (e.g. food companies) mount public engagement initiatives. Companies commercializing genetically modified (GM) crops have up till now mounted more traditional corporate affairs initiatives aimed at deregulation goals and not societal acceptance *per se*. As GM crops enter a third decade of commercial use the issue of societal acceptance remains prominent. Societal acceptance impacts the coexistence of GM and non-GM crops because coexistence is driven by societal desires and political will.

1. Public concerns over GM crops

The novelty and wonder of GM has been both a boon and a challenge for companies developing GM crops. This technology has opened the door to endless possibilities but the extent of its novelty can be an opportunity for opponents to level open ended criticisms. To some extent as a result of this, proponents of GM crops (both in science and industry) have argued that GM is an extension of traditional breeding methods (Herdt, 2006). They note that humans have been genetically modifying crops for millennia and that GM technology is an extension and facilitation of natural breeding. At the same time, however, GM crops are patentable, emphasizing that the process is truly novel and different from natural breeding (Boucher, 1999). In addition, expert technical assessments acknowledge the unique and novel nature of GM (Taylor 2007). This situation highlights the conundrum and challenge of not only introducing disruptive new technologies into society but having such technologies accepted by society.

Public concern over GM crops is focussed on not just one issue. Typical concerns can be categorized into three general areas; human health, the environmental and the economy. Within each of these areas, concerns can range but they often coalesce around more colloquial and broad societal issues. Examples of these include; consumer choice, feeding the world, and seed ownership.

1.1. Consumer Choice

Food is the most intimate commodity for consumers. Having a safe and sustainable food supply and ability to make choices in this regard, is important to people. Fears of GM are forcing both agriculture and food companies to consider GM in marketing decisions (Blaine & Powell, 2001; Rotolo et al., 2015). Consumer satisfaction is a traditional core pillar of sustained sales and prominent food companies invest tremendously in promoting their brand to maintain consumer loyalty. Understanding the market in terms of brand perceptions by the public are new challenges that GM technology companies are facing, and this is very difficult when these companies are business to business companies and not business to consumer companies.

It has been suggested that the acceptance of GM crops in a given jurisdiction is a function of public familiarity with GM as well as the level of public trust of regulatory authorities (Vigani and Olper, 2013). It might be argued that GM crops have gained the least public acceptance in the European Union (EU) compared to the other countries around the world (Mann, 2015). Fischer et al. (2015) noted that the extent of GM food on the market in EU member states is based on common public opinion rather than GM food safety assessment. Mann (2015) corroborates this idea and noted, for example, that because of public opinion there are no GMO's products on Swiss food market shelves. Pinstrupt-Anderson (1999) suggested that due to the high productivity of GM crops,

low-income developing nations would want to cultivate GM crops. However, a recent study by Inghelbrecht et al. (2014) highlights that the approval of GM crops in many developing nations has been slowed due to a recognition of a lack of public acceptance of GM crops in the EU and fears over how this might impact agricultural exports. Lending credence to these fears are cases of market rejection driven by consumer fears. Notable amongst these was the withdrawal of GM Bt potato (NewLeaf™) varieties from the market because the two largest buyers of processing potatoes in North America (Frito-Lay and McDonalds) were fearful of potential consumer rejection (Kynda & Moeltner, 2006).

1.2. feeding the world

Critics of GM crops have questioned their necessity in terms of agricultural productivity to feed the world (Gilbert, 2013). They point to studies that have shown that current agricultural output far exceeds global calorie needs and that distribution, access and waste are the key limitations to feeding those who are hungry (Altieri, 2005). Counter to this is the firm evidence of the extent to which agricultural technology has transformed agricultural productivity over the past 200 years leading to productivity levels that create the possibility to feed the world, other issues aside (Pingali, 2012). It is the denial of the reality of the impact of technology on agricultural productivity that can be frustrating for proponents of GM crops, especially when the rapid adoption of GM crops has been shown to also provide proven economic benefits in the near term (McGloughlin, 1999). None the less, feeding the world is a complex issue which makes it a challenging issue in terms of public engagement and alignment.

1.3. Seed ownership

The modern crop seed business is global in scope and scale and has been tracking in this direction for many decades. The juxtaposition of GM technology and consolidation in the seed industry has provided another avenue of criticism for GM technology. It is true that a relatively few seed companies control a majority of seed sales for the world's major crops (Schubert, 2011), but consolidation is not unique to the seed business. In terms of public perception however, seed ownership, because it is for food crops, may create extra sensitivity. Fischer et al. (2015) noted that the issues of private industry control and intellectual property rights over seeds have been linked to the idea that this may limit farmer access to seed and the wellbeing of farmers, especially in low-income countries, by opponents of GM (Mosher & Hurburgh, 2010). In addition, efforts by GM seed companies to protect their patented seeds through court actions have created cause victims for GM opponents (Marvier & Van Acker, 2005; Semal, 2007; Kershen 2013) and further challenges for public engagement.

2. The Media and Public Trust

The media has been accused of having a negative bias against GM and of dramatizing risks and serving as a risk amplifier in this regard (Hobbs & Plunkett, 1999). The media has also been accused of fabricating the idea that government regulatory agencies are influenced by co-opted scientific advisors. Marques et al. (2015) argued that trust in scientists and regulation organizations is critical to overcoming the influence of media and in shaping public attitudes toward GM foods. Frewer et al. (2002) established this idea more than a decade earlier in regard to GM technology and risk communication specifically. This idea is critical because public trust, generally, in science and scientific institutions has been declining since the 1950's (Cvetkovich & Lofstedt, 1999). For GM technology companies, the key point to note is that the perceived benefits associated with a potential hazard together with trust in regulatory bodies has a very strong combined effect on public behaviour and acceptance of technology (Blaine & Powell, 2001) and the media has a key influence on what the public perceives (McCluskey et al. 2015). Factors such as whether the risk is dreaded or catastrophic affect the public's judgment and perception of the risks or benefits of GM foods (Blaine & Powell, 2001). And this is not accounting for wild cards. For example, the high profile but highly criticized study by Seralini, et al. (2013), fueled unprecedented public concern and resulted in government action in the EU where new long term feeding studies were initiated (deVriend & Spok, 2015).

3. Public engagement and societal acceptance of GM foods

Agriculture and food is a continuum that is generally understood by the public and as such, the public readily links GM seeds to food. Therefore, although consumers are typically not customers of GM seed they are easily drawn to the issue of their acceptance in society. GM technology companies have up till now mounted more traditional corporate affairs initiatives aimed at deregulation goals (Gilbert, 2013) and not societal acceptance *per se*. Societal acceptance of GM technology requires engagement beyond the customers of GM seeds. Societal engagement could be facilitated, for example, by the consideration of food democracy approaches, the labelling of GM foods, and through transparency and dialogue.

3.1. Food democracy

Food democracy is a concept founded on the rights of all people to sustainable, safe and adequate food supply (Lang, 2009). Critics of GM argue that agribusinesses are trying to control seed and food rather than support food democracy (Inghelbrecht et al., 2014). Proponents of GM technology argue that GM technology facilitates an affordable and reliable food supply in the world (Apel, 2010). Proponents of food democracy note, however, that the definition of the concept of food democracy is expanding, in particular in wealthy nations where food culture links a multitude

of desired characteristics to food and is summed up succinctly by Pollan (2006) who describes the increasing demand from consumers to have food that is good to eat and good to think [about].

In practice, food democracy has five dimensions (Hassanein, 2008): meaningful participation, knowledge of food systems and their facts, common talk and sharing ideas, an ability to have a relationship with food and promoting the well-being of the community. These dimensions can be considered for possible successful co-existence of GM food in the market. Moore-Lappe (2007) the founder of the small planet organization promotes a number of practical arts to promote democracy, including food democracy (Table 1). These tools could be used to gain public acceptance of GM foods by GM technology companies.

3.2. Labelling of GM Foods

In all EU countries and other countries including Japan, Malaysia, Australia and New Zealand, food products being produced from GMO's have to be labelled to inform consumers, but in the US and Canada there is no mandatory labeling requirement (Mann, 2015). Proponents of labeling believe that consumers have a right to know this detail about the ingredients of their food (Esposito & Kolodinsky, 2007). Opponents to labeling of GM food argue that the labels would be burdensome to retailers, would force prices to rise and would confuse people (Moschini, 2008; Marsh et al. 2013). A recent study on labelling GM corn in the US showed that some people did interpret the GM label as risk and were therefore less likely to purchase (Philips & Hallman, 2013). And consumer knowledge in this regard is an issue. In this same study, researchers provided additional information stating "GM: it has 14% more protein than non-GM corn" and still people reacted negatively commenting that they were worried about what additional protein in corn might do to their health. Additionally, when the corn was labeled as "GM corn: reduced pesticide" some people did not want to know or be reminded that pesticides are used in agriculture while others commented that they did not want to eat something that kills bugs. So although labeling of GM foods can facilitate choice and transparency it is may or may not be an aid to societal acceptance.

3.3. Transparency and Dialogue

When society is engaged and well informed on an issue there is opportunity for reasonable progress and maximum realization of benefits to society. In the case of GM, acceptance by society is far from congruent or universal (National Academy of Sciences 2015). Transparency and dialogue are key tools for facilitation and for developing agreement amongst fractious parties. Food philosophies are dynamic, universal and varied. Some emphasize markets, others citizens. The Green Revolution centred on food availability, hunger and unmet need. A new or 'emerging' more complex food and agriculture development paradigm is centred on sustainability and the desires of individuals. This is being coupled to the balkanizing power of decentralized and democratized

media platforms. On the positive side the latter allows for new opportunities for transparency and dialogue. On the negative side it is an opportunity for too much noise and blurred reality. Still, transparency and dialogue, most critically, allow for combined understanding and perhaps even an opportunity for co-creation (Leavy, 2014), a concept which is current in terms of corporate engagement strategies. Co-creation considers whether proponents of GM understand the full picture and ask whether a partnership with society is perhaps required to achieve societal acceptance. Dialogue also helps to overcome systemic issues including semantics and epistemic positioning.

4. Conclusions

GM is one of the most significant technology introductions to modern society and this fact warrants a serious consideration of the importance of societal acceptance of this technology. Proponents of GM crops argue that the technology can make a vital contribution to increasing agricultural production, improving livelihoods, and enhancing food quality. In contrast, critics believe that GM technology undermines seed and food security and that hunger is largely dependent on lack of access to food, not on overall production. There is a need to bridge the gap between these positions and that may then be a path to societal acceptance.

Table 1. Practical tools in democracy (adopted from Moore-Lappe, 2007) that can be used to engage the public in relation to GM food

Tools	Definition
Active listening	Searching for the meaning, openness to public concerns and criticisms
Creative conflict	Sharing with others in ways that produce value for all
Negotiation	Problem solving to meet at least some interests of all involved
Public dialogue	Talking clearly about GM food matters (e.g. being clear about the nature of the technology)
Public imagination	Picturing a future based on reality not scarcity of good and goodness
Public judgment	Allowing the public to make choices
Celebration	Enjoying what we learn and achieve
Evaluation	Assessing achievements and measuring them against values

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