The social construction of green and social inclusive technological discourses in the Global South: evidence from India and Bangladesh

Abstract

The process of technological innovation is widely considered to be crucial to enable human development and to guarantee environmental sustainability. However, the process of development in the so-called Global South has delivered controversial outcomes in terms of social and environmental sustainability. Does this setting present new forms of sustainable futures or is it rather absorbing the consumerist attitude of the North through the elaboration of new forms of dependency and domination? By illustrating two case studies of eco-friendly innovations in Bangladesh and India, this paper attempts to shed light on the dilemmas that surround the introduction of the values of modernity in the Global South.

1   INTRODUCTION

Innovation, meant as socio-technical change, appears to be innate in human beings. Such urgency for change acquires different forms according to the cultural settings in which it emerges. This process is evident even in those groups that struggle to *'change for not changing'*. People change for improvement, for preserving or disrupting certain power arrangements. The socio-technical nature of modern capitalism imposes the change in the form of technological innovation. The idea that the generation of economic value is driven and generated by novelty not only pervades the dominant industrial establishment but also persuades the collective imaginary of common people. On the other hand, we still live in a widely heterogeneous world in which the forces of modernity are slowly penetrating traditional cultures with uncertain outcomes. At the periphery of the world system this battle for change occurs in a less evident fashion. Here people rely on informal economies and informal networks. The socio-technical change, so evident in the standardised setting of industrial countries, becomes blurred and elusive. As some anthropologist pointed out, the modernising wave of capitalism does not sweep away traditional cultures, but it triggers unexpected pathway of change for those subjects that are willing to make sense out of this new condition (Sahlins, 1992, 1993). This hidden process is occurring everywhere on different battle fields. People struggle to improve their education, their health and their general welfare. The vast field of Political Ecology has documented as traditional communities that rely on basic ecosystems services tend to oppose the process of commodification of natural resources through conflicts but also via a process of social and technical rearrangement (Martinez-Alier, 2002).

Innovation in this scenario hardly fits the traditional label of *'creative process of novelty'*. Those covert processes of change shake the very teleology of innovation: innovation is not just novelty for the sake of novelty (or for the sake of money…). Innovation implies a purpose, a goal. Those purposes are variegated. There are different narratives, different perspectives that give rooms to several kinds of tensions and contradictions. The typical classification for those perspectives is the dichotomy: 'technocratic approach Vs grassroots approach'. The first is an attempt to explain and

frame innovation within business-as-usual dynamics. Markets, values chains, wealth generation and development are its key words. On the contrary, grassroots advocates use a different vocabulary composed by words like empowerment, appropriate technologies, social value and inclusiveness. However this dichotomy is artificial because framed in specific narratives that reflect in turn different constructed visions of the world. Narratives and regimes in the real world co-exist and overlap and are at the same time the subjects of tensions and contradictions (power and interests). Thus process leads to hybrids narratives that are the real key to understand social change.

By analysing two case studies, the paper is an attempt to analyse how technology and innovation are framed in the Global South with a particular attention to pro-poor eco-friendly innovation-making initiatives. The cases are the product of ethnographic research carried out between 2012 and 2013 in Bangladesh and India. The paper is organised as follows:

The first section illustrates the mainstream conceptualization of the technological innovation process underlining its limits and paradoxes. The central part is a description of two examples of innovative social businesses that leverage on the empowerment of the poor through the development of eco-friendly solutions. Finally, the implications that emerge from the cases are discussed.

2 THE LIMITS OF THE MAINSTREAM THEORETICAL UNDERSTANDING OF THE INNOVATION PROCESS

Evidence that innovation activity is crucial to gain competitive advantages for the firms encouraged several scholars to search for managerial practices that could somehow speed the pace of innovation creation within organizations. They attempted to identify the key change agents inside and outside the organization in driving and shaping how management innovation comes about (Birkinshaw, Hamel, & Mol, 2008). Innovation thus became something to be managed and planned. This process occurred at least at two different levels: at macro-level, where innovation policies are supposed to be designed to boost the innovative capacity at a country level, i.e., IS framework; at micro-level, where the focus is on the single firm and its capacity to sustain innovation activity over the time. In this section, we analyse the most common model of managing innovation at the micro level. This model is often described as 'pipe-line model' that organizes innovation activity within the firm in a set of sequential steps (Bessant, Lamming, Noke, & Phillips, 2005; Dabholkar & Krishnan, 2013; Tidd & Bessant, 2009). The general and most accepted model of Innovation framework from a management perspective is given in Figure 1. It begins with a problem, followed by an idea to solve the problem resulting in an invention/solution which finally ends with some kind of impact. The four-step model is essential in an innovation process and the absence of any one step will make it incomplete. In simple words, it refers to the practical translation of ideas into new or improved products/services as solution to the problems and has the potential to impact.
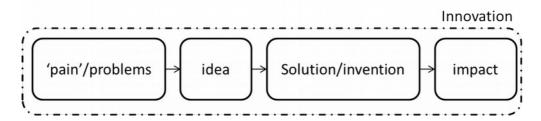

Figure 1 Managing Innovation in four conceptual steps

The modern notion of Innovation stresses on the functional aspects of socio-technical change. The logical consequence is that Innovation is seen as a process. From academia to industry, scholars stress on the fundamental distinction between 'invention' and 'innovation'. Inventions imply novelty and technical ingenuity, innovation always implies an impact. Within the capitalism framework, innovation implies 'market impact'. Inventions that rest on the shelf and never reach the market are not innovation. Ideally, an innovation process involves the following stages namely; Problematization, Idealization, Implementation and Diffusion.
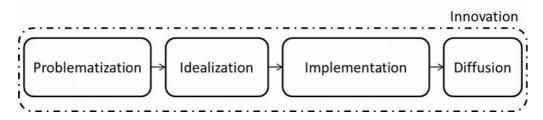

Figure 2 The four states of innovation

Problematization: In this stage, problems or 'pains' are identified, described and analysed. In some, cases are constructed from the scratch (i.e. the 'invention' of endless new luxury gadgets can be seen as a process of 'creation of pains' rather than a way to address critical problems).

Idealization: The pains are addressed by the formulation of potential solutions often in the form of more or less abstract ideas. In this stage, a more or less huge variety of solutions pops out, and competes with each other. The results of this phase are always uncertain and are not always influenced by technological feasibility but they are influenced by social, economic and political factors.

Implementation: This phase implies a practical solution, which is commonly known as invention. An invention can be a new technology, new product, process, a new organizational setting, or a new business model. Similar to the previous stage, this phase is affected by high uncertainty since the success of a specific solution might encounter unexpected failures in the most important phase of innovation process: the marketization or diffusion.

Diffusing: In modern capitalism, this step is maybe the most important. This is when an invention acquires the status of innovation. The solution is marketed and diffused and eventually creates (or not) an impact. The impact can be efficiency improvement, higher profits or higher productivity. In the overwhelming majority of the cases, extant literature talks about 'competitive advantages', cost cutting and higher profits. In other words, innovation creates new markets, increases the firm share in existing markets or reduces costs.

Innovation theories, with different degrees, focus on those steps to improve in turn each stage of the innovation process. Several approaches have been developed to improve the process of 'identification of pains', the rate of ideas generation and the diffusion of products and services. It is important to notice that the technological aspects in those approaches are rather limited. Much attention is paid to managerial, organizational, strategic and even marketing aspects.
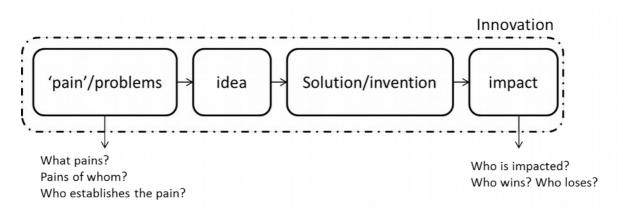
Figure 3 A framework for responsible innovation

2.1 Limits of the Mainstream Model

What's wrong with this model? This model is incomplete for the simple fact that it describes a process in a vacuum environment. The process is neutral and the social and politics are totally neglected. Social actors are depicted in a minimalistic way and often as consumers rather than human beings. Novelty is generated for the sake of novelty. Introduction of formal and informal institutions in those models (see new institutional economics and innovation systems mentioned above) has attempted to model tools of governance and guidance of the innovation process. However, in the overwhelming majority of the cases, those approaches never really interfered with the alleged automatism of market economy. Furthermore, in many cases, pains can be invented. Pains can be false or constructed pains or the pains or certain sectors of society. As a consequence, the impact is undefined. There is no moral, ethical or even spiritual specification of what the impact should be or should not be. In a nutshell, the extant framing of innovation process neglects at least two relevant aspects of socio-technological evolution (Figure 2): *What's innovation for? Who's innovation for?* Who establishes what pains are real pains? Who and for what reason new pains are created for? Why the pains of certain sectors of society are privileged, whereas other are completely neglected? Furthermore, the same applies to the outcome of the process. Who is impacted? How? Who wins and who loses?

If one introduces those questions in the process, innovation becomes a 'vector' (Figure 4) (Stirling, 2007). The direction of such a vector is given by the relative weight of its components. In this game, there are many variables: profitability, efficiency, productivity, equality, social welfare and environment among many others. In order to better understand the role of socio-technical change in human society, we have to re-politicize the study of innovation process introducing new research questions: Who decides which direction is legitimate? How do those decisions become dominant? How are they embedded in discourses? Also finally, why have those questions been removed from the mainstream of innovation studies?
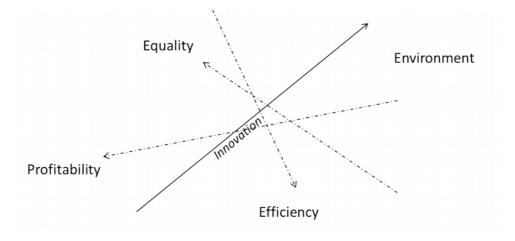
Figure 4 Innovation as a vector

Is it possible to shape the innovation vector in a way that combines positively all the relevant direction? (e.g. environment, equality, profitability and efficiency). Our first hypothesis is that all the components cannot have an equal weight. Some narratives claim that it is possible to be profitable by doing good. They tend to de-politicize innovation and depict societies as uniform settings. They remove politics, alliances and power relationships from the social. This is a real political move. Evidence from the analysis of the hegemonic discourse (academic literature, political discourse and media), suggests that this description is strongly associated with neo-liberal discourse. Is it possible to shape socio-technological regimes? Is it possible to create a framework of 'responsible innovation' (Owen et al., 2012)? Is it possible to engage society in the shape of socio-technological change? Is it possible to direct this change to build up a society of de-growth?

To address such questions is crucial to understand how certain directions are legitimated whereas others are excluded from the public debate. In short, why do certain visions of the world gather momentum while others simply fail? As Foucault suggests, once narratives (or discourses) have been constructed they do not remain on the paper (or on the media), they are embodied in practices (Escobar, 1984; Foucault, 1984). The narrative of innovation as the engine of economic growth has been translated to the practice by formulating innovation policy, creating new institutions and new discourses (Escobar, 1984, 2012). Figure 5 illustrates the process of narrative creation and evolution into practices (Callon, 1986). A similar framework has been used with success for the analysis of the introduction of specific innovations by Nicolini (2010a, 2010b). As Callon makes explicit, the enrolment and mobilization process are never complete and are always at risk. Dissidence can appear at any moment creating conflicts and competing alternative narratives (see Figure 5).
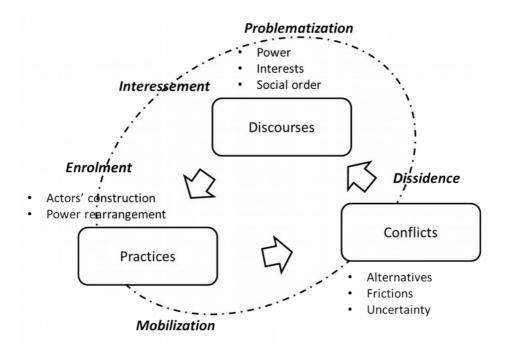
Figure 5 Theoretical framework

The process of discourse's construction and operationalization of narratives into practices can be seen as a complex system of intertwined loops that reassembles the Varela's *autopoiesis* mechanism (Escobar, 2000; Jackson, 2006) or the Batesonian cybernetic approach (Bateson, 2000). Once a narrative is becoming dominant, dissidents might appear in reaction to the process of translation and new discourses and new power relationships are constructed. The introduction of the industrial narrative in the Global South follows a similar pattern. The discourse of efficiency and industrialism slowly penetrated the post-colonial settings of many so-called developing countries after the IIWW and then steadily became embedded in a dominant narrative on global basis.

My first assumption thus is that the construction of an *Innovation narrative* in the Global South has followed a very similar process to the social construction of development as described by scholar like Arturo Escobar (Escobar, 2012). This construction created the fictitious feeling that the non-western countries that did not present the signs of an incipient modernity were 'under-developed' or not developed at all. In order to develop, the Global South had to invest in industrial infrastructure, accept the free market ideology and get rid of their cultural peculiarities. The more recent innovation narrative is just a more complex formulation of this credo. The innovation narratives basically advocate for investing in science and technology, opening the market, formalising informal economies and upgrading education system. This would increase the innovation capacity of the Southern countries. However as for the development programs, almost 5 decades of this thinking have created frictions and conflicts (Abrol, 2004; A. Smith, Fressoli, & Thomas, 2013). As neither innovation performance nor in many cases income have increased (whereas inequality has increased), the discourses on innovation have evolved towards different directions: i.e. the so-called Bottom of the Pyramid (BOP)[1] narratives (Prahalad, 2012), the narrative of social business (Yunus,

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[1] I refer here to 'BOP innovation' but I could have said more properly 'pro-poor innovation'. However I'll need to specify that labels and names are also part of a process of narratives' construction. That means that labels such as "BOP", "below the radar", "frugal", "jugaad" and so on also underlie different narratives (Pansera, 2013).

2010) to deal with poverty issues, political ecology, sustainable development and eco-innovation narrative to deal with the environmental issues grassroots narratives to deal with empowerment issues (Pansera & Owen, 2013). The interaction between the dominant discourse and the counter-hegemonic forces has created a new huge spectrum of alternatives. The aim of the following sections is to show 2 examples of those alternatives.

3   RESEARCH QUESTIONS AND METHODS

The empirical work that supports this paper is the result of two research projects carried out in Bangladesh and India between 2012 and 2013. The research draws on ethnographic data. Qualitative methods have usually been selected for research at the interface between formal and informal economy (Sánchez et al., 2005). A wide range of observational approaches that use inductive logic, often based on case studies, have been considered to be a more appropriate approach for this environment (Lee, 1999; Oosterlaken, 2011). The main benefit of qualitative research methods is that they enable a researcher to uncover and explore relationships in complex environments, disclosing the influence of the social and cultural context upon the unit of analysis (Shah & Corley, 2006; M. L. Smith & Seward, 2009). Reflecting this philosophy, I have employed a method based on an ethnographic mode of enquiry using non-participant observation (van Maanen, 1988), reflexivity analysis (Czarniawska, 2007; Ortner, 1984), and micro-ethnography techniques (Neyland, 2008).

Three main research questions have led my research journey:

- How is the concept of 'Innovation for development' constructed and how is it framed in certain narratives and embodied in certain organizations?
- What conflicts the narratives of modernity generate in non-western environment through the introduction of new pattern of consumption and production?
- Are social and environmental sustainability narratives constructed to reframe the ideology of growth or to foster it with more sophisticated tools of legitimation?

Those specific questions set the scene for a more basic research question about the very nature of innovation process thought as a process of *'deployment of scientifically pursued and valuable knowledge'*: What's innovation for? How is the expert-driven and scientific narrative of innovation constructed? By whom and why? If there are other constructions, how are these to be made visible? What is their relation to dominant models? How can this relation be modified given the global innovation discourse that prevails?

4   THE CASE STUDIES

4.1 Case 1 – Grameen Shakti: Renewable energy for 8 million of Bangladeshi

Bangladesh has been depicted as a country with   *"dysfunctional politics and a stunted private sector"* but one with surprisingly good development indicators when compared with its neighbours (the Economist, 2012). Bangladeshis enjoy a life expectancy four years longer than Indians, despite

the Indian being, on average, twice as wealthy (World Bank, 2013). These advancements are not a mere result of economic growth: according to financial figures, Bangladesh remains a poor country with a GDP per capita of US$1,900. Bangladesh has benefited from the extraordinary work of NGOs (Lewis, 2011). The NGO sector displays a strongly indigenous character and has been fundamental to the discovery of grassroots-level solutions to tackle poverty. Reflecting this, Bangladesh has recently been portrayed as a laboratory of innovative solutions for the developing world (Belt, 2011).

The Bengali company Grameen Shakti (GS) has developed an interesting market-based program with a social objective to address the energy demand of millions of rural villagers using renewable sources. GS is a branch of the Grameen Bank (GB) and is configured as a social business dedicated to the innovation and diffusion of renewable energy technology for rural Bangladesh. This includes a very successful range of Solar Home Systems (SHS), a promising technology to produce biogas and a popular programme of Improved Cooking Stoves (ICS) (Wimmer, 2012). GS has installed more than 3,200,000 solar home systems in rural areas in the last ten years (Grameen, 2012). GS adopted the GB's model to provide financial packages, which reduced costs and allowed an economy of scale to be achieved. The financial package also provides an extremely affordable annual maintenance contract. The GS model consists in a capillary coverage of the country with local branches and a regional network of Grameen Technology Centre (GTC) where female technicians are trained to assemble and repair all the components of the SHS. GS is also experimenting with micro windmill and biofuel technologies in innovation labs spread all over the country, drawing on local human and material resources.

GS constructs its innovation process around resource constraints as an important driver that frames innovation in terms of its purposes, motivations, dynamics and socio-cultural construction. GS's innovation framing embeds both elements of frugal innovation and social movements' narratives, locating this within a market based paradigm as a social enterprise that is culturally empathetic and which creates social values. The observed hybridisation is described in the following key elements:

(i)   Minimum use of materials and energy: Local materials are preferred where it is possible.
(ii)   'Good-enough' solutions: Products/services are deprived of all the unessential features that do not interfere with the main functionality.
(iii)   Deskilling processes: In order to minimise the need for a specialised labour force, those solutions must be simple to learn and easy to repair.
(iv)   Operational, service and management innovation: GS has to deploy and diffuse its solutions, including after sales support, at minimum cost.
(v)   Working institutional voids: GS draws on the failure of public and private sector to deliver reliable energy services.
(vi)   Leverage: existing GB networks, external providers, rural electrification schemes etc.
(vii)   Micro finance: GS assumes that the needs of low income people are better addressed by market financing mechanisms rather than charitable initiatives.
(viii) Social value: GS considers the access to energy for rural people essential for achieving social empowerment. This constitutes the very core of GS corporate values.
(ix)   Greening: environmental concerns are key drivers to attract investors and public support.
(x)   Empathy: the solutions are embedded in the local cultural context, although they often challenge establish powerful habits like patronage.
(xi)   Finally and surprisingly, resource-constrained innovation as framed in this particular case study seems to be a mean to covey modernity values such the need and the right to energy or the right to health and good education.

4.2 Case 2 – Mother Earth: promoting local eco-friendly manufacturing traditions

Mother Earth (ME) is an Indian retail company specialised in the commercialisation of rural Indian handicrafts. ME arises in 2011 from Industree Crafts, a social enterprise that dates back to 1994. The first intention of its founders, Neelam Chhiber and Gita Ram, was to help the rural artisanal sector, which they felt was "*treated as a sunset sector by the government*". Their vision was to leverage on urban markets to create demand for Indian crafts and reshape them in a new contemporary fashion. In 2011 the project was reorganised by introducing four different entities with four distinct functions: Mother Earth for Retail, Industree Crafts Pvt. Ltd. for manufacturing expertise, design and support, Industree Transform Pvt. Ltd. for Supply Chain and the Industree Crafts Foundation, the non-profit soul that work with the government and provide training to the artisans. In 2011 ME opened its first flagship store, an 11,000 square feet hall, in the posh Indira Nagar neighbourhood in Bangalore. Nowadays ME has 6 shops and 250 employees. The company planned to add on 40 stores by 2015 and reach a turnover of Rs. 1500 million. Neelam, one of the co-founder, started as a designer studying at the National Institute of Design in the '80s. She was fascinated by traditional Indian aesthetics but soon realized that the raising young middle class was largely influenced by western sensibilities. Neelam was so fascinated by artisan life that decided to invest her time living with them to understand their world. She spent a year living in a village and learning the ancient iron casting techniques that came directly from the Bronze Age. By working with traditional rural artisans Neelam realized that, despite their valuable skills in many manufacture sectors, they were not able to sell their products. Their traditional markets were disappearing and this was leading many of them to a shift in manufacturing to urban areas. There was a rampant migration, which had impoverished the rural artisans. But the newcomers had neither found a way to apply their skills into the modern manufacture industry nor to locate their products in the urban markets. What really struck Neelam, was the supply–demand mismatch in the home furnishings sector. The economic liberalization that followed the decade of the '90s exposed India to global competitors and their products. Plastic bins, mats and plates are cheaper and more resistant than their traditional fibre-made equivalent. Suddenly they realised that they had local production, which they were exporting and local demand for which they were importing. The idea of connecting rural producers and urban consumer pushed Neelam to look for investors. With the support of the social investor Gita Ram and co-founder Poonam Bir Kasturi, Neelam founded Industree Crafts was founded in 1994. The company was set up as a private limited firm selling contemporary items made by rural artisans from traditional craft techniques. The products were designed in-house but produced in the villages. The crafts were sold through Industree boutiques. At the same time Neelam started to participate to international fairs all over the globe in order to promote Industree products. As a consequence they created a niche in the natural fibres segment, exporting to over 25 countries in Europe and the United States. Nowadays, the Industree family is a hybrid entity that connects different kind of stakeholders (see Figure 6). Its non-for-profit soul, Industree Foundation, was founded to provide technical training and financial support to groups of rural artisans who were willing to form independent Self-Help Groups with the purpose of selling their production to Industree Crafts, the for-profit soul of the family. The products, manufactured following traditional techniques using eco-friendly materials, are designed, branded

and marketed by ME. Today ME offers a huge gamma of choice of male/female apparel, furniture, natural fibres objects, home linen, crockery and accessories[2].

ME's model is based on a network of Self-help Groups (SHG) spread all over the country. The model has been borrowed from Grameen Bank that popularised the creation of women SHG micro-credit loans to set up small businesses in rural Bangladesh. The model is quite diffused in the South-East Asia and consist in a group of 10-20 individual who sharing the risks and the benefits of small entrepreneurial ventures. ME's SHGs are composed mainly by women living in rural or peri-urban areas. They elect their own leaders who are in charge of providing the raw material for production and acting as an interface between the company and the group. They are supposed to share the profits equally among the members and save a small amount of them monthly. The savings can be used for the mutual assistance of the members in case of necessity.
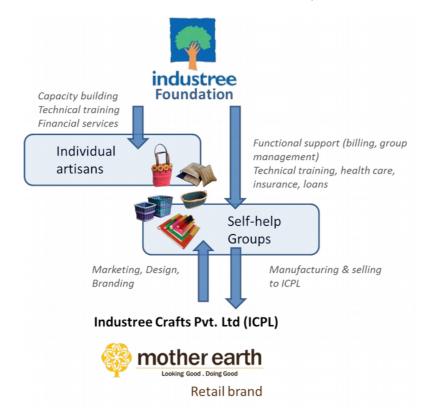

Figure 6 Mother Earth/Industree stakeholders' interaction model

The language used by the Industree/ME employees to describe the activity of training and organization of the SHGs sounded to me like a schooling jargon. Their approach to the villagers is structured on two basic levels. One is the improvement or upgrade of the artisans' skills. In the case of unskilled people their action results in a capability building process. This aspect is easily visible in the training process in which a set of practical skills and technical, managerial or financial capabilities are transferred from the company to the SHGs members. The second aspect is more subtle and concerns the transformation of the artisans as villagers into productive individuals. This process does not involve a concrete transfer of knowledge, information or practical skills but a mind-set, an

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2 http://motherearth.co.in/

attitude towards the work and productivity that is somehow alien to the locals. For the trainers, the villagers have not been exposed, at least the vast majority of them, to the possibilities that the city or the foreign markets offer. In order to disclose those opportunities under their eyes, they need to educate them.

The decision of Industree to scale up to reach as much artisans as possible projected the company in the highly competitive market of the retail industry. Such a new context requires a totally different organization of the production and, above all, implies the optimization of a supply chain that has not productivity and competitiveness in its DNA. But even though the new scenario is the wild arena of the emergent Indian capitalism, ME founders do not advocate for an industrialisation of the rural world. As Neelam said to me, Indian companies are scared by labour; on the contrary ME's mission is to be a successful labour-intense business. Since the transformation of rural life in ME's creators' minds does not pass through the confinement of the villagers into the factory, their emancipation cannot be achieved by any kind of unionization. Their empowerment passes through the sense of ownership and responsibility. They have to become entrepreneurs who are responsible for their production and proud of their work. The industree family, on the other hand, is a catalyser and a bridge that links the rural world to the modern market. But in the end, the final beneficiaries are the artisans and the employees of Industree/ME who collectively own the companies and collectively will enjoy the equity as soon as ME will be financially strong enough to distribute dividends to its stakeholders. This is in a nutshell the ME's corporate discourse.

5 THE DILEMMA OF THE APPROPRIATE TECHNOLOGY PARADIGM: A FORM OF POST-MODERNITY OR A NEW FORM OF DOMINATION?

While it is important not to generalise from two case studies, the empirical evidence suggests that a process of cultural hybridisation is occurring in what we call the Global South. This process evolves hybrid framings and narratives of resource-constrained innovation, elaborating them through a process of cultural *bricolage* which may at first appear to be paradoxical in nature. Both cases, indeed, leverage the market-oriented discourse typical of top-down narratives and combining this with concepts of empowerment and inclusiveness characteristic of grassroots narratives. Framed as social enterprises, innovation at GS and ME presents a combination of features that do not follow just a public-oriented or private-oriented approach to social welfare. Furthermore this evidence challenges the orthodoxy of institutional theory that argues that weak economic institutions discourage innovation (Fagerberg & Srholec, 2008; Freeman, 1995). The cases suggest that innovation can be constructed around new hybrid framings and narratives, appropriate for the context of conditions of resource scarcity.

Both cases may be emblematic for many reasons, but perhaps one the most important features witnessed was the concept of "embeddedness" in the field. In the cases this *closeness-to-the-poor*, grassroots narrative *coexists* with a market-oriented approach typical of top-down narratives. Both use market-based approaches to facilitate micro-financing packages, to attract international donors and to lever public incentive schemes.   At the same time the *closeness-to-the-poor, empathetic* framing allows access to rural communities, empowering and creating social value appropriate for the resource constrained context in which GS and ME operate, legitimising their work. Rural

communities all over the Global South rely on reciprocal services that are very often based on non-monetary exchanges (Martinez-Alier, 2009). They are still embedded in what Illich (1973, 2013) calls a convivial society where external influences may be received with a great deal of hostility. As a consequence, heterogeneity of the participants is one of the biggest obstacles to the diffusion of frugal and non-frugal innovation (Rogers, 1995). Empathy with the locals, real or pretended, is crucial in those contexts where cognitive gaps between producers and consumers are likely to be wider (Fyvie & Ager, 1999). As ethnographers like Sahlins (1993; 1992) have suggested, the impulse of development is generated from within, by a process of making sense of a window of opportunities created by contact with new technologies, new habits or social rules. As Schumacher (1973) argues, "*development cannot be an act of creation, it requires a process of evolution. The change must stand in some organic relationship to what local people are doing already*". Thus, despite the potential offered by globalization, robust evidence from all over the developing world suggests that the benefits of technology diffusion can only be delivered with parallel indigenous innovation (Fu, Pietrobelli, & Soete, 2011).

However this process is not painless. It embodies specific political directions and creates tensions and frictions between new comers and incumbent actors whose dominant positions might be affected by the change. In Bangladesh, for instance, the Grameen institutions are often opposed by the government establishment that worries about the increasing sphere of influence of the NGOs in the country. In the case of ME, a whole process of transformation of the traditional village life is on-going. The villagers, indeed, are depicted as *'uneducated and unexposed'*; they need to be trained and introduced to the notion of efficiency and productivity that are alien to their life. Although their skills of manufacturing eco-friendly and appealing products are recognised, the way they organise production and distribution is considered primitive, obsolete and inefficient. Both cases are emblematic examples of post-modern adaptation of traditional settings to the pressure of modernity. Both cases present hybrids elements that reject the dichotomies profits-driven/socially-driven, top-down/bottom-up, public/private. However the process of transformation of villagers into electricity consumers in the case of GS and into efficient producers in the case of ME has no clear implications in terms of empowerment and freedom of the stakeholders involved. Are energy and efficiency tools for emancipation or are they rather a more subtle instrument of dependency? The collectivization of traditional artisans in India and the technological upgrade of their eco-friendly technology certainly provide a new source of extra income. On the other hand, the same process creates a stronger dependency on the urban markets. This dependency is not based on an equal distribution of power between ME and the artisans. In short, GS and ME in their respective cases are in the position of deciding which kind of technology and which kind of organizational settings their clients/suppliers should adopt. In conclusions we can only state that the clash between modernity and traditional societies is generating interesting hybrids narrative as regards technology and innovation process. On the other hand, the risk that this process perpetuates new form of dependency and domination is still very high.

6 CONCLUSION

One billion people live in the least developed countries and four billion people live in the so-called developing countries (Collier, 2007). The study of innovation in those contexts is extremely important in order to understand the future framing of innovation in a world in which population growth is

certain and resource scarcity and insecurity will become increasingly ubiquitous. The evidence shown confirms the idea that innovation occurs *despite* and maybe *because of* resource constrains (Srinivas & Sutz, 2008) usually when a combination of four factors occurs: institutional weakness/voids, resource and environmental constraints and strong social and cultural motivations. These findings challenge approaches to innovation that privilege either the boosting of formal R&D programs, capital investments, and entrepreneurship or of pure grassroots, low scale and appropriate technologies initiatives: both may be insufficient to face a multipolar and unstable global society facing a future of resource constraint and insecurity, and suggests innovation policy could productively focus on the emergence of new locally-oriented hybrids narratives in the face of resource scarcity as an emerging global paradigm. In particular further understanding of conditions under which hybrid narratives emerge and how to integrate such hybrids in the process of policy making may offer new avenues for innovation policy discussions. Moreover, the phenomenon highlights the need for a cultural politics that takes seriously the *co-existence* of innovation framings from *both* the developed and developing world (Escobar, 2012), which are united by the linked challenges of resource constraint, resource insecurity and environmental sustainability. In this hybridisation, I suggest a multi-universe of innovation framings and models that cohabit and interact with various formulations of narratives of top down, market based innovation, and grassroots innovation will exist. These hybrids are not always openly in tension or in contradiction with the hegemonic narratives but continuously absorb and rearrange such models through a process of cultural bricolage. Finally, I speculate whether this bricolage is destined to reproduce the consumerist model typical of Western innovation-driven cultures or rather presents new and unexpected features or even a novel innovation paradigm fit for a world of resource constraints, population pressures, environmental change and sustainability challenges? This study has no clear answer to such a question.

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