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Shyama V. Ramani and Vivekananda Mukherjee

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by

Shyama V. Ramani
UNU-MERIT
Keizer Karelplein 19
6211 TC Maastricht
The Netherlands
ramani@merit.unu.edu

and
Ecole Polytechnique
F-91128 Palaiseau Cedex, France

Vivekananda Mukherjee
Department of Economics,
Jadavpur University,
Calcutta 700032, India
mukherjeevivek@hotmail.com

ABSTRACT

Do firms need to sacrifice profit while innovating in order to further social objectives, as corporate social responsibility (CSR) would seem to suggest? To answer this question, the paper compiles a classification of innovations according to market impact and CSR potential. Then it details case studies of two market changing (MC) innovations in India: genetically modified cotton of Monsanto and a drugs cocktail for HIV/AIDS of Cipla. It demonstrates that the CSR potential of an MC innovation can directly serve to increase profits and augment bargaining power in conflicts if it is supported by a robust business model.

Key words: CSR, Monsanto, CIPLA, Innovation.

JEL Codes: M14, O32

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1. Introduction

While the virtues of corporate social responsibility or CSR as a means to increase firm profit are being widely discussed in business and academic circles, its newness as a possible norm for carrying out the diverse activities of a firm, envelops the application of CSR in 'strategic' and 'market' uncertainty. Firms are experimenting to discover the right CSR practices in terms of scope and scale, as a function of their history and resource base and the nature of the markets in which they operate. CSR ratings of firms are mostly derived from an evaluation of corporate governance and the voluntary routines adopted towards environmental security, management of climate change, maintenance of good relations with clients and suppliers, fair human resource management within the firm, and finally corporate philanthropy. Thus, it is not surprising that the existing literature on CSR practices also mainly focuses on these parameters with only a passing mention of innovation strategies. It seems unlikely that even firms evaluate the CSR potential of an innovation, while formulating their R&D investment decisions. Yet we know that major technological innovations with the potential to change the structure of a targeted market, referred to in this paper as 'market changing innovations' (or MC innovations), can augment firm profit as well as societal welfare. Recognition of the CSR potential of an MC innovation can yield high dividends to firms with foresight. Thus, the present paper hopes to contribute to a better understanding of these issues through detailed case studies of the diffusion of two MC innovations in the context of deep poverty.

In conventional economics, as exemplified by the writing of the Noble Laureate Milton Friedman, there is a strong theoretical argument that a firm's responsibility to society must be limited to compliance with existing regulations; anything over and above would be an encroachment on the rights of the State and act against the interests of shareholders (Friedman, 1970). According to this line of reasoning, diversion of investment by corporations to improve social welfare would have a negative effect on the profits of the firm; consequently the value of the shareholders' investment would not be maximized, and ultimately investment and social welfare would also fall. By extension, this implies that CSR in innovation creation should be limited to an engagement in R&D such that the innovation creation process conforms to accepted ethical norms and legal regulations.

However, this standard view is more and more questioned by empirical findings as well as theoretical work (See Kakabadse, Rouzel and Lee-Davies, 2005 for a survey). Firms themselves are also observed to hold the view that they should go beyond their traditional roles to take up some social responsibilities. For example, an official document of Novo Nordisk, world leader in healthcare, explains that "As such, social responsibility is more than a virtue – it is a business imperative" (Novo Nordisk, 2003). Finally, societal expectations of corporations are clearly embodied in the plan proposed by the former UN Secretary General to achieve the Millennium Development Goals, in which he delineates the role of corporations as being not only to help developing country governments achieve the Millennium Development Goals by using their more efficient and often larger network, but also to influence their governments to pursue such goals (United Nations, 2005).

The interrelationships between CSR and the innovation strategies of firms' merits study because as our economies become more knowledge intensive, the rate of generation of MC innovations is rising, and they are also increasingly being held responsible for imposing high costs on society, which can be better managed by a more astute application of CSR. We illustrate this argument with four emblematic examples.

Negative externalities can be generated during the course of innovation creation. The trials and experiments associated with the commercialization of genetically modified Starlink corn seeds by Aventis during the late 1990s (before it was purchased by Bayer in 2002) and Bt-10 maize seeds by Syngenta in the first years of this millennium led to contamination of non-genetically modified seeds for foods and feeds (Clapp, 2008). While the firms concerned paid a heavy price, the long term effect on human health and world biodiversity is still uncertain.

Innovation can upset age old practises. In 1998, Delta & Pine Land, a seeds company later acquired by Monsanto, was granted a US patent for its 'Terminator' seeds, which were a very robust but sterile variety of seeds. In other words, any farmer using this variety was forced to go to the market to buy new virile seeds each season instead of continuing with the age old tradition of sorting and saving seeds from a harvest for future planting. Had Terminator seeds been successfully commercialized in the Third World, developing country farmers could have become extremely dependent on the seeds supplied by Monsanto, the seed of conventional plants could have been polluted and the livelihood-risk of the agrarian community could have increased greatly (Niiler, 1999; Specter, 2000; Robin, 2008). World wide protests against 'Terminator technology' eventually led to its ban in developing countries.

Activists can be provoked to stage protests whenever danger is sensed either to the natural environment or any stakeholder, even in State supported projects. For instance, in the town of Crolles in France a state of the art research centre was set up overlooking the French Alps in 1990 and the best water of the region was provided to STMicroelectronics, under the aegis of the local government and the 'Atomic Energy Commission' of France. Though, STM has adhered to environmental regulation and invested in water purification plants and generated hundreds of jobs in the Grenoble region, there have been steady protests against STM and an activist group called the PMO has been formed. The latter is continually protesting against the capture of local resources, environmental degradation and potential risks of conducting experiments and producing products based on nanotechnology (Vinck, 2010; documents of PMO from http://www.piecesetmaindoeuvre.com/).

Civil strife can be initiated by the commercialization of an innovation. Tata Motors, one of the oldest and respected companies of India, renowned for its investment in CSR and corporate philanthropy, unveiled its 'Nano car' costing only $2500 in January 2008. Plans were underway at the time to open a large manufacturing unit on land obtained from farmers in Singur in the State of West Bengal in India. However, the relocation of farmers was not done correctly and it caused civic strife, violence and heavy casualties. Thus, the plant relocated to another State of India (Chattopadhyay, 2008).

The above examples illustrate that the double-edged potential of MC innovations lead to important CSR questions for firms competing in technology races. Does investment in the creation of a MC innovation hold any CSR potential? Do firms need to sacrifice profit while innovating in order to further social objectives, as CSR would seem to suggest? The existing literature on CSR is more or less in the dark on such questions with respect to innovation

creation, but in general they indicate two possible strategies that can be pursued to be socially responsible.

The first and easier strategy, which is more commonly practiced, is for firms to make unilateral transfers of innovations to needy stakeholders i.e. engage in charity work. Rather than involving the society in its day to day operation, it can take recourse to philanthropy to address some of the concerns of society. Here the firm separates its core business objectives from its social objectives, usually through a charity foundation that operates as an NGO funded by the firm. Such a strategy is based on the premise that the CSR motivation of the firm should be grounded in a sense of reciprocity to society (e.g. Baron, 2007; Besley and Ghatak, 2007). We refer to such investments as non-strategic CSR or corporate philanthropy.

The second and more difficult strategy is to engage in continuous dialogue with the representatives of important stakeholder groups in a socially responsible way. Strategic CSR refers to "A business that is integrated with core business objectives and core competencies of the firm, and from the outset is designed to create business value and positive social change and is embedded in day-to-day business culture and operations" (McElhaney, 2009). This approach promotes the development of the knowledge base, skills and networks of the firm that help to increase medium to long run profit while fulfilling a social responsibility to society. Strategic CSR can serve to develop competitive advantages (Porter and Kramer, 2006), create dynamic capabilities (Hart, 1995) or penetrate new bottom of the income pyramid (BOP) markets (Prahalad and Hart, 2002; Prahalad, 2005) in the medium to long run.

The burning question then becomes – which is the better strategy for a firm and which is better for society? Clearly the strategy of philanthropy is closer to Friedman's position as it separates the social objective of the firm from its profit maximization objective. Here the focus of CSR primarily remains the satisfaction of share holders. However, the strategy of accommodating or reaching out to stakeholders is a show of more involved commitment from the corporation to society. If these are the merits and demerits of the two strategies, one must admit, it is very difficult to judge which is better from the point of view of the corporations and society. Therefore, in an attempt to provide some elements for an answer, the present paper studies in detail the launching of two MC innovations with CSR potential.

The first firm considered is the US agbiotech giant Monsanto, which has changed the face of the market for cotton in India with the launching of its genetically modified cotton seeds. The second enterprise examined is the small Indian firm, Cipla, which came into the international limelight with the commercialization of a low cost drugs cocktail for HIV/AIDS. These two firms are interesting to study, because both have earned large profits and the good will of their share holders through launching their innovations, but they have also faced conflict with other stake holders. Monsanto is probably the most controversial firm in the world today as many of its innovations have provoked worldwide protests (Robin, 2008). Cipla is notorious in a different way, being hailed as the Robin Hood of the pharmaceuticals industry for supposedly stealing technology from the leading multinational firms.

The methodology to build the case studies was as follows. There is an extensive economics literature on the diffusion of Bt cotton in India by Monsanto and a few articles on CIPLA. These were surveyed and compounded with a study of all articles appearing in business journals, newspapers and documents on the internet. The annual reports and the websites of both the firms were also studied carefully. Interestingly, even a cursory scrutiny of the websites of the

two firms confirms the newness of CSR as a guideline for company strategy. While Monsanto's website clearly states its CSR credo, there is nothing present on the website of Cipla on CSR. Furthermore, most of the CSR investment by Monsanto is apparently unrelated to its innovation activity. Its website announces CSR investments in corporate giving, product stewardship and education of youth. Finally, as with most firms, there is no mention of any CSR linked to innovation strategy in the websites of either of the two companies. But, we show through these case studies that the innovations launched by these firms had tremendous CSR potential and the manner in which such potential was identified and exploited in turn affected their fortunes.

The paper is organized in 6 sections. First, section 2 discusses the taxonomy of innovations, the different approaches to CSR and introduces some definitions to highlight the links between CSR and innovation. Then, sections 3 and 4 present our case studies on Bt cotton and anti-HIV/AIDS drugs respectively. Section 5 discusses the results obtained from the case studies, and finally, section 6 concludes.

2. CSR and innovations great and small

We start from the premise that CSR investment as related to innovation creation can take one or more of the following forms: (i) voluntary investment by firms, beyond compliance to existing regulations, to reduce any damage engendered by the commercialization of the innovation; (ii) investment in the creation of innovations that generate positive externalities; (iii) any bearing of costs that permits a greater consumer surplus[1] from commercialization of the innovation and which cannot be recuperated in the short run. The CSR potential of an innovation or the CSR gains from innovation for a firm is essentially in the form of reputation gains in short run, which may be translated into increased demand for its products, or construction of dynamic capabilities, in the medium or long run, both of which may lead to higher profit.

As we stated in the introduction, we have coined the term 'market changing' technological innovation as a generic term to refer to any innovation in the form of a new product or process that changes the industrial organization in a market significantly. Armed with an MC innovation, a firm gets catapulted to a position of market leadership, while other incumbent firms lose market shares or exit. Why such a generic term? This is because innovations can impact a market in a variety of ways and keeping in mind that in a broader sense innovations also include new business models and organizational routines within the firm, we propose the following compilation of innovations according to their market impact and CSR potential.

Incremental innovations: These are non-MC innovations that do not change the industrial organization of any market. An incremental innovation represents a quiet entry in an established market, with set leaders, attained brand loyalties and consumer acceptance and well defined norms for safety and quality. It can either take the form of a cost-reducing process routine or a quality enhanced final product that does not significantly change the market shares of the firm's rivals, even as it increases firm profit.

Radical technological innovations: In the economics literature, Schumpeter (1947) identified radical innovations as new products or processes that are far superior to the existing

[1] Greater with respect to the consumer surplus generated at the profit maximizing price given a particular market demand.

ones technologically and claimed that such radical innovations are the major driving force behind market evolution. Technologically strong firms invest in the creation of radical innovations to increase their market share to the detriment of their competitors. Radical innovations impact the market through their superior technological performance constituting a clear break with existing technology paradigms (Dosi, 1982). Radical innovations cannot be copied easily because they require a high scientific and technological capability that first needs to be acquired by late-comers.

Discontinuous technological innovations: A discontinuous innovation refers to a major innovation that takes the form of new products or services for which no equivalent product existed before such that a consumer base needs to be created. Here consumers need to be educated in order to facilitate adoption and use. Typical examples are car, plane, television etc. These innovations are usually generated through the development or application of radically new technologies. Their commercialization success depends not only on their intrinsic characteristics but also on how they are delivered as consumer familiarity needs to be built (Vcryzer, 1998).

Radical second generation (or reengineered) technological innovations: Historically the industrial organization within countries and the industrial ranking between countries have been drastically changed in short periods of time by reengineered versions of original innovations through creative duplication. Reengineered innovations are usually commercialized at lower prices and initially, only price sensitive consumers may buy the product. But as the innovator acquires a sizeable market share and invests in improving its technological capabilities, it might be able to expand its range of products to fill a larger price-quality spectrum and become a market leader. Acquiring reengineering skills is not simple and the performance of a reengineered copy can be equivalent in terms of technical performance and technological complexity with the original innovation. A reengineered product need not be easily replicable either, because of the high level of technical skills and tacit knowledge that goes into its making.

The ‘catch-up’ literature of the evolutionary school of economics, which refers to the stream of rich and well documented historical case studies on the ‘catching-up’ processes of the North American and Western European countries in earlier centuries, the rise of the ‘Newly Industrializing Countries’ of Asia in the last century, and present-day ‘Emerging Economies’, contains many examples to illustrate this proposition on an international scale (see Fagerberg and Godinho, 2005 for survey). Radical second-generation innovations also disrupt the market, pushing out incumbents in typical Schumpeterian waves of creative destruction.

New market creating disruptive innovations: In recent times, the notion that the industrial organization on the supply side of a market can be drastically changed without the introduction of a technologically superior radical innovation has been generalized in the concept of a ‘disruptive innovation’ by Christensen and Bower (1995) and further elaborated in Christensen (1997). “Disruptive innovations are characterized by processes, products, services or business models that offer lower performance along traditional trajectories. As such, they are under-valued by traditional lead-customers and often generate lower gross margins. Perceived as ‘low-end’ by industry incumbents, disruptive innovations introduce new-types of performance in niche markets. Through a period of exploitation and migration upstream towards higher-end customers, they eventually redefine the paradigms and value propositions on which existing industries are based” (Lettice and Thomond, 2008).

Disruptive innovations can take the form of new products, new processes or new business models – but all of whose quality and performance do not match their high-end counterparts. Some examples of disruptive innovation identified in the literature are the Ford car at its inception, cell phones, e-bay to auction items not exchanged in traditional auction houses and easy jet and Ryan air offering cheap flights etc. The emerging literature on disruptive innovations point out that they emerge because incumbent firms over-supply their traditional customers, forgetting about 'low-end customers' and 'new potential customers'. By re-aligning existing products along an innovative business model or delivery system entrants start by catering to these 'non-consumers' and expand their market base to include mainstream consumers (Christensen 1997; Calder 2003).

While the first three kinds of MC innovations provoke creative destruction through their technological superiority, disruptive innovations start with an innovative business model or delivery to provoke creative destruction. With a low-end, no-frills product, not involving any intrinsic technological innovation, they change the market structure through catering to unmet or underserved needs of consumers.

There are two lessons from this taxonomy of innovations for firms. First, firms have to watch out for all possible types of MC innovations: radical innovations, discontinuous innovations, second generation radical innovations and disruptive innovations. Second, all four types of innovation can potentially lead to CSR gains. However, CSR is not what always motivates a firm and therefore we distinguish four types of innovations according to their CSR rationale:

- *Profit enhancing incremental innovations with no CSR potential:* This includes innovations that increase the profits of the firm but which do not impact the consumer surplus or externalities generated greatly. Since there are no significant differences induced in the status quo by the innovation we do not consider such innovations to have CSR potential.
- *Profit enhancing incremental innovations with CSR potential:* These comprise innovations where the technology component does not change much, but the product is re-designed, packaged and delivered in such a way as to increase the market coverage (e.g. serve low-income communities) or reduce negative externalities (e.g. reduce pollution). A typical example is a mobile phone with less features which can also be sold at a lower price in order to be accessible to low income households.
- *Profit oriented MC innovations with CSR potential:* Firms invest in the creation of profit oriented MC innovations mainly to maximize firm profit – but because MC innovations usually increase the consumer surplus with respect to existing products greatly, they also have CSR potential. Most major innovations fall in this category, they are essentially designed to maximize profit but not consumer surplus and externalities are neglected.
- *CSR oriented MC innovations:* These are the rare MC innovations in which the firm invests primarily to cater to an underserved market and meet a social need. Maximization of profit in the short run is not the primary consideration, though minimum profit must be made for business viability.

In terms of voluntary undertakings on innovation investment with CSR potential, the literature has mainly studied '*profit enhancing incremental innovations with CSR potential'* and '*disruptive innovations with CSR potential'* in the form of pro-poor innovations. These are innovations to serve the consumers at the bottom of the income pyramid, mostly in developing countries, referred to as the BOP market[2]. Seminal works by Prahalad (2005) and Hart (2005) propose that pro-poor innovations that promote inclusiveness of low-income communities in markets could fuel firm growth and profit. They advocate firms to look beyond the 'design of the technology' to the 'design of business models and delivery mechanism' that incorporate the interests of both innovation providers and potential end-users. For success, they emphasize that mutual benefits need to be generated both for the recipient community and the commodity provider. The growing literature on optimal win-win strategies to address low-income communities has spelt the optimal characteristics of pro-poor innovations and has identified various strategies for 'co-creation' or joint-value creation with the user community through non-traditional forms of collaboration (Prahalad and Hart, 2002; Franceys and Weitz, 2003; London et al., 2005; Brugmann and Prahalad, 2007; Perrot 2010).

The penetration of BOP markets is being taken with increasing seriousness by giant multinational companies. At one end of the spectrum, studies have shown that profits can be enhanced through incremental and disruptive innovations in packaging, design, delivery and market support (See SadreGhazi, S. and G. Duysters, 2009 for survey). At the other end, there is a debate on whether a new kind of organizations – a social business firm, can discard profit as the driver of firm success and instead place social responsibility as the main goal and incentive to operate in underserved markets (Yunus, 2007). It has been demonstrated through examples of firms in telecommunications, consumer electronics and energy production that disruptive innovations that address social and environmental challenges hold high potential for firm growth and market leadership (Hart and Chistensen, 2002). While the best opportunities for creating disruptive innovations are in the BOP markets and some of these can also promote sustainable economic development of the region concerned, there are real challenges to be met to acquire capabilities to understand the needs of underserved communities and then engage in innovation to find solutions for the same (Hart, 2005).

What is clearly interesting is that none of these works cite examples of a radical or a discontinuous or a second generation radical innovation that has served to penetrate BOP markets. Indeed, it would seem that technologically complex products are always designed keeping only the high income communities in mind. Once the high income communities are satisfied, in order to increase firm profit even more, efforts are made to simply redesign, repackage or redeliver the innovation so as to penetrate the BOP market. In contrast, our case studies show that radical innovations and second generation radical innovations can both be launched directly for the BOP community.

[2] The term 'bottom/base of the income pyramid' or BOP is often used referring to households whose working members earn less than $3,000 USD per year, in PPP terms. The BOP is not a single homogeneous segment but a set of distinct socio-economic segments sharing the common feature of low household income. The nature of the BOP as a market is also likely to be specific to the sector concerned (see UNDP 2008 and Hammond et al 2007 for examples).

3. Monsanto and Bt cotton in India

India is the third largest producer of cotton in the world, after China and the U.S.A., with an acreage of about 9 million hectares, representing about 20% of the land surface devoted to cotton in the world and the largest area under cotton for any country. Cotton-based industry is among the most important in the country, employing about 60 million people in production, industry and trade. While acreage under cotton constitutes 6% of the land under cultivation, it is responsible for 54% of the consumption of pesticides in India, leading to high costs for poor farmers and extreme environmental damage (Raghuram, 2002). At the beginning of the 1990s, Indian cotton yields were among the lowest in world, with poor quality seeds, high cost of culture and poor fibre attributes of hybrids, which deteriorated rapidly with successive pickings[3].

By the mid-1990's Monsanto had developed and bought to the U.S. market cotton containing genes from the soil bacteria Bacillus Thuringiensis (Bt). The different layers of this soil bacteria contain several proteins that act as poison for specific insects according to different modes of action. Each of these proteins is coded by a single gene, which makes it easy to transfer the trait to plants. The gene inserted in Bt cotton seeds, Cry1Ac, provides a high degree of resistance to the American bollworm, the spotted bollworm and the pink bollworm, which are also among the major insect pests attacking cotton. Therefore, with Bt cotton, farmers need to spray less pesticides than with conventional cotton, their costs are lowered and consequently there is less damage to their health and the environment. By 2001, Monsanto's Bt cotton technology, first commercialized in 1996 in the USA, was being sold commercially in seven countries: the United States, China, Mexico, Australia, Argentina, South Africa and Indonesia (James, 2002).

Not surprisingly Monsanto began to target the introduction of Bt cotton also in India. According to Newell (2003), Monsanto sought to get Government approval for the commercialization of its agbiotech products from 1990, but bids to license the technology to Indian firms were refused, as the technology fees were deemed too high. It seems likely that at this point it approached the biggest Indian seed company Mahyco for collaboration[4].

Mahyco applied to the the Department of Biotechnology (or DBT), which operates under the aegis of the Ministry of Science and Technology to import Bt cotton seeds developed by Monsanto. In March 1995, the DBT granted this demand and authorized the import of 100 grams Bt cotton seed. The next two years were not only devoted to crossing the American Bt cotton variety with the local Indian ones, but also to consolidating market power and establishing a research base in the Indian seed sector. In 1998 Monsanto acquired a 26 % stake in Mahyco and went on to create a joint venture, Mahyco Monsanto Biotech company (or MMB) with 50% equity holding for each.

In parallel, in April 1998, the DBT approved of MMB's request to carry out small trials of Bt cotton, using 100 grams in each trial plot. However, the company did not restrict itself to these small trials and consequently NGOs, which are an active protector of citizen's rights in India protested. In November 1998, the farmers group KRRS (Karnataka Rajya Ryota Sangha) brought to the notice of the public and the government that Bt cotton seeds were being planted illegally by MMB in other areas before clearance had been obtained, burning crops in field trials to drive home their point[5]. In January, 1999, the 'Research Foundation for 'Science, Technology

[3] Document of Cotton Corporation of India: http://texmin.nic.in/tmc_introduction.pdf
[4] Maharashtra Hybrid Seeds Company Limited.
[5] http://www.viacampesina.org/IMG/_article_PDF/article_136.pdf .

and Ecology' led by the well known activist Vandana Shiva, filed a case in the Supreme Court challenging the 'illegality' of the field trials authorized by the DBT.

Despite these protests from activists, in July 2000, the DBT granted permission to MMB to conduct large-scale field trials including seed production at 40 sites in six states: Gujarat, Maharashtra, Andra Pradesh, Madhya Pradesh, Karnataka and Tamil Nadu with the results to be monitored by the DBT. But a year later, in June 2001, the DBT backtracked. The Genetic Engineering Approval Committee (GEAC) which operates under the Ministry of Environment insisted that field trials of Bt Cotton be extended by another year and that large-scale trials on 100 hectares in seven states be conducted again to ascertain their safety with field trials subject to monitoring by the 'Indian Council of Agricultural Research'. This additional year of field testing which delayed the commercialization of Bt cotton was instigated by protests from Vandana Shiva of the 'Research Foundation for Science, Technology and Ecology', and Nanjundaswamy, the leader of the 'Karnataka Rajya Raitha Sangha (Karnataka State Farmers' Organization)'. Such opposition was also supported by other prominent NGOs such as Gene Campaign and Green Peace-India.

At this point, while the Indian Government was trying to answer the queries of the NGOs on the safety and sustainability of Bt cotton through independent enquiries, a strange thing happened – Bt cotton was diffused to farmers, apparently by chance. In October 2001, suspicions were aroused when 30% of the cotton crop remained unaffected by the bollworm infection that was sweeping the state of Gujarat. Tests by GEAC revealed that the cotton in doubt was indeed transgenic containing a gene from Bt, at a time when commercialization had not been approved by the GEAC. Navbharat Seeds, the company selling the illegal variety claimed that their seeds had been developed from healthy plants found in a bollworm infested field. Monsanto stated that it could not press charges against Navbharat Seeds for its Bt-gene was not patent protected in India, (Jayaraman, 2001b). Though GEAC threatened immediately to burn the cotton fields grown with illegal seeds and bring Navbharat Seeds to task, it could do nothing, because the farmers were very happy with their increased crop and protested violently at the idea of having their fields burnt.

Caught in this quandary, a year later, on the 27th of March, the GEAC approved the commercialization of three varieties of insect-protected hybrid Bt cotton that could be made available to the Indian farmers for the 2002 growing season (Mech-12 Bt, Mech-162 Bt and Mech-184 Bt) under the brand name 'Bollgard'[6]. Authorization for commercialization was granted for April 2002 to March 2005 under specific conditions concerning refuges around Bt cotton fields and sharing of information on field trails with GEAC[7]. This authorization was renewed in May 2005 and the GEAC permitted at least six more Bt cotton varieties to be commercialized (Jayaraman, 2000, 2001a, 2001b, 2003, 2005).

What was the impact of Bt cotton on farmers, most of whom are poor? Initial studies on field trials carried out by Mahyco in 2001 indicated that the average yields on Bt cotton were 80% higher than those on non-Bt varieties (Qaim, 2003) and similar results were also reported in Qaim and Zilberman (2003). This striking performance was explained by the heavy incidence of

[6] website of Monsanto : http://www.monsanto.com/monsanto/layout/media/02/03-27-02a.asp

[7] Any farmer using Bt cotton has to plant refuge zones with non-Bt Cotton along the edge, in five rows with a width of 2.5 to 3 meters irrespective of the size of the holding, constituting at least 20% of the cultivated land, to act as a barrier to pollen flow and to prevent development of insect resistance. Second, Mahyco has to transmit information on the results of the field trials every year to the GEAC.

pests in the region and by the fact that the Bt-varieties had to be sprayed three times less often than their non-Bt counterparts, even though the spraying frequency against the other pests had not decreased.

Later studies on the productivity of Bt cotton showed that while yields may be greater (if there is an incidence of pests) from Bt cotton, the variance of yield from Bt cotton is also higher than from existing hybrids and that yields are highly correlated with complementary inputs like water and fertilizer. A study based on 341 interviews with cotton farmers over four states (Maharashtra, Karnataka, Andra Pradesh and Tamil Nadu) in 2003 in India also confirmed that on average, utilization of Bt cotton leads to substantial pesticide reduction, yield increase and income augmentation. However, these positive effects exhibited significant variations due to random pest incidence and heterogeneous agroecological conditions (Qaim et al., 2006). This could be because a Bt variety leads to higher yields only if the incidence of pests for which the Bt cotton contains its own insecticide is high, otherwise not. Furthermore, the variation in the income generation decreases with access to water and access to credit to buy the other complementary agrochemical inputs. Another detailed study on Maharashtra by Bennett et al., (2004) based on the performance of Bt cotton and non-Bt cotton in 9000 farm plots during the 2002 and 2003 seasons found that Bt cotton leads to significant increases in yield and income, but it is accompanied by a non-negligible spatial and temporal variation, which could be due to heterogeneous agronomic and weather conditions.

Such findings are complemented by innumerable studies by NGOs that confirm the high degree of variance in returns to Bt cotton. It also seems that the knowledge and information base of many farmers who are being offered Bt cotton seeds is highly imperfect. For instance, Orphal (2003) presents the results of a survey of 100 farmers in the southern state of Karnataka during the cropping season of 2002-2003. She finds that there is a lot of ignorance both among farmers and extension agents, who consider Bt cotton simply as a new high yielding variety that does not require pesticides. In areas, where the incidence of pests is not high, the use of Bt cotton does not translate into higher yields or higher profit. This last effect is particularly noticeable in rain fed cultivated areas, which form 2/3 of total cultivated area. An entire series of articles can be found in the website of one of the most active NGOs in this field, Gene Campaign founded by Dr.Suman Sahai, confirming similar arguments expressed by the other civic society groups through direct observations and conversations with farmers in Andra Pradesh and Maharashtra.[8] Incorrect expectations about the returns to Bt cotton has even led to social unrest, and mobilized the local government in certain states like Andhra Pradesh, to press charges against Mahyco-Monsanto Biotech ltd and demand compensation for farmers.

Nevertheless, MMB is doing well in India with Bt cotton. In 2007, MMB began sales of the next generation of Bt cotton seeds: Bollgard II. Between 2002-2008, cultivation of Bt cotton grew at the rate of 11% per year accounting for 60% of the cotton acreage. Starting from 3 hybrids of Bt cotton in 2002, MMB had introduced about 140 hybrid_varieties by 2009. They also claim a 17% reduction in the use of pesticides; a 32% increase in yield and a 11% decrease in the total cost of production for Bt cotton farmers[9]. Thus, in spite of a recent history heavily marked by controversy (Robin, 2008), in India Bt cotton and Monsanto are here to stay and

[8] http://www.genecampaign.org/Publication/Article/article_btcotton.htm
[9] http://www.monsantoindia.com/monsanto/layout/news/2008/news_jan2008.asp

given the success of the commercialization of genetically modified varieties in developing countries, the shareholders of Monsanto continue to enjoy positive and increasing dividends.

4. Cipla and the invisible market for ARVs

Cipla or the 'Chemical, Industrial and Pharmaceutical Laboratories Ltd' was created in 1935 by Dr. Khwaja Abdul Hamied. During the 1970s it gained notoriety as a technology leader, increasing its market share through introducing low-priced me-too versions and generics of patented drugs in the Indian market. Such development of technological capabilities in the form of reverse-engineering skills was possible after the introduction of an amendment in the existing intellectual property regime (inherited from British colonial times) in the form of the 'Indian Patent law of 1972' which permitted process patents instead of only product patents in the pharmaceutical sector.

When India attained its independence in 1947, its pharmaceutical industry was of a very modest size; Western multinationals (MNCs) held about 80% of the market and drug prices were among the highest in the world and this situation persisted throughout the 1950s and 1960s (Greene, 2007). Faced with a healthcare crisis created by a lack of essential drugs both in terms of availability and affordability, the Indian Government debated between two options. Either medicine could be imported in large quantities as essential commodities or incentives could be provided for the development of the local pharmaceutical industry. The Indian government chose the latter solution and changed the Indian patent law to permit the commercialization of reengineered drugs. This policy experiment was highly successful and led to Indian firms racing to develop innovation capabilities and eventually take over the Indian market by the end of the 1980s (Ramani and Venkataramani, 2001).

Cipla is a typical example of an Indian firm that increased its market shares through the development of technological capabilities. For instance, before the IPR Act of 1972, India used to export dried leaves of vinca rosea and Eli Lily used them to make vincristine capsules, an anti cancer drug, which were then sold back in India for $2.28 each. By 1984, Cipla had improved and scaled up this known process to make tablets costing less than a dollar and then began to export it as well (Ramani and Venkataramani, 2001). By the early 1990s, Cipla was among the top five companies in the Indian pharmaceutical sector and in 2007 Cipla overtook Ranbaxy and GlaxoSmithKline India to become the largest pharmaceutical company in the domestic market[10].

AIDS, the short form for 'Acquired Immunity Deficiency Syndrome' was first coined in 1982 as significant numbers of patients in the USA and Europe were found to be infected by HIV or the 'Human Immunodeficieny Virus'[11]. Between 1980 and 1990 it is estimated that about a million people globally were affected by AIDS[12].

The 1990s were years of pharmaceutical breakthrough in the prevention of HIV infection and the treatment of AIDS. Five large multinational pharmaceutical firms (Merck, Bristol-Myers Squibb, Boehringer Ingelheim, Glaxo SmithKline Beecham and Roche) developed a series of drugs that were effective in treating AIDS. In 1996, physicians in the USA reported that patients treated with a combination of three of about nine anti-HIV drugs (called protease inhibitors or

[10] http://www.rediff.com/money/2008/jan/02pharma.htm
[11] http://www.avert.org/
[12] http://www.avert.org/his87_92.htm

reverse transcriptase inhibitors which suppress the HIV virus), in a drug cocktail called 'HAART or Highly Active Antiretroviral Therapy' enjoyed near-miraculous improvements in health[13]. These drugs are now referred to as 'Anti-retroviral (ARV) drugs' because they have the potential to dramatically improve the health of people with AIDS. However, with the costs of these cocktails being well above $10,000 (per person per year), it was simply out of reach for most patients in developing countries, who numbered nearly two million by 1995[14]. Thus, the market for ARV was invisible in developing countries, especially Africa, due to a lack of access from the demand side.

The first case of AIDS was detected in India in 1986 and it soon spread very rapidly through drug users and prostitutes[15]. Like the father Dr. Khwaja Abdul Hamied, the son Dr. Yousuf Hamied, the present Chairman and Managing Director of Cipla, believes that pharmaceutical firms providing essential drugs have a duty towards the poorest in society and this belief motivated him to initiate research on ARV development[16].

In 1991, Cipla was approached by the Indian government to produce AZT, the only known drug at that time to combat the disease. Cipla answered the call and came up with an Indian generic version of AZT for US$ 2 per day as against the then prevailing international price of more than US$10 per day. However, even this price was too high for procurement by the Indian government and most Indian patients and it was not a commercial success. Therefore, Cipla stopped production of AZT. However, by 1997, thanks to the US Medical report, Cipla became aware of HAART[17].

Guennif (2004) explains that Cipla initiated a research collaboration with the Indian Institute of Chemical Technology (IICT, Hyderabad) in 1991 and started producing and marketing the simplest drug, Zidovudine (or AZT) and then proceeded to develop generic versions of Stavudine (d4T; original patentee Bristol-Myers Squibb) and Lamivudine (3TC; original patentee GSK). By 2000, it had succeeded in producing Nevirapine, a more sophisticated drug with greater amount of the active substance and a more complex formulation process, whose original patentee was Boerhinger Ingelheim (BI)) and Duovir – a combination of Lamivudine and Zidovudine, which was originally patented by GSK. She explains that after two years of investment in research, Cipla was able to offer Nevirapine at a price that was 150% lower than that offered by the patentee, Boerhinger Ingelheim (BI). At this point, Cipla decided to take on the challenge of producing an AIDS cocktail, and in 2001, Cipla launched its own AIDS cocktail containing Stavudine, Lamivudine and Nevirapine in the form of a tablet to be taken twice a day (instead of at least 10 tablets) called Triomune. At the same time, it commercialized another variety of AIDS medicines called protease inhibitors, which contain even more active materials and are even more complicated to formulate.

James Love, founder of the NGO 'Consumer Project on Technology (CPTech)' that focuses on the impact of intellectual property protection on consumer interests points out that Cipla first tried to make the market visible through approaching the big pharma cartel in order to make ARVs more accessible, "On December 19, 2000, Cipla, an Indian manufacture of generic ARVs, wrote to Glaxo, Pfizer, BMS and Boehringer Ingelheim, offering to license patents on a

[13] http://www.avert.org/his93_97.htm
[14] http://www.avert.org/his93_97.htm
[15] http://www.expresspharmaonline.com/20071031/market01.shtml
[16] See interviews : http://www.amfar.org/cgi-bin/iowa/asia/news/?record=3
[17] Speech of DR Y K Hamied at Young President's Organisation Meeting, Ivy restaurant, London, 14th April, 2004.

number of ARV and other AIDS related medicines..... The Cipla letter to Glaxo requested licenses to patents on 3TC and AZT as well as combinations of those drugs together. Later Cipla-Medpro, a South Africa concern that Cipla is a part owner of, wrote to Glaxo asking for licenses to these same patents. Cipla offered Glaxo a royalty of 5 percent of net sales. Glaxo responded with very detailed and burdensome requests for proprietary business and technical information from Cipla, and did not license the patents. This is a common pattern in cases where the owner of intellectual property has no intention of licensing the technology but wants to avoid a clear refusal to license."[18]

Even at this juncture, there was no response from the national or international market. So in February 2001, Hamied took another bold, humanitarian step and announced a major price reduction for Triomune and this time the world sat up to listen (especially the pharma majors). It meant that the cost of Triomune required for one year for one person was $350 for NGOs like MSF (thanks to negotiations by Love), $600 for governments, and $1200 for retail distributers.

The impact of Cipla's offer was immediate and significant. Alternative AIDS cocktails were selling at $10,000-$15,000 (cost per patient per year) in the USA and Europe at the time and the multinational drug companies did not view the offer of Cipla in a charitable light. The multinational drug companies threatened to fight Cipla, but due to international pressure, they did not; instead they cut the price of their own drugs - by up to 90 per cent. Hamied himself was vilified by a former head of Glaxo, among others, of being a pirate and a thief, to which he responded, "What was Robin Hood? A thief or a benefactor?"[19]; which of course only served to boost his image further. Today, Triomune is sold in over 130 countries of the world[20].

5. Discussion of results: Similarities and differences in firm strategy

Monsanto's Bt cotton is a typical example of a first generation radical innovation, while Cipla's drugs cocktail for HIV/AIDS is representative of a second generation radical innovation. At the same time, MMB (which we will simply refer to as Monsanto from now on) and CIPLA are similar in that both foresaw the huge market potential of their innovations and came up with successful innovation investments. However, Monsanto was investing to create a '*profit oriented MC innovations with CSR potential'*, while CIPLA was on a trajectory to bring out a '*CSR oriented MC innovation'*. Therefore, from the outset the rationalities of the two firms were different.

The case studies demonstrate that at the product development stage both firms kept in mind technological performance, but this was supported by different rationalities. The objective of Cipla was to lower the cost of production of the drug to the maximum extent so that final market prices could be slashed and the drug could be made accessible to the maximum number of patients. Therefore, the social purpose of the innovation was to maximize patient coverage. Monsanto concentrated on product performance to create a product that would reduce the cost of production of farmers the most. Of course, it was aware of the CSR potential of its innovation, as the farmers would benefit from both higher yields of cotton and reduced pesticide related health hazards. But the objective was to maximize the quality improvement of the seed so that it could

[18] www.cptech.org/ip/health/cl/cl-cases/rsa-tac/love02032003.doc
[19] http://www.positivenation.co.uk/issue91/features/feature4/feature4.htm
[20] http://www.docstoc.com/docs/11316036/Cipla-Overview

be sold at the highest possible price to farmers and still displace the available seeds in the market developed by local breeders and public research institutions. Here, the CSR element was embodied in the benefits to the environment and the health of farmers and it helped to justify a high price of Bt cotton. Therefore, the innovation strategies of both firms took into consideration the CSR potential at the development stage itself. But Monsanto focused on profit maximization and Cipla focused on access maximization.

Second, both firms were propelled by their managerial vision in their innovation trajectory but in different ways. Monsanto is a Western multinational governed by a professional management team, while Cipla is an Indian family company also managed by professionals but guided by the vision of the founding family. Monsanto is typical of an 'outsider system' of governance while Cipla is an example of an 'insider system' of governance (Franks and Mayer, 1992).

In the outsider system (as observed commonly in the US and the UK) there is a separation in ownership and control of the firm. The owners (shareholders) delegate the control of the firm to the managers and expect them to behave in a way that maximizes the value of their investment. The ownership and control rights of the firms are traded in the capital markets generating little concentration of the shareholding in a particular firm. As opposed to this, in the insider system (as observed commonly in the EU, Japan and elsewhere) the ownership and control of the firm are not separated. The shares of the firm are infrequently traded. It is common to find large shareholdings in the hands of people controlling the companies, families and government.

It is widely acknowledged that Monsanto's leap of faith into agbiotechnology was mainly due to the vision of some key of the management team despite being of the outsider system type (Chataway, Tait and Wield 2004). Monsanto was the only large established agrochemicals firm of its time to have perceived agbiotechnolgy to hold tremendous potential. However, managerial vision did not extend to specific incorporation of CSR in its innovation strategies. In the case of Cipla, Hamied said that his decision to bear a price lower than that dictated by profit maximization was triggered by a devastating earthquake in the state of Gujarat which had killed 17,000 people and left 1 million homeless just a few weeks earlier. Hamied felt that AIDS was going to be worst than any earthquake and therefore was moved to pursue this strategy[21]. The fact that Cipla's ARV cocktail was driven by managerial vision is confirmed even by other firms. Dr.Khanna from Ranbaxy, a leading Indian competitor explains: "The AIDS drugs cocktail was Yousef's brain child. He thought that was important and he fought at every level to bring it out. Finally, the whole world accepted this. But he thought of it first"[22]. Thus, in an insider system firm CSR can be incorporated in the innovation strategies more easily if the management desires the same.

There is some evidence that firms falling under the *insider systems of corporate governance* are more likely to invest in being socially responsible than firms belong to the *outsider system* group (Lannoo, 1999). The reason for this apparently is the higher philanthropic motivation and the stakeholder participation associated with the insider system. Our case studies support the hypothesis that CSR oriented MC innovations are more likely to be initiated by firms with insider systems rather than outsider systems.

[21] http://www.essentialdrugs.org/emed/archive/200102/msg00011.php
[22] Interview with Dinar kale and as recounted by the latter to the author.

Third, both firms faced conflicts with other stake holders but for different reasons. An MC innovation can have market and non-market effects. Within the market, it can increase profit for the innovator, increase the consumer surplus and also lower the profit of incumbent and sometimes even force their exit. Thus, MC innovations are likely to engender conflicts with incumbent market leaders. Outside of the market, positive or negative externalities can be generated by the firm during any of the steps leading to innovation creation such as research, development, design and commercialization. If negative externalities are generated then societal stakeholders are likely to protest.

Clearly, Cipla faced conflicts with the incumbent leaders because of the creative destruction it caused in the market. Whereas, Monsanto had to deal with NGOs and civic associations because of the externalities it generated on the environment. Thus, MC innovations, whether or not with CSR potential, can have different effects on the different groups of the society. The groups, which perceive themselves to be adversely affected by the MC innovation, on the basis of their acquired information or simply their apprehension, may try to block the realization of the innovation profit, by creation of appropriate coalitions. Whereas, if the CSR impact is very clear, even if the innovation provokes creative destruction of incumbents, governments and NGOs may rally to help the innovating firm.

Four, the case studies are a proof by example that MC innovations, either as radical or as radical-disruptive technologies, with or without initial CSR orientation, can also serve BOP markets. Furthermore, through catering to underserved consumers or answering a social need, the innovators can enjoy CSR benefits, which can further boost the profit and dividends of the firm. Table 1 recapitulates our inferences drawn from the comparison of Monsanto and Cipla.

Table 1: A comparison of the nature and impact of the CSR investment associated with the MC innovations of Monsanto and Cipla

	Monsanto	**Cipla**
Motor for innovation creation	Market needs	Market needs
Nature of need	Low productivity of cotton seeds and high use of pesticides	High price of HIV-AIDS drugs
Nature of innovation	Radically new product	Radically lower-priced and lower-dosed product
Market welfare generated by innovation creation	Positive but heterogeneous	Positive
Non-market externalities by innovation creation	Uncertain risk of contamination and development of resistance (negative)	Better health due to better access to drugs (positive)
Supported by	Farmers, often ignorant	NGOs and public agencies supplying drugs

Opposed by	NGOs	Western pharmaceutical multinationals
Initial profit generated by innovation	Positive	Insignificant
CSR component at the product development stage	Innovation investment lowers negative externalities (in this case- lowers use of pesticide with positive impact on health)	Enables poor deprived of treatment against AIDS to gain access to the necessary drugs.
CSR risk shared with	Indian Farmers	Indian government and NGOs
Generation of reputation gains from CSR potential of innovation	marginal	Very positive
Evolution of share prices	Positive	Positive

6. Conclusion: Insight on CSR and MC innovation strategies

Firm strategies for the commercialization of MC innovations are interesting to study because they are designed to maximize profit and reputation gains. At the same time, the CSR component also matters, because on the demand side, CSR ratings are likely to impact consumer acceptance and adoption. In this paper, by studying the launching of two MC innovations, we have tried to arrive at some conclusions with limited generality on the issue of CSR as related to innovation creation. What new insight can be inferred from our study on the practice of CSR for firms? We propose the following.

While undertaking any MC innovation effort, a firm should also assess the CSR potential of the innovation so that the design of the innovation strategy takes this into account. Awareness and identification of the CSR impact within and outside of the market will help the firm to leverage the CSR gains better and channel it more efficiently towards profit enhancement.

With any kind of MC innovation, conflict with other stakeholders is likely to be generated, starting with the displaced incumbents. Discontent might mobilize more stakeholders if negative externalities are generated along the route to innovation creation. For instance, a case was lodged at the World Trade Organization against Cipla for having usurped the market shares of pharma majors in developing countries by apparently wrongful (though perfectly legal) means. Similarly, civic associations and NGOs waged protests against Monsanto for violation of Indian laws on testing of genetically modified seeds. In the case of Cipla, it was the incumbent patent holders of the drug who were adversely affected by Cipla's innovation and who threatened legal actions. In the case of Monsanto, the NGOs opposed to Monsanto and genetically modified seeds brought the case of illegality into the limelight and built pressure upon the government to take action. But, both firms won their cases, and moreover, Monsanto got away with repeated violations. How did they win?

With respect to Cipla, initially the Indian government and later the United Nations backed the firm's innovation on humanitarian grounds as it had the potential to help millions of poor AIDS victims in developing countries in Asia and Africa. The patent holder multinational

drug companies succumbed to international pressure and backed off from taking legal action against Cipla[23]. So, the BOP component of the CSR value helped Cipla tide over the opposition built to thwart the commercialization of the innovation. It is no wonder that Cipla does not advertise its CSR initiatives in its websites. The BOP reputation of its product makes the firm a symbol of CSR.

Coming to Monsanto, the farmers were the target consumers and since they were very happy with the innovation, they pressurized the Indian government to legalize Bt cotton and to overlook the violations made during testing. Indeed, the farmers who used the Bt cotton seeds without knowing the full implication of the use of genetically modified seeds in the long run and who enjoyed higher yields as well as reduced health hazards from the pesticides, formed a large constituency to force the Indian government to ignore the apprehensions held by the NGOs opposed to genetically modified plant varieties and Monsanto. In order to take the farmers in confidence, Monsanto committed to various CSR projects most of which were not directly related to the innovation. This kind of non-strategic CSR was needed as maximization of the CSR value of the innovation for the BOP market was not integrated as an objective at the product development stage; therefore, additional efforts were required to tide over the resistance put up by the concerned authorities and NGOs at the commercialization stage.

From the above, it can be noted that in addition to profit enhancement, the CSR value of the innovation improves the bargaining position of the firm in negotiations with other stakeholders. The manner in which the CSR potential of an MC innovation is used as a tool for bargaining will of course depend on the history and the resource base of the innovating firm and the nature of the market in which it operates.

The case studies also indicate that firms launching MC innovations must identify primary and secondary stakeholders who can either be allies or adversaries in diffusing an innovation. The international NGO – 'Medicines sans Frontieres' played a crucial role in the realization of returns from Cipla's investment. In the case of Monsanto, NGOs watched each of its moves closely and brought pressure upon the Indian government to impose sanctions upon it. However, Monsanto repeatedly flouted agreements and the NGOs were unsuccessful in banning Bt cotton. The NGOs could convince only a small minority of ecologically minded farmers with a long term planning perspective to opt for the conventional cotton varieties. These outcomes partially confirm the hypothesis of Rao (2008) that the commercial success of radical innovations can be made or broken by activists (i.e. this is true in the case of Cipla but not Monsanto). They also provide new evidence confirming the finding of Brugmann and Prahalad (2007) that an unanticipated side product of economic liberalization in developing countries is the spectrum of new opportunities for firms and social activists to work together to develop and commercialize innovations with a high CSR value.

As a corollary, it is clear that the choice of the target community for innovation-adoption impacts the design of subsequent CSR strategies and construction of CSR reputation gains. If the MC innovation is targeted for the poor, it is easier to win over the support of the government/authority as it complements the government's/authority's objective. Cipla could do this at the first try, Monsanto failed. If an MC innovation is targeted for the BOP market, the

[23] Interestingly in spite of Microsoft Corporation being very vocal about violation about patent laws in countries like India and China, Bill and Melinda Gates Foundation supported Cipla in its innovation in India which came through violation of patent laws.

CSR reputation will build up on its own. In this case, any non-strategic CSR unrelated to the commercialization of the innovated product in the form of corporate philanthropy will be less of a necessity.

The final form of CSR build-up is different in a developed and a developing country. A developing country in general is characterized by lower levels of education, skills, high poverty burden and a weaker system of governance. At the same time, the weaker system of governance may be balanced by the presence of NGOs and civic associations. Cipla had a window of opportunity to reengineer the patented HIV/AIDS drug because the TRIPS agreement (Trade Related Intellectual Property System) banning all reengineering of patented drugs became effective in India only in 2005[24]. But, in a TRIPS compliant developed country with strongly enforced patent rights and extensive social security support for health, Cipla's strategy would have been neither needed nor fruitful. The success of Monsanto's innovation strategy also lay in exploiting the typical features of underdevelopment. Not only was the weak enforcement of laws in India exploited, but the weak network of inadequately informed NGOs operating at the grassroots level and the gullibility of poor (mostly illiterate and ignorant) farmers was used to commercialize Bt cotton. These features helped to build up the popularity of genetically modified seeds among the farmers, which has not been the case in European markets with their strong network of well informed NGOs and enforcement laws.

However altruistic the motivations of a firm, it is clear that no CSR oriented MC innovation can succeed without being supported by a larger robust business strategy of the firm. Cipla could offer ARV at a low price only by making up for any losses through sales of its other star products. According to Hamied, CSR innovation should not be considered as the cash cow of the firm, but a humanitarian offering among other innovations that should assure the economic viability of the firm. Furthermore Hamied explains that, "I don't want to make money on Aids drugs.... ....I make enough money on other things. On this particular issue, can't we all pool our resources? I make 800 drugs. If I don't make money on six, why should I worry?"[25] He also argued that Cipla was able to manufacture the drugs at cheaper cost because it was already making most of the raw materials and production costs in India were lower. This combined with a three-tiered pricing system was sufficient to ensure that they broke even on costs[26].

Returning to the core question of this article on the role of CSR in MC innovation strategies, we can now summarize our findings on firms. Recognition of the CSR potential of an MC innovation can help firms to exploit its CSR potential better – both to increase profit and to deal with any conflicts generated by the MC innovation. An innovating firm must not only keep in mind potential consumers, but also other stakeholders in the system, who may either help or hinder the commercialization of the innovation. Any CSR oriented MC innovation must be supported by a robust business model to make it viable.

Finally, we turn to the inferences for policy design. As the case studies show, contrary to accepted truisms, MC technological innovations can serve to penetrate BOP markets and generate CSR and consumer welfare gains for firms and low-income communities respectively. Therefore, industrial or innovation policy that supports MC innovation creation with CSR

[24] All countries can still use the clause of 'compulsory licensing' in TRIPS for reengineering if there is a strong public interest or national emergency.
[25] http://www.guardian.co.uk/aids/story/0,,898056,00.html
[26] http://www.essentialdrugs.org/emed/archive/200102/msg00011.php

potential can contribute to poverty alleviation. This can take a variety of forms. At the same time, the externalities generated by MC innovations need to be monitored and this is usually the mission of private watch-dogs within the system. Without the existence of such activist groups, even innovating firms that comply with existing regulation need not care about the social costs generated by their innovation activity. Therefore, it can be argued that recently enacted laws in some countries, such as 'The Public Interest Disclosure Act of 1998' in the UK, and the ordinance in process in the USA, such as the 'Whistle Blower Protection Enhancement Act of 2007' that support activism as a watch-dog activity, can be considered in other countries as well.

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