



Contents lists available at ScienceDirect

## Technological Forecasting &amp; Social Change



## Catalysing innovation for social impact: The role of social enterprises in the Indian sanitation sector

Shyama V. Ramani<sup>a,\*</sup>, Shuan SadreGhazi<sup>a</sup>, Suraksha Gupta<sup>b</sup><sup>a</sup> UNU-MERIT, Boschstraat 24, 6211 AX Maastricht, The Netherlands<sup>b</sup> Kent Business School, University of Kent, Canterbury CT2 7NZ, UK

## ARTICLE INFO

## Article history:

Received 6 February 2016

Received in revised form 10 October 2016

Accepted 18 October 2016

Available online xxxx

## Keywords:

Social entrepreneur

Social entrepreneurship

Social enterprise

National system of innovation

India

Sanitation

Base of the Pyramid (BoP)

## ABSTRACT

One of the roles of social entrepreneurship within a national system of innovation (NSI) is to generate and ensure effective adoption of innovations that address underserved needs. However, many such innovations do not achieve the expected social impact. Why? Our paper explores answers to this question by considering access to sanitation as a basic need and 'toilets' as an innovation for those who had no prior access to one. We trace the evolution of the Indian sanitation sector and then delve into the process of sanitation coverage in an Indian village. We show that demand for social entrepreneurship is being increasingly satisfied by third party sponsored social enterprises. However, there is systemic uncertainty about the efforts required to catalyze demand and strategic uncertainty about the social enterprise's capabilities and intentions. Long term impact is jointly determined by the true intention of the social enterprise, its capabilities and the nature of contextual challenges. Therefore, forecasting of social change should integrate the incentives within NSI for social entrepreneurship to make high-quality sustained social impact rather than short-lived ones. This will not only depend on the willingness to adopt, but also the monitoring systems, impact analysis and sustainability audits that social entrepreneurship is subject to.

© 2016 Elsevier Inc. All rights reserved.

## 1. Introduction

As of 2010, only 46.9% of the 246.6 million households in India had their own toilet facilities, 3.2% had access to public toilets, which left the remaining while 49.8% households no option but to defecate in the open (Census of India, 2001). In rural areas, where 68.84% of the population lives, the percentage of households without toilets was 69.3%, while in urban areas it was 18.6% (Census of India, 2001). Clearly such a lack of sanitation signals an underserved need (Ramani, 2008; JMP, 2012) jeopardizing health and human dignity (Ramani et al., 2008; UNHR, 2011; Water Aid, 2012). On the other hand, the census reported that 53.2% of the households had a mobile phone (Census of India, 2001).

These statistics raise a puzzle. Starting from the premise that any product is an *innovation* for a potential user who currently has no access to one, both toilets and mobile phones are akin to innovations for households which never used them before. Moreover, an artefact such as a low cost toilet is associated with a simple technology, whereas a cell phone embodies a much more sophisticated and complex technology. There is an extensive literature on diffusion-adoption (Geroski,

2000; Rogers, 1962), including how firms select and assess technology opportunities (Walsh and Linton, 2011). At a systemic level, the seminal work of Griliches (1957) still provides insight. Griliches (1957) pointed out that technical and commercial 'availability' and consumer 'acceptability' of an innovation are the two main drivers of diffusion. Here, the mobile phone beats toilets at all levels, because being a profitable product, firms have sought to make it available in a variety of quality-price ranges and its utility as a means of communication has led to its near-seamless adoption, making it ubiquitous even among the Base of the Income Pyramid or BoP communities (Anderson and Markides, 2007). By the BoP, we refer to the largest but poorest socio-economic groups in the global income pyramid working in predominantly informal markets and living on a few dollars a day (Pralhad and Hart, 2002). Clearly, it is not enticing to firms to make low-cost toilets, which cost at least 10 times more than a cheap mobile phone, 'available' to the BoP, especially as additional efforts are required to make users 'accept it' and change their behaviour away from open defecation (Ramani and Parihar, 2015). Following Griliches (1957), for social welfare enhancement, one would expect the State to enter as a player in the national system of innovation (NSI). Further, if this was insufficient, we would expect social entrepreneurship to address this needs-gap. This last factor is indeed what our paper seeks to explore, as it is likely to give us insight on the role of social entrepreneurship within an NSI as a carrier of pro-poor innovations, whose social and economic value

\* Corresponding author.

E-mail addresses: ramani@merit.unu.edu (S.V. Ramani), ghazi@merit.unu.edu (S. SadreGhazi), S.Gupta@kent.ac.uk (S. Gupta).

are self-evident, even when the need is not explicitly expressed by under-served communities.

Sanitation coverage has direct consequences on economic growth and regional development via promotion of environmental security and health, and thereby labour productivity and income generation (Ramani and Parihar, 2014). Even in 2015, there were 2.4 billion people worldwide who lacked access to an improved sanitation facility, i.e. a toilet that is connected either to a public sewer, or a septic tank or some pit in such a way that the air, water and soil in and around the pit are not contaminated (JMP, 2015). Furthermore, 90% of those practising open defecation lived in rural areas (JMP, 2015). Thus, governments of developing countries like India are determined to improve sanitation coverage as exemplified by the adoption of the 17 Sustainable Development Goals (SDGs) in September 2015 by the UN General Assembly (<http://sbm.gov.in/sbm/>). To celebrate Mahatma Gandhi's birth anniversary, on October 2, 2014, the Indian Prime Minister Narendra Modi inaugurated the Swachh Bharath Mission (SBM) or Clean India Mission, whose central objective is to eliminate open defecation in India through installation of toilets and triggering of behavioural change by 2019. Similarly, SDG 6 not only aims to ensure availability and sustainable management of water and sanitation for all by 2030, but also to eliminate open defecation. (<https://sustainabledevelopment.un.org/sdg6>).

In order to study how inclusive development goals such as the above may be attained, scholars are turning to NSI as a framework of analysis in different parts of the developing world (Srinivas, 2014; Hart et al., 2014; Cassiolato et al., 2014). Indeed, the need to forecast optimal pathways for achieving the SDGs leads us to study the functioning of the NSI in novel ways (Ramani and Szirmai, 2014). For the most part, as a conceptual framework, the NSI has been used to trace how innovation generation occurs as a country specific phenomenon, leading to the accumulation of industrial capabilities, and thereby economic growth. However, when the focus is shifted from 'innovation for economic growth' to 'innovation for inclusive development' towards goals such as SDG 6, wherein innovations like toilets have to be diffused and adopted, three central questions are opened up on the NSI.

First, how is the *diffusion* of pro-poor innovations to be incentivized via social entrepreneurship? By pro-poor innovations we refer to product and services that cater to the essential needs such as healthcare, housing, food, water and sanitation or enhance productivity and income-generation capacity (Mendoza and Thelen, 2008).

Second, how is the *adoption* of pro-poor innovations to be incentivized via social entrepreneurship? Inclusive development calls for positive social impact on the poor. This means that it is not the market transactions or non-market transfers of the innovation that alone matters – but also the effective adoption of the pro-poor innovation.

Third, given the above mentioned problems on the supply and demand sides respectively, should new actors be found to assure production and especially impact creation of innovations like sanitation? What about social entrepreneurship as an NSI pathway? At present, while policy makers and scholars recognize that within the NSI, social entrepreneurship has a crucial role to play as an innovation carrier, they are much less clear about how an NSI ought to catalyze this process for optimal social impact.

The answers to the above questions developed in the present paper constitute its contribution to the literature on NSI and social entrepreneurship. A set of theoretical constructs are proposed from a survey of the existing literature to distinguish the role of social entrepreneurship within the NSI as effectuated by social enterprises. Then, these are confronted with the Indian sanitation case study to understand how social entrepreneurship diffuses pro-poor innovations within a system and promotes adoption among target beneficiaries. The pursuit of improving sanitation coverage forms a useful backdrop to answer the research queries, because the last two decades have indeed witnessed a perceptible shift in public policies to promote coverage through multi-stakeholder platforms (Iles, 1996). By focussing on the

functioning of social entrepreneurship as a diffuser of toilets, the elements to be integrated for the forecasting of social change through new technology diffusion in the context of deep poverty are identified.

The remainder of our paper is organized as follows. Section 2 presents the literature survey on social entrepreneurship and the theoretical constructs on the role of social entrepreneurs within an NSI. Section 3 presents the case study methodology for its validation. Section 4 contains the Indian sanitation case study. The dynamics of the sectoral evolution of sanitation is examined first, followed by a reconstruction of the history of sanitation coverage in a village called Kameswaram. Section 5 discusses the results and Section 6 concludes.

## 2. From technology to social impact

In this section, we briefly analyse the NSI literature and that on social entrepreneurship to infer a set of theoretical constructs on how social entrepreneurship acts as a conduit for inclusive development via social enterprises.

### 2.1. Innovation, NSI and social impact

To tackle global challenges in healthcare, water, energy, environment and food, a variety of creative enterprises are generating and diffusing innovations using both emerging and disruptive technologies (Groen and Walsh, 2013). Viewed from the user perspective, whenever a commodity or service that has never been used by the target beneficiary is proposed to him or her, then that commodity or service is akin to an innovation vis-à-vis the beneficiary. Furthermore, if adoption and/or use of the innovation improves the quality of life and/or the livelihood possibilities of the intended BoP beneficiary significantly, then it is a pro-poor innovation as well. Sanitation is a typical example of a pro-poor innovation. One of the goals of social entrepreneurship is to create, diffuse and sustain innovations i.e. make new offerings to the community that generate social and/or environmental value. Armed with these assumptions, the framework of the NSI can be applied to study the institutional ecosystem surrounding pro-poor innovations carried by social entrepreneurship.

According to the NSI framework, the creation, commercialization and adoption of innovations are collective processes embedded within a system specific to the country concerned (Lundvall, 1992; Nelson, 1993; Freeman, 1995). The innovation diffusion trajectories are path-dependent and traced as a function of the existing networks between the state and a variety of organizations such as firms, consumers, public laboratories, universities, financial institutions and civic associations. The NSI framework has also been adapted to study sectoral dynamics (Malerba, 2002).

The main objective of the NSI studies has been to seek and identify firm strategies and government policies to build capabilities for boosting industrial and/or economic growth. Pro-poor innovations have received scant attention. For new technology led growth, financial-institution capabilities to bear the costs of risky investment (Gerschenkron, 1962) and an educated work force with social capabilities (Abramovitz, 1986) are deemed very important. Innovation creation is boosted when public labs with scientific capabilities and firms with technological capabilities (Lall, 1992) as well as intrapreneurial capabilities (Athreye et al., 2009) interact with support from the state (Etzkowitz and Leydesdorff, 2000). In addition, intangible assets such as organisational and network capital are crucial, contributing to the innovativeness of firms in regional innovation systems (Kramer et al., 2011).

There is also an extensive literature on how governments can facilitate new technology creation and business entrepreneurship in mainstream sectors, though scholars note that government policy does not sufficiently recognize the contribution of small organizations to employment or innovation creation (Birch, 1987; Kirchoff, 1994; Kirchoff et al., 2013). They point out that more than size, the quality

and magnitude of market impact should guide policy to support techno-entrepreneurship. This problem is compounded in the case of social entrepreneurship as the intended impact is more social than economic.

Finally, there is an emerging stream, of which the present work is one, exploring the application of NSI as a tool to study the process of inclusive development via introduction of pro-poor innovations. For instance, Schumacher (1973) advocates ‘appropriate technology’ i.e. making optimal use of local resources to develop technologies at lowest cost for the needy. In a similar vein, Hart and Christensen (2002) and Prahalad (2005) propose that firms should pay attention to affordable and accessible incremental or disruptive innovations to create or leverage payoffs from markets at the BoP. In contrast, Ramani and Mukherjee (2014) highlight that radical product innovations (e.g. genetically modified seeds) and radical process innovations (e.g. accessible HIV/AIDS drugs cocktails) have also been made accessible to BoP communities profitably. On a global scale, innovators in emerging countries, operating under tremendous resource constraints, are producing frugal innovations that eventually make their way to global markets (Kaplinsky, 2011). Thus, it should come as no surprise that scholars are beginning to study how the NSI can promote the creation and diffusion of these different kinds of pro-poor innovations for inclusive development, in addition to the conventional innovations for economic growth (Ramani and Szirmai, 2014).

2.2. On social entrepreneurs, social enterprises and social entrepreneurship

The three terms forming the heading of this section are increasingly popular buzzwords. Indeed, research on these terms has been triggered by the socio-economic and environmental impact of practitioners (Mair and Marti, 2006), but their precise definitions and distinctions remain fuzzy. Thus, following upon the comprehensive survey by Bacq and Janssen (2011) of the social entrepreneurship literature, we start by classifying these terms on the basic understanding that the first term, a ‘social entrepreneur’, refers to a certain type of individual; the second term, a ‘social enterprise’ is an organizational form; and the third term, ‘social entrepreneurship’ is a process. Different scholars have defined these terms in different ways, as proved by two independent reviews of the literature on social entrepreneurship and social entrepreneurs by Zahra et al. (2009) and Dacin et al. (2010) that identify 20 and 37 definitions respectively. Therefore, for the sake of clarity, we distinguish between the three terms as shown in Table 1. These form the foundation of our theoretical constructs.

As Table 1 shows, both social entrepreneurs and social enterprises are primarily focussed on making a social impact, but social enterprises pursue their organizational goals with a business mindset. Furthermore, social entrepreneurship can be considered as a social value generation activity practised by a variety of economic actors ranging from individuals, micro-enterprises to large firms. Like any corporate venture, social enterprises tackle social problems only if they can leverage adequate resources, whereas social entrepreneurs practise entrepreneurial effectuation and are more likely to make do with what they have (Sarasvathy, 2001). Thus, both social entrepreneurs and social enterprises have overlapping objectives and require similar capabilities.

The categorization of Table 1 also lends us clarity on what is a social enterprise. We infer that in order to be a social enterprise, three conditions must be fulfilled: (i) the market or non-market offering must address a social need; (ii) the organization must be financially viable, either through their direct offerings (either through market or non-market routes) or via third party financiers like foundations and public agencies that support their activities and offerings to the community; and (iii) the organization must apply business management principles in its internal governance, marketing and delivery of goods/services.

First, social activists are not necessarily social entrepreneurs. They have a social mission but they do not always integrate business/management principles to handle their efforts. Their livelihood does not always depend on the outcome of their social mission.

**Table 1**  
On the ‘social’ and ‘private’ parts of social entrepreneur, social enterprise and social entrepreneurship.

Social entrepreneur The individual	Social enterprise The organization	Social entrepreneurship The process
Objective: To create, sustain, distribute or disseminate social or environmental value in order to maximize social welfare while being financially sustainable <sup>b</sup> .	Objective: To create, sustain, distribute or disseminate social or environmental value to maximize social welfare in order to attain the objectives of the enterprise which could range from financial sustainability and/or maximization of returns to its staff and/or growth of the organization (Lévesque and Mendell, 2005).	Objective: To create, sustain, distribute or disseminate social or environmental value rather than maximize shareholder value or personal wealth or commercial profits (Zadek and Thake, 1997)
Trigger: Identification of a ‘social or environmental problem’ <sup>b</sup> .	Trigger: Identification of a ‘social or an environmental problem’ and the ‘resources to solve the problem’ (Lévesque, 2004).	Trigger: Identification of a ‘social or environmental problem’ with or without the resources <sup>b</sup> .
Drivers of activity: capabilities to resolve social/environmental problems using market-based approaches and practising financial bootstrapping and/or bricolage (Zahra et al., 2009).	Drivers of activity: capabilities to resolve social/environmental problems as business opportunities that can be tackled with a market based approaches (Seelos and Mair, 2009).	Drivers of activity: possibilities for resolving social/environmental problems using market based approaches whether or not there is a business opportunity and/or adequate resources.
Traits of the individual:	Traits of the organization:	Traits of the process:
<ul style="list-style-type: none"> <li>- Makes a high impact with frugal use of resources<sup>a</sup></li> <li>- Applies business management principles<sup>a</sup></li> <li>- Creative, radical, committed, compassionate and effective (Miller et al., 2012)</li> <li>- strong social networks (Shaw, 2004).</li> <li>- Adept in communicating and presenting the hard realities of the society creatively so that they come across as solutions to the organisational objectives or business needs of the funders (Mallin and Finkle, 2007).</li> <li>- Adept at relationship marketing (Morgan and Hunt, 1994; Gupta, 2015).</li> </ul>	<ul style="list-style-type: none"> <li>- Makes a high impact with frugal resources<sup>a</sup></li> <li>- Applies business management principles<sup>a</sup></li> <li>- strong social networks and dense personal contacts of the founders (Shaw, 2004).</li> <li>- Adept in communicating and presenting the hard realities of the society creatively so that they come across as solutions to the organisational objectives or business needs of the funders (Mallin and Finkle, 2007).</li> </ul>	<ul style="list-style-type: none"> <li>- Makes a high impact with frugal resources<sup>a</sup></li> <li>- Applies business management principles to create social value (Austin et al., 2006; Sharir and Lerner, 2006)</li> <li>- Generates a flow of information and persuasive arguments to create awareness and interest in order to develop a flow of funds to create social value or resolve a social problem (Sodhi and Tang, 2011).</li> </ul>
Revenue model: Any combination of payments from: (i) the target beneficiaries; (ii) own donations; (iii) public grants, (iv) donations from the public or other organizations; and (v) payments for products/services from other organizations - to support the activities of the entrepreneur or the enterprise. <sup>a</sup>		

Note: References are mentioned wherever possible; otherwise, the concepts have been coined by the authors compiling the sense of the various articles in the literature.

<sup>a</sup> Implies that the associated observation has been made in most of the articles in the literature.

<sup>b</sup> Refer to authors’ own formulations in keeping with the essence of the literature.

Second, NGOs, charities and public agencies are not necessarily social enterprises. For instance, an NGO that works on collecting and preserving old stamps in a country would not qualify to be a social

enterprise. Even if it generates resources through entrepreneurship or entrepreneurial activities, the final outcome of a 'historical stamp collection' is unlikely to address a pressing social need. However, an NGO that addresses a direct social need such as access to medicines or taking care of the elderly, with contracts from the government or firms could be considered as a social enterprise. More often than not, NGOs, charities and public agencies have a checklist approach and are rarely forced to engage in entrepreneurial opportunity recognition within a system to innovatively solve problems or raise funds.

Third, *CSR divisions or corporate social responsibility units* are also not social enterprises because their ultimate purpose is to augment firm value through engagement in community development. However, they can practise social intrapreneurship in their philanthropy or CSR projects. Nevertheless, there are warnings about the perils of combining social missions with commercial activity and the potential trade-offs that may jeopardize the social missions of the enterprise, especially in poverty contexts (Garrette and Karnani, 2010; Rashid, 2010).

Fourth, *corporate foundations* engaged in social welfare generation may be considered as social enterprises, if their primary mandate is their social mission. But this is difficult to confirm as true intentions become known only over time and with appropriate measurements. Well known examples of foundations that are considered to be social enterprises are the Bill and Melinda Gates Foundation and Google.Org.

Fifth, the distinction of not-for-profit vs. for-profit does not apply to categorize a firm as being or not being a social enterprise. An enterprise is identified as being social or not given the objective of its activities combined with the pursuit of business sustainability through application of rational management principles. How an enterprise redistributes its profit does not determine its categorization as a social enterprise. Social enterprises can be community based, theme based or both (Ratten and Welpel, 2011) and they may or may not require external intervention for success, even in the context of poverty (Handy et al., 2011).

Finally, just as in the case of a business enterprise, which may or may not be linked to an entrepreneur, a social enterprise may or may not be founded or associated with a particular social entrepreneur per se. Thus, both social entrepreneurs and social enterprises practise social entrepreneurship, albeit with slight differences.

### 2.3. Social enterprises within an NSI

Any entrepreneurial process comprises four important components: 'opportunity recognition', 'development of the solution concept', 'actualisation of the solution' and 'harvesting' (Davidsson, 2012). In social entrepreneurship, 'opportunity recognition' simply refers to identifying a social problem, while for business entrepreneurship it refers to a chance to earn profit. Similarly, the objective of social entrepreneurship is to maximize social impact, while for business entrepreneurship it is usually to maximize profit. However, both types of entrepreneurship involve experimentation to develop a solution concept and to mobilize resources and networks for actualization and leveraging benefit from start to finish.

In the same vein, designing an innovation, product or service that is a good fit for a context forces a social entrepreneur to think like a business entrepreneur albeit vis-à-vis consumers who may not be willing or able to pay. The innovation must serve an unmet or underserved need and the price/performance ratio must be attractive and accessible (Christensen et al., 2006; Hart, 2005) and function efficiently in the targeted context (Pralhad, 2005). Furthermore, it must be compatible with the cultural and socio-economic constraints of the context (Katz, 1961; Rogers, 1962). The entire marketing strategy should take into account socio-cultural norms, power groups and thought leaders (Kotler et al., 2006; Letelier et al., 2003).

However, the BoP context presents a number of challenges from the demand side not usually associated with mainstream consumers. The consumers may not 'want' the innovation even if it can augment their

income generation capabilities (Kaplinsky et al., 2009). They may lack the knowledge (Kotler et al., 2006), assets (Reddy et al., 1991) and/or skills (Jeffrey and Seaton, 2004) to adopt and use the innovation effectively. Significant behavioural changes may be required on the part of users, which they may not be willing to make (Abrahamson, 1991; Rogers, 1962). The innovation may not be compatible with multiple local systemic features (Stewart, 1977) such as institutions needed for sustaining demand (Ramani et al., 2012). Finally, social impact may be obstructed by power groups which misappropriate the innovation and bar its access (Klein and Sorra, 1996).

Another crucial distinction between business entrepreneurship and social entrepreneurship is that for the former, market sales are the end objective, whereas for the latter, it is not enough to just diffuse the innovation among the target users. Social enterprises must also ensure that the innovation is adopted effectively. For instance, malaria bed nets may be diffused among a rural community, but if the households do not use them properly to avoid mosquito bites, or do not re-apply the required mosquito repellent coating on the bed net when needed, the incidence of malaria may not fall (Minakawa et al., 2008). Thus, financiers such as the state, international and national agencies and large firms interested in social impact investing are seeking out social enterprises to implement welfare enhancing projects (Christine et al., 2008; Dees, 2007) and in this process social enterprises are getting embedded more densely within the NSI (Alvord et al., 2004).

Large companies which want to promote their own business agenda while demonstrating their commitment and social responsibility to the BoP are issuing contracts to social enterprises to undertake developmental activities in the latter's area of expertise (Lee, 2008; Reed and Reed, 2009). Social enterprises are used to create new markets or expand existing BoP ones (Chesbrough, 2006; Dahan et al., 2010; Webb et al., 2010) by developing an emotional connection with the targeted consumers via life-quality enhancing activities and projects (Sridharan and Viswanathan, 2008; Ulhøj, 2005). Social enterprises are helping to create or augment stakeholder loyalty by catering to the needs of the local community in which the firms operate (Dahan et al., 2010; Hart and London, 2005; Webb et al., 2010; Joyner and Payne, 2002; Kapelus, 2002).

Public agencies are also seeking social enterprises to act as research and development units to find solutions for intractable social problems (Leadbeater, 1997). Often managers of funding bodies do not have contemporary knowledge about the needs of their target beneficiaries or the environment in which they make their socio-economic decisions, and here, social enterprises are most useful to design delivery platforms for transferring value (Psychogios and Szamosi, 2007). Thus, policy makers are using social enterprises as a means of regenerating underserved communities, creating a culture of social inclusion and delivering public services in more effective and cost efficient ways (Harding, 2004).

Surprisingly, despite the deeper embedding of social enterprises within NSIs, the potential of social entrepreneurship to bring about positive transformative changes in the context of poverty remains understudied (Rashid, 2010). Indeed, Mair and Marti (2006) argue that the interaction between the social entrepreneur and the context should be the fundamental unit of analysis for studying the process of social entrepreneurship, but there is scant understanding about the mechanisms and processes of social impact in the context of poverty. On an even larger scale, Lundvall et al. (2009) note: "innovation system researchers are yet to develop an institutionally grounded theory of entrepreneurship." This calls for more reflection on the role of social entrepreneurship as a carrier of pro-poor innovations within an NSI. For the remainder of the paper we will focus on social enterprises rather than social entrepreneurs noting that while the intent or purpose of the activities of both the social entrepreneur and the social enterprise is to promote social welfare, the short term organizational objectives and constraints of the social enterprise may be broader than that of a social entrepreneur.

## 2.4. Theoretical constructs

From Section 2.2, we can illustrate the entrepreneurial process mobilized by social enterprises to generate social impact as shown in Fig. 1. Though represented as a linear process, in reality it is often a non-linear iterative process with complementarities and feedback loops. Moreover, while the main phases of the entrepreneurial process are the same for business and social entrepreneurship, the nature of the processes within each phase to realize the targeted outcome are very different.

Social enterprises are embedded within the NSI as shown in Fig. 2. The density and variety of their interconnections with other systemic stakeholders is growing. For a social enterprise we can divide the actors in the NSI with which it networks into two broad groups – those who provide the resources and those who must be helped. The state and public agencies provide contracts to implement developmental projects involving pro-poor innovations. Volunteers provide labour to carry out a number of tasks for free or minimal cost, releasing resources for other purposes. Firms take on social enterprises as their partners in their philanthropic or CSR projects. Social enterprises thus leverage different kinds of resources from their different partners to transform them into innovations that are delivered to achieve a social impact. Social enterprises act as the catalysers which transform the resources from the providers into innovations for intended beneficiaries such that there is a positive social welfare enhancing transformation. The positive social impact of the efforts of the social enterprise forms the returns for resource providing sponsors.

Social enterprises and financiers are connected through the business model whereby the financiers pay social enterprises for generation of social impact as shown in Fig. 3. Such undertakings are often risky, because positive social impact is uncertain given the systemic uncertainties and challenges associated with the target context.

This completes our theoretical construct and now we move on to the Indian case study to explore to what extent the reality corroborates the theory.

## 3. Methodology

We have opted for the case study approach to validate and refine our theoretical constructs formulated from the survey of the literature. The case study method is useful whenever the purpose of the scientific

query is to understand the ‘how’ rather than the ‘why’ of a process (Eisenhardt, 1989; Yin, 2002). The evolution of sanitation coverage (or rather non-coverage) in rural India is the process against which our theoretical constructs are tested.

As defined by Yin (1994), a case study is an empirical inquiry that is suitable for studying complex social phenomena, especially for research on contemporary happenings when boundaries between the phenomenon and its context are not clearly evident. This exactly fits the conditions of our enquiry. Moreover, the case study method is preferable to a large-scale statistical analysis, when there are no secondary sources of data on the parameters of the theoretical model and/or observations through proxies are not sufficiently high or adequate (Urias, 2015). Nevertheless, we pooled a variety of data drawn from primary and secondary sources to construct the case studies.

In what follows, we present two brief case studies at the sectoral level and at a village level respectively and analyze them. The sectoral study is compiled from the existing economics literature on sanitation drives in India as well as government documents. The village case study is based on the data accumulated by the first author over a period of ten years (from 2005 to 2015) as a development practitioner in a multi-stakeholder platform to improve sanitation coverage in a typical Indian village through social entrepreneurship. The data used comes from extensive memos, reports to donors, notes by villagers and emails exchanged as a participant-observer in sanitation drives both in that village and in other villages of India. The notes were taken during interactive sessions (informal get-togethers, strategic discussions, public meetings etc.) with different stakeholders in sanitation projects, such as rural households, social enterprises undertaking the installation of toilets, micro-finance institutions and local and district level government officials.

## 4. Evolution of sanitation coverage in India: sectoral and village-level dynamics

At the end of WWII, household toilets in urban and semi-urban India were either toilets with septic tanks or traditional dry toilets. While a septic tank needed to be emptied only once every 2–5 years depending on the size of the tank and the rate of usage, traditional dry toilets had to be emptied on a daily basis, usually by members of the conventional scavenging caste. In rural areas, almost the entire population practiced

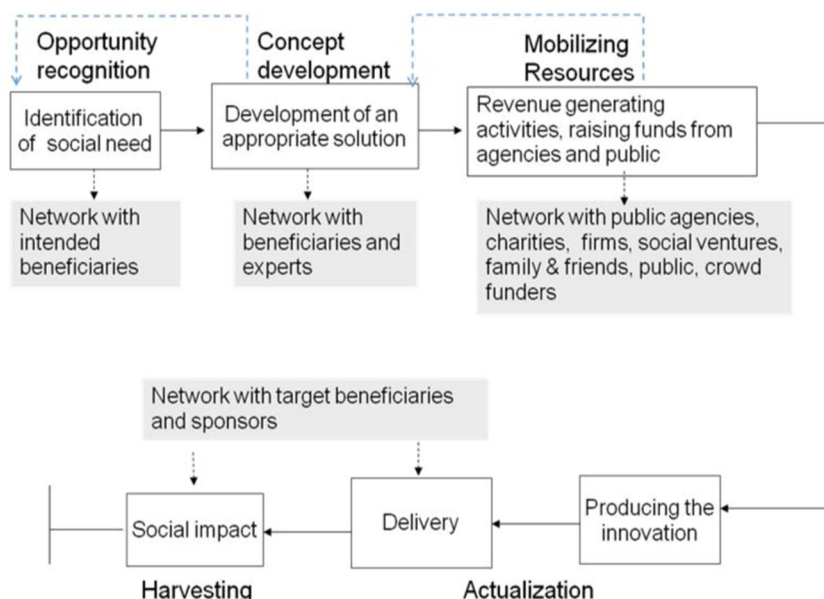


Fig. 1. The entrepreneurial process of social enterprises for social impact \*represent phases common to business and social entrepreneurship.

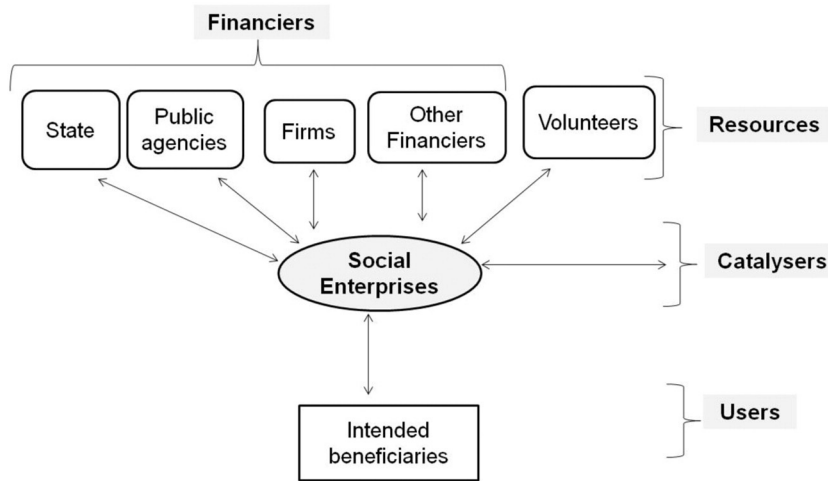


Fig. 2. Embedding of social enterprises within an NSI.

open defecation. The sanitation market was in equilibrium without any innovative activity being undertaken. The psychological costs of outsourcing maintenance services of dry toilets to those belonging to a manual scavenging caste were not high enough for this option to be rejected. But this unjust market equilibrium was overturned by social entrepreneurs and social enterprises.

4.1. Evolution of sanitation coverage in India: sectoral case study

4.1.1. Social entrepreneurs (1940s–1990s)

Two notable social entrepreneurs who transformed the Indian sanitation sector were Mahatma Gandhi and Bindeshwar Pathak. There were also other social entrepreneurs who had local impact, but for the purposes of the present paper, we will focus on these two social entrepreneurs because they had the most impact at the national level.

The first remarkable social entrepreneur to search for a better sanitation technology was unsurprisingly the leader of India’s freedom movement and one of the greatest fighters against caste oppression in India, namely M.K. Gandhi, popularly known as Mahatma Gandhi (Mehta, 1996; Pathak, 2011). He launched a call to search for a toilet technology that could be maintained without the help of either agencies or scavengers. In his ashram (or retreat), he broke all taboos by experimenting with different models of ‘dry closets’ and different modes of maintenance of the traditional dry toilet. His biggest

achievement was to get his followers to clean the experimental dry toilets by setting an example himself. While Gandhiji’s experiments did not give rise to any technological innovation, his writings, his speeches and the routines for toilet maintenance that he initiated created a collective consciousness with a systemic impact. The need for a new toilet technology, accessible to all and capable of being maintained autonomously came to be recognized, at least by some.

Bindeshwar Pathak, a young sociology student and a follower of Mahatma Gandhi, realized the Gandhian dream in the 1970’s by introducing a toilet with a new design that could be easily maintained autonomously by the user without having the intervention of any external agency or manual scavenger for maintenance. Just like Gandhi, he too felt that the toilet was an instrument of empowerment, for both the scavenger community and for women. Sulabh, the social enterprise he founded in 1970, has been diffusing this model of the toilet ever since and Pathak has been the recipient of numerous national and international awards for the social impact achieved by Sulabh (Pathak, 2011).

The Sulabh toilet looks just like the standard Indian squatting style toilet slab with one hole for flushing, but, instead of the flushed waste going directly into the ground or a septic tank or to a central sewer canal, it falls into one of two deep pits that are outside the toilet. When the first pit is full, the family switches to a second pit, while the waste in the first pit gets gradually and naturally transformed into a rich material that can be removed and used as dry, powdery fertilizer. When the second pit is nearly full, the first pit can be emptied (manually but without problems as faeces would have been transformed into compost in the form of fine dust) and its contents can be used as compost. Therefore, the two pits can be used alternatively and continuously (Tilley et al., 2006).

Thus, till the 1990s, the only active NSI actors in the sanitation sector were social entrepreneurs. However, neither Fig. 1 nor Fig. 2 apply as a representation of their activities, as they operated in quasi isolation, raising funds directly from beneficiaries or from social networks in order to be financially viable. Moreover, the lack of sanitation in rural India could not be attributed to a lack of technology availability in the NSI, given that social entrepreneurs had developed a variety of technology designs using local resources.

4.1.2. The entry of the state in the sanitation sector (1980s – to date)

By the 1980s there was increased awareness in India that even among rural areas, the population needed to be induced to start using toilets. Thus, the state entered the sanitation sectoral system of innovation (or SSI) with the aim of diffusing toilets as a merit good, i.e. as an essential installation publicly financed that every citizen should be provided with. The delivery platform was designed in 1986 by the Ministry of Rural Development under the aegis of the Central Rural Sanitation

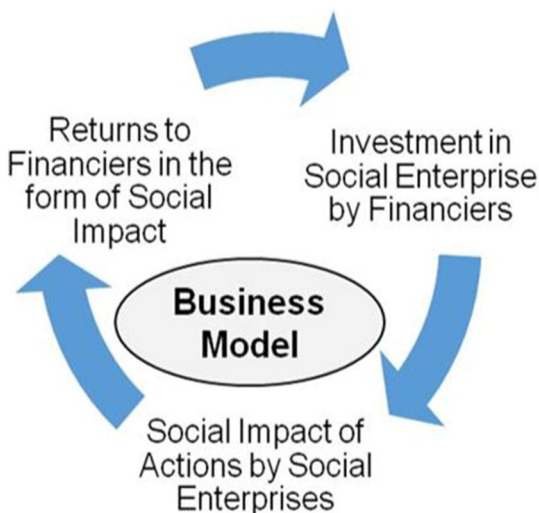


Fig. 3. The business model linking financiers and social enterprises within NSI.

Program (CRSP). Under this scheme, at the district level, the Offices of the District Rural Development Agency (DRDA) financed the construction of toilets to meet set targets, and the beneficiaries were partially or near-totally absolved (depending on their income level) from the responsibility of paying for the installation. At the district level, officers were given a target number of toilets to be constructed and these were simply built. It was not clear whether the toilets were appropriate, either in terms of technology or the socio-economic context. The model diffused under the government program was the 'single pit latrine' which overflows during the rainy season and which has to be covered or dislodged when full. In the case of the latter, the entire super-structure has to be dismantled and a new pit has to be built. Thus, it is not surprising that most of these single pit latrines were abandoned when they began to dysfunction or when they got full (UN-DESA, 2003; Saxena, 2005).

The large scale failure of the CRSP led to a complete turnabout of state strategy that was further influenced by the adoption of economic liberalization in 1991, which ushered in a wide variety of large and small international organizations to enter India and finance development projects- to promote their own agenda. Slowly, the Indian state began withdrawing as a direct player on the supply side of the market providing toilets, and became an indirect player financing sanitation drives. In other words, from being the main supplier on the toilets market, the state became the main financier (See the Government of India, Ministry of Rural Development website <http://rural.nic.in/sites/TSC.asp>).

In 1999, the Department of Drinking Water Supply of the Ministry of Rural Development, launched the 'Total Sanitation Campaign (TSC)' in order to provide incentives for the development of a private market for sanitation. It involved a demand driven approach, including education as a major component and actively soliciting the participation of Panchayats (or village level government bodies), women's groups, youth clubs, NGOs and social enterprises. The full details and progress of the TSC program can be found on the website of the Ministry of Rural Development, Government of India (<http://rural.nic.in/sites/TSC.asp>). To sum up, the government's strategy now is to provide incentives for the development of a private market for sanitation. International agencies like the UNICEF<sup>1</sup> and World Bank<sup>2</sup> (as indicated on their websites) have also expanded their activities in India in the post-liberalization period (after 1991). Indeed, the adoption of liberalization and the new ease of mobility for people, commodities, capital and knowledge, have led to an influx of international organizations like Water Aid, GIZ, BORDA, WASTE<sup>3</sup> etc., which are extremely active in promoting sanitation. These organizations are creating further business opportunities in sanitation and offering contracts to Indian social enterprises as indicated by their activities in India on their websites.

In 2014, the Swachh Bharath Mission or Clean India Mission, whose central objective is to eliminate open defecation in India by 2019 through installation of toilets and triggering of behavioural change, was inaugurated. This flagship programme aims to transform village and city populations into open defecation free (ODF) communities, wherein ODF is defined by three parameters: access to a toilet, usage of a toilet and toilet technology being safe vis-à-vis humans as well as the environment. The Mission plans investment on capacity building in the form of trained personnel, financial incentives and systems for planning and monitoring with extensive private participation and collaboration with social enterprises. At present, there are no reliable statistics on the number of social enterprises or NGOs active in the Indian sanitation sector, but the authors surmise that it is at least in the hundreds. Technology per se is not cited as a major problem.

Then, how are such partnerships performing? In order to have a deeper understanding we now turn to a village study.

#### 4.2. The village case study: the rise and fall of sanitation in Kameshwaram

About 69% of Indian households with no access to proper sanitation live in rural areas such as Kameshwaram, a typical coastal village along the Indian Ocean in the State of Tamil Nadu. According to the 2011 Indian census, there are 1535 families in this village making up a population of 5713. Definitions of the poverty line are an issue of debate. Currently in India, poverty is measured according to the indicators proposed by the Tendulkar Committee, which proposes that those who consume more than INR 816 per capita per month in rural areas are not poor (Government of India, 2013). Following this definition, a survey of 988 households conducted in 2011 by the first author indicated that 170 households (or 16.92%) are starkly poor, while the national average for rural poverty is 25.7%.

On December 26, 2004, huge tidal waves of the devastating Asian Tsunami flooded Kameshwaram for a few minutes, but that was enough to wreck total havoc. In the aftermath of the tsunami, individuals across the world donated funds to charitable organisations to address the immediate and long-term needs of the tsunami victims. In Kameshwaram too, public and private agencies initiated projects for rehabilitation.

Reconstruction took many forms. A Franco-Indian charity project led to the creation of two associations Un-Ami in France and Friend in Need (*FIN* from now on) in India to help the women, in particular, and this initiative led to an unexpected project. Discussions with the women revealed that prior to the tsunami, there were tree-covered areas for women, which had been used for open defecation while the men used the beach. The need for toilets was not perceived even though it was well known that during the monsoon season, roughly three months in a year, these sites attracted mosquitoes leading to the rampant spread of mosquito-borne diseases. With the tsunami and the felling of the trees in these areas, vegetable cover for open defecation was eliminated, putting the women in a quandary to find secluded areas. Women started to retain themselves or go near rubbish heaps at dawn and after dusk. As a result, some got bitten by rats; they were also faced with the need to protect themselves from insect, snake, and scorpion bites as well as sexual harassment.

As the high ground water table in coastal regions such as Kameshwaram makes any type of pit latrine, single pit or double pit (like the Sulabh), overflow during the three months of the monsoon season and after any heavy rainfall, it was necessary to hunt for an alternative appropriate technology. A search through the internet and interviews with experts revealed that a second major toilet innovation in the form of a urine diversion toilet had been designed for these regions during the late 1980s by a British naval engineer named Paul Calvert while on deputation to India.

The urine diversion toilet developed by Paul Calvert separates the urine from the faeces, thereby accelerating the process of compost formation (Calvert et al., 2002). The toilet squatting slab has three holes, one behind the other, with different slopes. The user urinates first and shifts slightly back to defecate permitting the faeces to fall into a compost pit. A mug of ash or saw dust is then thrown into this hole facilitating dehydration of the faeces. Then the user moves back further to wash the behind. The urine goes out through a bamboo pipe to irrigate a garden planted around the toilet. The wash water is filtered through layers of gravel so that the water that leeches out into the soil is harmless. Thus, urine, faeces and wash water are completely separated and recycled.

The urine diversion model was and is still not very popular in the regions for which it is designed, because it demands more effort both on the part of the end-user and the promoter. It is a technology that requires a basic understanding of composting for its proper use. A greater deal of effort is required for both its use and maintenance as compared to the other types of toilets. However, it represents a 'totally

<sup>1</sup> UNICEF <http://www.unicef.org/india/wes.html>.

<sup>2</sup> World Bank <http://www.worldbank.org/projects/P132173/india-rural-water-supply-sanitation-project-low-income-states?lang=en>.

<sup>3</sup> WATERAID <http://www.wateraid.org/where-we-work/page/india>;

GIZ <http://www.giz.de/en/worldwide/368.html>; Borda <http://www.borda-sa.org/>

decentralized' and 'sustainable sanitation system that closes the loop – completely recycling the waste without any risk of environmental contamination and hence is 'ecosan' or sanitary for the environment (Langergraber and Muelleggera, 2005).

Having identified the right technology for the coastal village, in a next step, *FIN* formulated its business model as follows. Though registered as a non-profit social enterprise working towards sanitation coverage in India, it had no prior experience in sanitation projects. Therefore, it decided to raise seed funds for capable local NGOs active in toilet construction to implement the project. Consequently, an NGO from the closest large town with an impressive record in sanitation coverage was selected.<sup>4</sup> Being well known and well connected in the sanitation sectoral system of innovation, it was able to attract funds from UNICEF as well as the State government under the Total Sanitation Campaign programme. Then with seed funding from *FIN* paying partially for the people's participation, about 150 urine-diversion toilets were built and inaugurated with great fanfare in Kameshwaram. For this achievement, the Kameshwaram Panchayat was awarded the 'Nirmal Gram Puraskar'<sup>5</sup> (prize for complete sanitation coverage) from the Indian government in 2007, based on the assumption that such sanitation drives would soon ensure the complete sanitation coverage of Kameshwaram. It is thus noteworthy that the construction of these toilets had been enabled by the participation of variety of economic actors on a sanitation drive: (i) the beneficiary households; (ii) local masons; (iii) *FIN*; (iv) a local NGO; (v) an international agency; (vi) the village council (Panchayat); (vii) the State level government – providing a clear illustration of Fig. 2 on the embedding of social entrepreneurship within an NSI network.

The Nirmal Gram Puraskar to Kameshwaram heralded that this village was one where the residents were ready to make the behavioural switch from open defecation to toilet usage. Such a signal attracted other local social enterprises active in the sanitation sector to seek funds from international agencies to build more toilets. For instance, in 2008, about 100 more urine diversion toilets were built by another local social enterprise with funding from WATER AID and seed funding from *FIN*.

This further increased the renown of Kameshwaram. Then, between 2007 and 2009, private actors, namely Western Christian Church groups and the charity foundations of local industry associations also began sponsoring the construction of 350 single pit latrines and toilets with attached chambers (that were passed off as septic tanks) the low cost sanitation option that is easy and quick to build. However, it is well known that pit latrines are not suitable for high water table areas, as they contaminate the ground water sources, especially during the rainy season (Dzwaïro et al., 2006; Nsubuga et al., 2004; Hagedorn et al., 1981). Thus, as sanitation coverage increased the network of actors facilitating the diffusion of toilets increased and became more complex, with *FIN* being at the centre of this web.

It is well known in innovation studies that technology trajectories can be unpredictable, rather than being linear and well-ordered, possibly being marked by both path dependencies and 'butterfly effects'<sup>6</sup> (David, 1985; Arthur, 1989; Surie, 2011). This was amply demonstrated in the village. From 2005 to 2007 only urine diversion toilets were diffused. Into this system, from 2007 onwards, new actors introduced a new model – the 'flush and forget' toilets, i.e. conventional toilets attached to pit that was passed off as a septic tank. This changed the knowledge base and awareness level of the users creating a totally unexpected outcome – intense social tension. The households with a urine diversion waterless toilet felt deprived. They now felt burdened with an inferior model – a 'poor man's toilet' reflecting socio-economic

stagnation. The ease of use of the conventional toilet seemed to override concerns for medium term ground water contamination or water logging of toilets during the rainy season. This evolution illustrates two results noted by other scholars working on BoP innovations. First, uneven diffusion of technologies within BoP clusters can become a source of perceived social exclusion (Silvestrea and Netob, 2014). Second, in BoP, the technological legitimacy of a model is also anchored strongly by its social attributes (Hall et al., 2014).

However, from 2009, it was noticed that the newly constructed toilets were not being used by all. As the abandoning of the toilets continued, a survey was undertaken by *FIN* in 2011 which revealed faulty construction to be the root cause of the problem. For example, most toilet roofs had developed cracks, which meant that during the rainy season– toilets could not be used, and there was always a risk of the roofing slab falling on the user's head when in the toilet. Either the external or internal walls of all toilets had to be repaired as the salt from the sea winds had leached into them. Furthermore, in the compost chambers of all ecological toilets, the ash that the households had been advised to throw in the chamber after usage had leached into the inner walls. Some of the toilet slabs and pipes needed to be fixed. Most of the doors could not be closed properly because the latches had fallen off or were too rusty. All doors and door handles were made of metal, and since no anti-rust paint had been used, they were rusty and falling apart. Most of the steps had cracks. Many of the conventional toilets with septic tanks also had problems. They overflowed during the rainy season causing a terrible stench. Moreover, due to faulty construction, visiting experts deemed most of the conventional toilets with – septic tanks – unsafe (i.e. contaminated ground soil and water). Faulty construction of toilets has been cited as the principal reason for the underutilization or abandoning of toilets in other Indian states (Dutta et al., 2016; Kumar and Taunk, 2010) as well as in other emerging countries like Ghana (Obirih-Opareh, 2001) and South Africa (Mjoli-Mncube, 1997).

Focus group discussions with the villagers confirmed that the problem was further aggravated by local households' lack of knowledge and the absence of a 'repair' agency in the area. Additionally, the villagers were not willing to pay for the costs of toilet repair even though the majority recognized that toilet usage had positive consequences on health, social status and personal dignity. Again, this is a widely prevalent challenge in developing countries, as in sanitation, Murphy et al. (2009) observe that the existence of technology and the mere installation of toilets physically are only a part of the solution and not its entirety.

Thus, the village of Kameshwaram, which had won the Nirmal Gram Puraskar, an award for complete sanitation coverage based on intent in 2007, stood in 2015 still with incomplete sanitation coverage. Kameshwaram is not the only village in India in this situation – there are many Nirmal Gram Puraskar winners and non-winners in the same state with faulty and abandoned toilets (Barnard et al., 2013).

## 5. Discussion of case study findings

The sectoral and village level case studies confirmed the theoretical constructs on the role of social enterprises within NSI (as given by Figs. 1–3 and Table 1). In addition, they refined them further by demonstrating that an NSI driven by pure market forces may fail to reward social entrepreneurship which strives to make a long term social impact adequately, and at the same time, over-compensate organizations, which are successful in catering to existing needs and demand without making a sustained social impact. Thus, the case studies provided real illustrations of the impact chasm presented in Fig. 4, which must be crossed for sustained impact of pro-poor innovations. This further leads to four noteworthy inferences.

First, drivers of emergence of social entrepreneurs and social enterprises in NSI are distinct. Table 1 posits that both social entrepreneurs and social enterprises view "social problems" as "opportunities" and strive to create social impact. However, social enterprises emerge

<sup>4</sup> No names are being given for the sake of confidentiality.

<sup>5</sup> [http://ddws.nic.in/tsc-nic/html/nirmal\\_gram.htm](http://ddws.nic.in/tsc-nic/html/nirmal_gram.htm).

<sup>6</sup> The butterfly effect in chaos theory has shown that in non-linear systems with sensitive dependence on initial conditions, small changes at one point can result in large differences in later states.



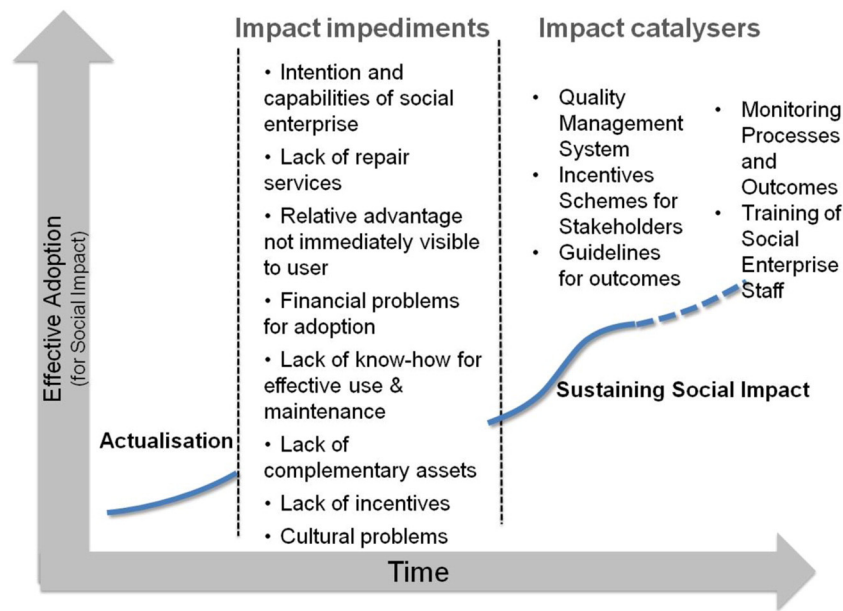


Fig. 4. Key factors for sustained social impact highlighted by case studies.

only if business viability is possible through working on social missions. This was confirmed by the sectoral case study. In India's pre-liberalization period, passion-driven social entrepreneurs strived for maximal social impact with whatever resources they could mobilize. In contrast, medium and large social enterprises entered the sanitation sector in the post-liberalization period only after business opportunities were created in the form of contracts from the state, international agencies, faith-based organizations from foreign countries, industry associations and large firms, confirming Fig. 2. Lastly, with respect to NSI studies at large, unlike in mainstream knowledge intensive sectors, in the context of deep poverty, we note that multinational faith based organizations that have established their legitimacy can be an important financial sponsor of local social enterprises.

Second, social impact is not always ensured due to the strategic risks in the form of adverse selection or moral hazard stemming from collaboration with the service providing social enterprises. The social enterprise is deeply embedded within the NSI and serves as a business to business partner for a sponsor (Fig. 2). Such a configuration brings to light a principal agent game, where the principal is the sponsor and the social enterprise is the agent. A principal-agent model is defined as a setting where the payoff to the principal depends on an action taken by the agent, which may not be observable. Further, the principal may not be able to fully confirm some of the agent's characteristics such as the latter's true intentions about fulfilling the contractual obligations or engagement in attainment of a specific long term goal. Thus, the principal must make offer to the agent with incomplete information about the agent, in order to initiate the collaboration. This was well illustrated by our case study wherein financiers interested in making a social impact hired social enterprises to undertake the project on the basis of trust, despite their incomplete information about the latter's capabilities or intention. Strategic risks associated with non-profits are no different from those with for-profit organisations.

Strategic uncertainty stemming from incomplete information about social enterprises can pose risks at the level of partner selection and thereafter in contract implementation. Adverse selection or inadequate selection processes may lead to the hiring of an ill qualified partner. Thereafter, imperfect monitoring systems and/or incentive systems can allow for moral hazard in the form of inadequate effort by the social enterprise. Both these problems can lead to sub-optimal outcomes as are well known in the economics

literature. Since it may not be possible to design contracts, which cover every possible contingency, standard economic theory advocates the practice of monitoring with audits, with rewards being provided for achievement of targets and punishment for deviation from contractual obligations. Such a carrot and stick mechanism coupled with monitoring provide incentives for performance to go beyond 'achieving targets' to include 'long term sustained impact for the population', 'quality' and 'safety' of installations.

As the village case study illustrated, as business partners of financiers, outsourced projects become bound by time and financial constraints. This coupled with organizational objectives of the social enterprise such as maximization of contracts with financial sponsors diverts attention from attainment of a social mission to ticking the boxes for contractual fulfilment. This is further exacerbated by the fact that service-offering social enterprises tend to be nomadic within an NSI, seeking and moving wherever business opportunities present themselves. While they work on projects aimed to improve the lives of underserved communities, they may not consider it their responsibility to maintain their installations or trouble-shoot any problems that may arise in the post-delivery phase to ensure sustained impact. This is left to the NSI system and unless there are agencies or actors within the NSI to do this – problems are left unattended or under-attended.

Third, social impact is not always ensured due to systemic risks from the demand side within NSI. Fig. 1 outlining the entrepreneurial process for social impact suggests that social impact is a quasi-automatic outcome of diffusion given the dire needs of communities in the context of deep poverty. However, our case studies demonstrated that technology transfer or innovation diffusion do not necessarily guarantee social impact. Indeed, problems for sustained social impact can arise from the demand side, i.e. from the intended beneficiaries in terms of lack of adoption, and yet, these are habitually the most neglected. There is often a gap in perceptions of innovation value between the provider and intended beneficiaries. Unless this gap is breached, the intended beneficiaries are not motivated to adopt the innovation efficiently. The innovation providers may not be aware of other challenges faced by intended beneficiaries such as lack of financial resources, ownership of required complementary assets (say water for toilet use), knowledge and skills for usage and maintenance of the innovation provided. Again, if these problems are not tackled, the social impact will be sub-optimal.

Fourth, financial capabilities of NSI for supporting social enterprises matter. The density and composition of social enterprises in an NSI is likely to be a function of the financial capabilities of the NSI and the structure of the financiers. In other words, the number and variety of social enterprises in an NSI is likely to increase as the demand for their (i.e. social enterprises') services within the NSI from the state, public agencies, international development agencies and other donors grows. This echoes the widely confirmed proposition of Gerschenkron (1962) for mainstream innovation driven sectors that they tend to emerge and grow when there are institutions that are ready to bear the costs of risky investment.

The above premise was clearly illustrated by the sectoral and village case studies. Before liberalization, the sanitation sectoral innovation system had only isolated social entrepreneurs and the state, both interacting with intended beneficiaries but not with one another. The state and isolated social entrepreneurs diffused toilets among the BoP communities as an innovation, in parallel processes, without any interconnections. After liberalization, the financial capabilities of the Indian NSI increased as the variety and density of sponsors grew. Entry of such a large variety of financiers in the market triggered demand for services of social enterprises, which in turn also increased. As a result, the variety and density of networks between the target beneficiaries, different types of sponsors and social enterprises increased, and the sanitation sectoral system of innovation became more complex.

To sum up, long term impact is jointly determined by the true intention of the social enterprise, its capabilities and the nature of contextual challenges. To facilitate long term positive social impact for populations and environmental sustainability, strategic and systemic challenges must be addressed through monitoring mechanisms, audits and training of social enterprise staff. In some cases, systemic reform such as new regulation or effective guidelines for quality outcomes may be required.

## 6. Conclusion

The objective of the present paper was to provide insight on the role of social entrepreneurship in an NSI and identify the interrelationships between the two through an examination of the evolution of the Indian sanitation sector. Considering toilets as an innovation for those who do not have one, the paper examined why the diffusion of toilets has been so inadequate and ineffective in rural India. In particular, given that social entrepreneurs are the most likely actors to tackle underserved needs of the community as 'opportunities' within an innovation system, it sought to study their role in the diffusion of toilets as an innovation in India. To this end, a clear distinction was made between the terms 'social entrepreneur', 'social enterprise' and 'social entrepreneurship'. Thereafter, theoretical constructs were formulated to represent the innovation process of a social enterprise and its embedding within the NSI. These were used to study the evolution of progress in sanitation coverage in India at a macro level and in a village. Despite the limitations dictated by the specificities of the context, our findings on the nexus between social entrepreneurship and NSI still offers some insight for policy and themes for future research.

First, to enhance the positive social impact from pro-poor innovations the focus must not only be on the management of technology, but also on the management of social impact, which also includes the technology. For this, the idea of 'innovation' has to be considered as being much broader than a technology, and include all possible mechanisms to enhance the likelihood of the desired social impact and its sustenance.

Second, though social enterprises can act as innovation catalysers within an NSI, they cannot guarantee social impact. The long run impact of a social enterprise is a function of its managerial vision, efforts, capabilities within the contextual demand and supply possibilities presented by the NSI to generate demand for and offer innovations of good quality.

Furthermore, the entrepreneurial capabilities of the social enterprise concern its ability: (i) to mobilize resources; (ii) to transform them into innovations; (iii) to create and sustain demand; (iv) to design and implement the innovation delivery; and (v) to create and sustain networks with other NSI actors to achieve (i)-(iv). All five kinds of capabilities are required to catalyse change.

Third, as the Indian experience highlighted, while social enterprise clusters are presently growing due to the increasing demand for service provision in BoP markets and communities, such opportunities are also leading to the emergence of social enterprises which are more focussed on maximization of contractual revenues than on guaranteeing sustained social impact. Therefore, what matters most is the 'intention' behind the social enterprise to achieve long term social impact, but since this is private information there is a need to promote sustainability audits.

Fourth, within an NSI, while it is very desirable that technology entrepreneurship and social entrepreneurship join forces to address social problems, in the context of deep poverty, the latter is likely to be even more important than the former. Conventional public actors' initiatives are often focused on just installing the technology and these usually have a limited social impact. Indeed, the central point of this paper is to highlight that if demand issuing from targeted beneficiaries for a concerned technology is low, then, even when the technology is provided, the social benefit may not be realized. This challenge is further exacerbated if the technology requires a behavioural change for adoption.

The above arguments coupled with the findings of the case study lead us to propose two policy recommendations. First, to ensure positive social change from the diffusion of pro-poor innovations, their quality and sustainability should be guaranteed. This is amply illustrated by the context of sanitation in India, where it is not clear whether the myriad sanitation drives will one day lead to efficiently functioning toilets used well by all (including men) or whether it will simply create millions of new points of contamination. Technology and even financial investment are only two components of the solution for sustained social impact. Rather than opportunism for its own sake, it is the cost, time and target-driven pressures embedded in the project routines of financiers and revenue maximizing social enterprises that drive the system towards immediate rather than long term social impact maximization. These problems can be addressed and rectified to achieve long term social impact if financiers are made aware of them.

Second, at a macro-level, while an NSI strives to create an enabling environment for social entrepreneurship, it should promote the use of long term impact evaluation audits to identify and reward 'sustained social impact' makers. For this purpose, devising guidelines corresponding to the sector or pro-poor innovation concerned along with workshops for the social enterprises on the quality and sustainability of their initiatives can promote early systemic dialogue for best possible impact. Social enterprises are entering the NSI in greater numbers in response to growing opportunities for service provision towards inclusive development as partners of the state, public agencies and firms. They have to be induced to go beyond provision of knowledge, technology or products for immediate impact to catalyze efficient adoption for sustained social impact.

In the light of our findings, it seems apt to conclude that despite all the funds pouring in from a large variety of financiers partnering with social enterprises, there is still a need and a place for passion driven social entrepreneurs in an NSI. They are most likely to have the 'emotional commitment' as innovation carriers to adopt a long-term vision of development with a dedication to quality and sustainability, which are required to maximize long term social impact.

## Acknowledgements

The first author gratefully acknowledges support under the ICSSR-NWO India-Netherlands Social Science Scholar Exchanges program

and the EU FP7 project MNEmerge, Grant Agreement No. 612889. The second author would like to acknowledge the research scholarship from Ingemar Broman Foundation in Gothenburg, Sweden. We are extremely grateful for the insightful comments made by the referees as well as the Guest Editors of the Special Issue. We would also like to thank Shankhajt Sen for excellent comments.

## References

- Abrahamson, E., 1991. Managerial fads and fashions: the diffusion and rejection of innovations. *Acad. Manag. Rev.* 16, 586–612.
- Abramovitz, M., 1986. Catching-up, forging and falling behind. *J. Econ. Hist.* 46, 385–406.
- Alvord, S.H., Brown, L.D., Letts, C.W., 2004. Social entrepreneurship and societal transformation an exploratory study. *J. Appl. Behav. Sci.* 40, 260–282.
- Anderson, J., Markides, C., 2007. Strategic innovation at the base of the pyramid. *MIT Sloan Manag. Rev.* 49, 83.
- Arthur, W.B., 1989. Competing technologies, increasing returns, and lock-in by historical events. *Econ. J.* 99, 116.
- Athreye, S., Kale, D., Ramani, S.V., 2009. Experimentation with strategy and the evolution of dynamic capability in the Indian pharmaceutical sector. *Ind. Corp. Chang.* 18, 729–759.
- Austin, J., Stevenson, H., Wei-Skillern, J., 2006. Social and commercial entrepreneurship: same, different, or both? *Entrep. Theory Pract.* 30, 1–22.
- Bacc, S., Janssen, F., 2011. The multiple faces of social entrepreneurship: a review of definitional issues based on geographical and thematic criteria. *Entrep. Reg. Dev.* 23, 373–403.
- Barnard, S., Routray, P., Majorin, F., Peletz, R., Boisson, S., Sinha, A., Clasen, T., 2013. Impact of Indian Total Sanitation Campaign on latrine coverage and use: a cross-sectional study in Orissa three years following programme implementation. *PLoS One* 8, e71438.
- Birch, D.L., 1987. *Job Creation in America: How Our Smallest Companies Put the Most People to Work*. Free Press, New York, NY.
- Calvert, P., Seneviratne, A., Premakumara, D.G.J., Mendis, U.A., 2002. Ecological sanitation a success in Sri Lanka. *Waterlines* 21.
- Cassiolato, J.E., Lastres, H., Soares, M.C., 2014. The Brazilian national system of innovation: challenges to sustainability and inclusive development. *National Innovation Systems, Social Inclusion and Development: The Latin American Experience*. Edward Elgar, Cheltenham, UK, pp. 68–101.
- Census of India, 2001. <http://www.censusindia.gov.in>.
- Chesbrough, H., 2006. Business models for technology in the developing world: the role of non-governmental organizations. *Calif. Manag. Rev.* 48, 48–61.
- Christensen, C.M., Baumann, H., Ruggles, R., Sadtler, T.M., 2006. Disruptive innovation for social change. *Harv. Bus. Rev.* 84, 94.
- Christine, N., Patricia, M.S., Nielsen, C., 2008. Understanding key factors in social enterprise development of the BOP: a systems approach applied to case studies in the Philippines. *J. Consum. Res.* 25, 446–454.
- Dacin, P.A., Dacin, M.T., Matear, M., 2010. Social entrepreneurship: why we don't need a new theory and how we move forward from here. *Acad. Manag. Perspect.* 24, 37–57.
- Dahan, N.M., Doh, J.P., Oetzel, J., Yaziji, M., 2010. Corporate-NGO collaboration: co-creating new business models for developing markets. *Long Range Plan.* 43, 326–342.
- David, P.A., 1985. Clio and the economics of QWERTY. *Clio and the economics of QWERTY* 75, pp. 332–337.
- Davidsson, P., 2012. The entrepreneurial process. In: Carter, S., Jones-Evans, D. (Eds.), *Enterprise and Small Business: Principles, Practice and Policy*, 3rd ed. Pearson Education Harlow, pp. 95–119.
- Dees, J.G., 2007. Taking social entrepreneurship seriously. *Society* 44, 24–31.
- Dutta, A., Hajra, G., Ramani, S.V., 2016. On incidence of diarrhoea among children in India. *Econ. Pol. Wkly.* 51, 121–129.
- Dzwairo, B., Hoko, Z., Love, D., Guzha, E., 2006. Assessment of the impacts of pit latrines on groundwater quality in rural areas: a case study from Marondera district, Zimbabwe. *Phys. Chem. Earth Parts A/B/C* 31, 779–788.
- Eisenhardt, K., 1989. Building theories from case study research. *Acad. Manag. Rev.* 14, 532–550.
- Etzkowitz, H., Leydesdorff, L., 2000. The dynamics of innovation: from National Systems and “Mode 2” to a triple helix of university–industry–government relations. *Res. Policy* 29, 109–123.
- Freeman, C., 1995. The National System of Innovation in historical perspective. *Camb. J. Econ.* 19, 5–24.
- Garrette, B., Karnani, A., 2010. Challenges in marketing socially useful goods to the poor. *Calif. Manag. Rev.* 52, 29–47.
- Geroski, P.A., 2000. Models of technology diffusion. *Res. Policy* 29, 603–625.
- Gershenkron, A., 1962. *Economic Backwardness in Historical Perspective*. The Belknap Press, Cambridge, MA.
- Government of India, 2013. Planning Commission, Press Notes on Poverty Estimates. [http://planningcommission.nic.in/news/pre\\_pov2307.pdf](http://planningcommission.nic.in/news/pre_pov2307.pdf).
- Griliches, Z., 1957. Hybrid corn: an exploration in the economics of technological change. *Econometrica J. Econ. Soc.* 501–522.
- Groen, A.J., Walsh, S.T., 2013. Introduction to the field of creative enterprise. *Technol. Forecast. Soc. Chang.* 80, 187–190.
- Gupta, S., 2015. A conceptual framework that identifies antecedents and consequences of building socially responsible international brands. *Thunderbird Int. Bus. Rev.*
- Hagedorn, C., Mc Coy, E., Rahe, T., 1981. The potential for ground water contamination from septic effluents. *J. Environ. Qual.* 10, 1–8.
- Hall, J., Matos, S.V., Martina, M.J.C., 2014. Innovation pathways at the base of the pyramid: establishing technological legitimacy through social attributes. *Technovation* 34, 284–294.
- Handy, F., Cnaan, R.A., Bhat, G., Meijs, L.C., 2011. Jasmine growers of coastal Karnataka: grassroots sustainable community-based enterprise in India. *Entrep. Reg. Dev.* 23, 405–417.
- Harding, R., 2004. Social enterprise: the new economic engine? *Bus. Strateg. Rev.* 15, 39–43.
- Hart, S.L., 2005. *Capitalism at the Crossroads: The Unlimited Business Opportunities in Solving the World's Most Difficult Problems*. Wharton School Publishing, Upper Saddle River, NJ.
- Hart, S.L., Christensen, C.M., 2002. The great leap: driving innovation from the base of the pyramid. *MIT Sloan Management Review Fall*, pp. 51–56.
- Hart, S.L., London, T., 2005. Developing native capability. *Stanf. Soc. Innov.* 3, 28–33.
- Hart, T., Jacobs, P., Letty, B., Ramoroka, K., Mangalaza, H., Mhula, A., Ngwenya, M., 2014. Promoting innovation for inclusive rural transformation in South Africa. *HSRC Policy Brief December*.
- Iles, A.T., 1996. Health and the environment: a human rights agenda for the future. *Health Hum. Rights* 2, 46–60.
- Jeffrey, P., Seaton, R.A.F., 2004. A conceptual model of receptivity applied to the design and deployment of water policy mechanisms. *Environ. Sci.* 1, 277–300.
- Jmp, Joint, Monitoring, ProgramStudy, 2012. Progress on Drinking Water and Sanitation [www.unicef.org/media/files/JMPreport2012.pdf](http://www.unicef.org/media/files/JMPreport2012.pdf).
- Jmp, Joint, Monitoring, ProgramStudy, 2015. Progress on Drinking Water and Sanitation. [http://www.wssinfo.org/fileadmin/user\\_upload/resources/JMP-Update-report-2015\\_English.pdf](http://www.wssinfo.org/fileadmin/user_upload/resources/JMP-Update-report-2015_English.pdf) (downloaded February 2016).
- Joyner, B.E., Payne, D., 2002. Evolution and implementation: a study of values, business ethics and corporate social responsibility. *J. Bus. Ethics* 41, 297–311.
- Kapelus, P., 2002. Mining, corporate social responsibility and the “community”: the case of Rio Tinto, Richards Bay minerals and the Mbonambi. *J. Bus. Ethics* 39, 275–296.
- Kaplinsky, R., 2011. Schumacher meets Schumpeter: appropriate technology below the radar. *Res. Policy* 40, 193–203.
- Kaplinsky, R., Chataway, J., Clark, N., Hanlin, R., Kale, D., Muraguri, L., Papaioannou, T., Robbins, P., Wamae, W., 2009. Below the radar: what does innovation in emerging economies have to offer other low-income economies? *Int. J. Technol. Manag. Sustain. Dev.* 8, 177–197.
- Katz, E., 1961. The Social Itinerary of Technical Change: Two Studies on the Diffusion of Innovation. *Hum. Organ.* 20, 70–82.
- Kirchhoff, B.A., 1994. *Entrepreneurship and Dynamic Capitalism: The Economics of Business Firm Formation and Growth*. Praeger, Westport, CT.
- Kirchhoff, B.A., Linton, J.D., Walsh, S.T., 2013. Neo-Marshallian equilibrium versus Schumpeterian creative destruction: its impact on business research and economic policy. *J. Small Bus. Manag.* 51, 159–166.
- Klein, K.J., Sorra, J.S., 1996. The challenge of innovation implementation. *Acad. Manag. Rev.* 21, 1055–1080.
- Kotler, P., Roberto, N., Leisner, T., 2006. Alleviating poverty: a macro/micro marketing perspective. *J. Macromark.* 26, 233–239.
- Kramer, J.-P., Marinelli, E., Iammarino, S., Diez, J.R., 2011. Intangible assets as drivers of innovation: empirical evidence on multinational enterprises in German and UK regional systems of innovation. *Technovation* 31, 447–458.
- Kumar, A., Taunk, A., 2010. A study of sanitation of toilets in elementary and senior Secondary schools located in rural areas of Uttarakhand state in India. *Int. J. Sociol. Anthropol.* 2, 178–184.
- Lall, S., 1992. Technological capabilities and industrialization. *World Dev.* 20, 165–186.
- Langergraber, G., Muellegger, E., 2005. Ecological sanitation—a way to solve global sanitation problems? *Environ. Int.* 31, 433–444.
- Leadbeater, C.W., 1997. *The Rise of the Social Entrepreneur*. Demos, London.
- Lee, R., 2008. Social capital and business and management: setting a research agenda. *Int. J. Manag. Rev.* 11, 247–273.
- Letelier, M.F., Flores, F., Spinoso, C., 2003. Developing productive customers in emerging markets. *Calif. Manag. Rev.* 45, 77–103.
- Lévesque, B., 2004. *Entrepreneurship collectif et économie sociale: entreprendre autrement*. Montréal Alliances de recherche universités-communautés en économie sociale.
- Lévesque, B., Mendell, M., 2005. The social economy: approaches, practices and a proposal for a new community-university alliance (CURA). *J. Rural Coop.* 33, 2005.
- Lundvall, B.A.E., 1992. *National Innovation Systems: Towards a Theory of Innovation and Interactive Learning*. Pinter, London.
- Lundvall, B.-A., Joseph, K.J., Chaminade, C., 2009. *Handbook of Innovation Systems and Developing Countries*. Edward Elgar Publishing Limited, Cheltenham, UK.
- Mair, J., Marti, I., 2006. Social entrepreneurship research: a source of explanation, prediction, and delight. *J. World Bus.* 4, 36–44.
- Malerba, F., 2002. Sectoral systems of innovation and production. *Res. Policy* 247–264.
- Mallin, M.L., Finkle, T.A., 2007. Social entrepreneurship and direct marketing. *Direct Mark. Int. J.* 1, 68–77.
- Mehta, V., 1996. The politics of sanitation. *Wash. Q.* 19.
- Mendoza, R.U., Thelen, N., 2008. Innovations to make markets more inclusive for the poor. *Dev. Policy Rev.* 26, 427–458.
- Miller, T.L., Grimes, M.G., McMullen, J.S., Vogus, T.J., 2012. Venturing for others with heart and head: how compassion encourages social entrepreneurship. *Acad. Manag. Rev.* 37, 616–640.
- Minakawa, N., Dida, G.O., Sonye, G.O., Futami, K., Kaneko, S., 2008. Unforeseen misuses of bed nets in fishing villages along Lake Victoria. *Malar. J.* 7, 1–6.
- Mjoli-Mncube, N., 1997. The impact of an alternative sanitation system on the lives of women in South Africa. *Sci. Technol. Dev.* 15, 104–111.

- Morgan, R.M., Hunt, S.D., 1994. The commitment-trust theory of relationship marketing. *J. Mark.* 58, 20–38.
- Murphy, H.M., Mcbean, E.A., Khosrow, F., 2009. Appropriate technology- a comprehensive approach for water and sanitation in the developing world. *Technol. Soc.* 31, 158–167.
- Nelson, R., 1993. *National Innovation Systems: A Comparative Analysis*. Oxford University Press, Oxford.
- Nsubuga, F., Kansime, F., Okot-Okumu, J., 2004. Pollution of protected springs in relation to high and low density settlements in Kampala–Uganda. *Phys. Chem. Earth Parts A/B/C* 29, 1153–1159.
- Obirih-Opahere, N., 2001. Public or private? A policy dilemma of liquid waste management in Accra. In: Van Der Geest, S., Odei, M.A., Post, J., Obirih-Opahere, N. (Eds.), *Toilet and Sanitation in Ghana: An Urgent Matter*. CSIR, Accra.
- Pathak, B., 2011. The sanitation challenge in India. In: Selendy, J.M.H. (Ed.), *Water and Sanitation Related Diseases and the Environment: Challenges, Interventions and Preventive Measures*. Wiley Blackwell, pp. 243–250.
- Prahalad, C.K., 2005. *The Fortune at the bottom of the Pyramid: [Eradicating Poverty Through Profits: Enabling Dignity and Choice Through Markets]*. Wharton School Publications, Upper Saddle River, NJ.
- Prahalad, C.K., Hart, S., 2002. *The fortune at the bottom of the pyramid*. *Strategy + Business*, pp. 54–67.
- Psychogios, A.G., Szamosi, L.T., 2007. Exploring the Greek national business system: towards a modernization agenda. *EuroMed J. Bus.* 2, 7–22.
- Ramani, S.V., 2008. Playing in invisible markets: the market for toilets and empowerment. *The Charles Cooper Annual Memorial Lecture*. UNU-Merit working paper, #2008–012.
- Ramani, S.V., Mukherjee, V., 2014. Can breakthrough innovations serve the poor (bop) and create reputational (CSR) value? Indian case studies. *Technovation* 34, 295–305.
- Ramani, S.V., Parihar, R., 2014. Linkages between sanitation, health and poverty reduction: a survey. *MNEemerge Report: EU FP7 Program, Grant Agreement: 612889*. UNU-MERIT, Boschstraat 24, 6211 AX Maastricht, Netherlands.
- Ramani, S.V., Parihar, R., 2015. Strategies of MNEs in developing countries in the field of sanitation. *MNEemerge Report: EU FP7 Program, Grant Agreement: 612889*. UNU-MERIT, Boschstraat 24, 6211 AX Maastricht, Netherlands.
- Ramani, S.V., Szirmai, A., 2014. Innovation in India: the challenge of combining economic growth with inclusive development. In: Ramani, S.V. (Ed.), *Innovation in India: Combining Economic Growth With Inclusive Development*. Cambridge University Press, New Delhi, pp. 1–34.
- Ramani, S., Benyacar, A., Didier, A., 2008. Commercializing an Innovation in an Invisible Market: Case of Ecosan Toilets. *eSS Occasional Papers* 1, pp. 77–90.
- Ramani, S.V., Sadreghazi, S., Duysters, G., 2012. On the diffusion of toilets as bottom of the pyramid innovation: lessons from sanitation entrepreneurs. *Technol. Forecast. Soc. Chang.* 79, 676–687.
- Rashid, A.T., 2010. Development through social entrepreneurship: perspectives and evidence from Bangladesh. *Can. J. Dev. Stud. Rev. (Can. Détudes Dév.)* 30, 441–455.
- Ratten, V., Welpe, I.M., 2011. Special issue: community-based, social and societal entrepreneurship. *Entrep. Reg. Dev.* 23, 283–286.
- Reddy, N.M., Aram, J.D., Lynn, L.H., 1991. The institutional domain of technology diffusion. *J. Prod. Innov. Manag.* 8, 295–304.
- Reed, A.M., Reed, D., 2009. Partnerships for development: four models of business involvement. *J. Bus. Ethics* 90, 3–27.
- Rogers, E.M., 1962. *Diffusion of Innovations*. 5th ed. Free Press, Glencoe.
- Sarasvathy, S.D., 2001. Causation and effectuation: toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Acad. Manag. Rev.* 26, 243–263.
- Saxena, N.C., 2005. Bridging research and policy in India. *J. Int. Dev.* 17, 737–746.
- Schumacher, E.F., 1973. *Small is Beautiful: A Study of Economics as if People Mattered*. Blond and Briggs, London.
- Seelos, C., Mair, J., 2009. Hope for sustainable development: how social entrepreneurs make it happen. In: Ziegler, R. (Ed.), *An Introduction to Social Entrepreneurship: Voice, Preconditions and Context*. Edward Elgar Publishing, Cheltenham, pp. 228–246.
- Sharif, M., Lerner, M., 2006. Gauging the success of social ventures initiated by individual social entrepreneurs. *J. World Bus.* 41, 6–20.
- Shaw, E., 2004. Marketing in the social enterprise context: is it entrepreneurial? *Qual. Mark. Res. Int. J.* 7, 194–205.
- Silvestrea, B.S., Netob, R.E.S., 2014. Capability accumulation, innovation, and technology diffusion: lessons from a base of the pyramid cluster. *Technovation* 34, 270–283.
- Sodhi, M.S., Tang, C.S., 2011. Social enterprises as supply-chain enablers for the poor. *Socio Econ. Plan. Sci.* 45, 146–153.
- Sridharan, S., Viswanathan, M., 2008. Marketing in subsistence marketplaces: consumption and entrepreneurship in a South Indian context. *J. Consum. Mark.* 25, 455–462.
- Srinivas, S., 2014. *Demand and innovation: paths to inclusive development. Innovation in India: Combining Economic Growth with Inclusive Development*. Cambridge University Press, Cambridge.
- Stewart, F., 1977. *Technology and Underdevelopment*. Macmillan, London.
- Surie, G., 2011. Emergence of new markets, distributed entrepreneurship and the university: fostering development in India. *Int. J. Technoentrep.* 2, 362–381.
- Tilley, E., Luthi, C., Morel, A., Zurbugg, C., Schertenleib, R., 2006. *Compendium of Sanitation Systems and Technologies*. EAWAG Aquatic Research.
- Ulhøi, J.P., 2005. The social dimensions of entrepreneurship. *Technovation* 25, 939–946.
- Un-Department\_Economic\_and\_Social\_Affairs, 2003. *World Youth Report. Chapter 4: Youth and Health Issues* (<http://www.un.org/esa/socdev/unyin/documents/ch04.pdf>).
- Unhr, 2011. Women and girls and their right to sanitation Retrieved January 9, 2015, from United Nations Human Rights <http://www.ohchr.org/EN/NewsEvents/Pages/Womenandgirlsrighttosanitation.aspx> (October 3).
- Urias, E., 2015. *Improving Access to HIV/AIDS Treatment in Brazil: When Are Compulsory Licenses Effective in Price Negotiations?* (Doctoral Dissertation) Maastricht University, Maastricht, The Netherlands
- Walsh, S.T., Linton, J.D., 2011. The strategy-technology firm fit audit: a guide to opportunity assessment and selection. *Technol. Forecast. Soc. Chang.* 78, 199–216.
- Water-Aid, 2012. 1 in 3 women lack access to safe toilets. [file:///C:/Users/DVJFIN/Dropbox/Sanitation%20Library/Sanitation%20&%20health/WaterAid\\_1\\_in\\_3\\_World\\_Toilet\\_Day\\_Briefing.pdf](file:///C:/Users/DVJFIN/Dropbox/Sanitation%20Library/Sanitation%20&%20health/WaterAid_1_in_3_World_Toilet_Day_Briefing.pdf).
- Webb, J.W., Kistruck, G.M., Ireland, R.D., Ketchen, J., 2010. The entrepreneurship process in base of the pyramid markets: the case of multinational enterprise/nongovernment organization alliances. *Entrep. Theory Pract.* 34, 555–581.
- Yin, R., 1994. *Case Study Research: Design and Methods*. Sage publishing, Beverly Hills, CA.
- Yin, R.K., 2002. *Case Study Research, Design and Methods*. 3rd ed. Sage Publications, Newbury Park.
- Zadek, S., Thake, S., 1997. *Practical People, Noble Causes How to Support Community-based Social Entrepreneurs*. New Economics Foundation, London.
- Zahra, S., Gedajlovic, E., Neubaum, D.O., Shulman, J.M., 2009. A typology of social entrepreneurs: motives, search processes and ethical challenges. *J. Bus. Ventur.* 24, 519–532.

**Shyama V. Ramani** is a Professorial Fellow at UNU-MERIT, United Nations University at Maastricht. Dr. Ramani holds a PhD in economics from Cornell University, USA. Her career has revolved around three core themes: the impact of the national system of innovation on the creation of industrial competence; the use of patent and publications statistics as indicators of competitive position and comparative advantage for investment; and the creation of incentives for cooperation and coordination in developmental projects. Her methodology is varied, ranging from contextual analysis and case studies to the use of game theory for studying strategic problems related to innovation creation. She is currently studying the role of technology and innovation to attain the Sustainable Development Goals. Her focus is on health, studying preventive measures (e.g. sanitation coverage and waste management) and curative measures (e.g. access to medicines). She has published 38 articles in international peer-reviewed journals and 17 chapters in books. She has edited two book volumes on 'Nanotechnology in Developing Countries' and 'Innovation in India'. She has coordinated eight research contracts.

**Shuan Sadreghazi's** academic interests lie primarily in innovation management and business strategy with a special focus on their application for development. His current research aims at studying the innovation process of private sector and their strategies to enhance diffusion of new products and services in low-income markets, with positive development impact. His PhD research is titled "Managing Innovation in the Bottom of the Pyramid: Analyzing Inclusive Business Strategies". He has worked with a number of European Multinationals on their inclusive business initiatives. With the UNDP Growing Inclusive Markets initiative, he served as a research fellow responsible for case studies in the Middle East and North Africa (MENA). He holds an M.Sc. in Management and Economics of Innovation from Chalmers University of Technology (Sweden).

**Dr. Suraksha Gupta** (PhD in Marketing from Brunel Business School) is a Senior Lecturer in Marketing at Kent Business School. She completed her Bachelor of Commerce from University of Delhi in India and MBA from Institute of Management Technology in India. Before coming into academia, Suraksha spent 18 years in publishing, IT and telecom industry. During these years she took up several consulting assignments with international IT and Telecom brands. She was also engaged in manufacturing and quality assurance certifications like ISO9000 for one of her assignments. She has received the following awards from industry: 2000 Received Outstanding Achievement Award from Samsung, India; 1997 Recipient of Special Recognition Award from Intel, India