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Business model innovation in the water sector in developing countries

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HIGHLIGHTS

- We describe the importance of business model innovation for water services in low-income countries.
- We describe business models for household devices and community-filter.
- We examine current business model innovations.
- We highlight the capabilities for making business models successful.

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ABSTRACT

Various technologies have been deployed in household devices or micro-water treatment plants for mitigating fluoride and arsenic, and thereby provide safe and affordable drinking water in low-income countries. While the technologies have improved considerably, organizations still face challenges in making them financially sustainable. Financial sustainability questions the business models behind these water technologies. This article makes three contributions to business models in the context of fluoride and arsenic mitigation. Firstly, we describe four business models: A) *low-value devices given away to people living in extreme poverty*, B) *high-value devices sold to low-income customers*, C) *communities as beneficiaries of micro-water treatment plants* and D) *entrepreneurs as franchisees for selling water services* and highlight the emergence of *hybrid business models*. Secondly, we show current business model innovations such as cost transparency & cost reductions, secured & extended water payments, business diversification and distribution channels. Thirdly, we describe skills and competencies as part of capacity building for creating even more business model innovations. Together, these three contributions will create more awareness of the role of business models in scaling-up water treatment technologies.

1. Introduction

Although water treatment technologies improve continuously, challenges remain in making water safer and more affordable for the low-income segments of the populations in developing countries. Low-income segments refer to the approx. 3.3 billion people living close to the poverty line of about 3975 USD per year in purchasing power parity (PPP) (World Bank, 2012). These people already pay for their water, and have annual water expenditures estimated at 20 billion USD (Rangan et al., 2009; Hammond et al., 2007). However, these people face a "poverty penalty", as their water is less safe while they simultaneously pay a higher price for it than higher income segments (Banerjee and Morella, 2012; Mendoza, 2011; Prahalad, 2004).

In the context of fluoride and arsenic mitigation, for example, relevant water treatment technologies (such as pretreatment oxidation, absorption and ion exchange, adsorption, precipitation and coagulation and membrane methods) face difficulties in becoming more affordable for the low-income segment (see German et al., in press; Johnston et al., in press; Osterwalder et al., in press for further information). For example, the Ethiopian organization *Oromo Self Help Organization* (*OSHO*) has experimented using bone char as a low-tech adsorption solution for fluoride mitigation for a couple of years already. Until now, *OSHO* has installed a few community filters and promoted a few hundred household filters. This scale remains minor when compared to the 14 million Ethiopians in the rift valley affected by fluoride mitigation (Zewge and Emiru, 2011). The Nepalese organization *Environment and Public Health Organization* (*ENPHO*) has promoted *Kanchan* filters on a large scale, but many filters are not maintained and people do not use them continuously (e.g., Ngai et al., 2006; Thakur et al., 2010). Safe and affordable drinking water for mitigating fluoride and arsenic is therefore still available on a limited scale only.

Although reaching scale with water services has been financed primarily by philanthropic contributions, donations and government subsidies, supplementing these investments with market-based approaches has however been discussed recently (Easterly, 2006; Sachs,

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2005; UNDP, 2010). Market-based approaches rely on the view that serving low-income markets is an economically viable business strategy. As such, these market-based approaches differ from grant-based poverty alleviation initiatives because the goods and services provided by the venture are not free of cost (London, 2008). Market-based approaches advocate traditional "business" based investments in which the revenues cover these costs and generate profits. Unlocking private investments allows the water sector to become more independent of donations, governmental subsidies and philanthropic efforts (London and Hart, 2010).

Market-based approaches also change the awareness of people from getting something for "free" to receiving something "valuable". When people pay for goods and services, they become aware of their value, which, in turn, motivates them to use and maintain them more carefully. People become more self-confident and even prouder, because they can afford something themselves (Viswanathan et al., 2009).

Within the debate of market-based approaches, providers of water services have started to experiment with business model innovations. *OSHO*, for instance, experiments with water revenues from the community to finance the bone char material. Unfortunately, the water sector still lacks knowledge of how business model innovation could reshape water markets. Lack of knowledge means that there is little empirical evidence of the long-term impact of business models and business model innovation (see Section 2 for definitions) on the demand and supply of water (Ahlstrom, 2010; Hystra, 2011; London and Hart, 2004; Prahalad, 2004; UNDP, 2010; Yunus et al., 2010).

We attempt to close this knowledge gap by drawing on our recent empirical investigations. However, being a feature article rather than a full research paper, neither the research methods used to collect the data nor the analysis of the specific case studies of business model innovations is described in detail. In short, an ethnographic method (e.g. interviews, observations and participation in workshops and meetings) (Arnould and Mohr, 2005; Lindeman et al., 2010) and secondary data (e.g. research reports and documentation of water projects) were used. We have taken examples from *A Vision for Clean Water*, *ENPHO*, *Grameen Veolia*, *Nakuru Defluoridation Company (NDC)*, *OSHO*, *Sarvajal*, *Trunz*, *Unilever* and *Water Health*.

2. Theoretical framework for business models and business model innovation

A business model is an overarching concept, which assembles the different components that constitute an organization as a whole (e.g. Chesbrough et al., 2006; Demil and Lecocq, 2010; Morris et al., 2005; Johnson et al., 2008; McGrath, 2010; Osterwalder and Pigneur, 2010; Zott et al., 2011). A business model is a representation of an organization's underlying core logic and strategic choices for creating and capturing value (Shafer et al., 2005).

The term "business" is not meant to imply that the business models are only useful for organizations aiming at economic goals (Foster et al., 2009). They are also relevant for organizations trying to maximize public welfare (or "social value"). Business models are often discussed within the categories of profit-oriented firms, social businesses and non-profit organizations. In the case of profit-oriented firms, the list of business models includes "low-cost providers", "fast followers" and "razor and razor blade". These have become common sense and outline how a profit-oriented firm can create value. Non-profit organizations describe their funding models as being "member motivator", "beneficiary builder" and/or "resource recycler" (Foster et al., 2009). Social businesses can be classified into "service subsidization model", "fee-for-service model", "organizational support model", etc. (Grassl, 2011). Table 1 highlights some business models of profit-oriented firms, social businesses and non-profit organizations.

Business models in the water sector can be organized either under a non-profit or for-profit oriented form, even if they are engaged in similar activities. Non-profit organizations or profit-oriented firms describe the choice of the organizational form. Social and/or economic goals play a decisive role in the choice of the organizational form (Townsend and Hart, 2008). Individuals at *NDC* with a stronger social than economic motivation are, for example, more likely to choose a non-profit organization. Conversely, managers at *Unilever* with stringent economic goals would be more likely to integrate the *Pureit* water filters into a profit-oriented business unit.

The choice between non-profit and profit-oriented organizational forms depends not only on the economic and social goals but also on the institutional environment. Water providers operate mostly as non-profit organizations because it is easier to attain legitimacy. Legitimacy is more likely, due to the fact that water is a human right (United Nations, 2010). As a non-profit organization, it is also easier to gain access to donors and philanthropic investors. Stakeholders, such as the Ministry of Health and other governmental and non-governmental organizations, also favor co-operation with non-profit organizations rather than with profit-oriented firms. There is the risk of a public debate on whether profit-oriented organizations take advantage of severe health conditions if the Ministry of Health co-operates with profit-oriented firms.

We do not use non-profit and profit-oriented firms as a business model framework because they are solely organizational forms, and consider the importance of social and economic goals as being a more suitable framework (Townsend and Hart, 2008). This framework is a continuum spanning across the relative importance of economic and social goals. At one end of the continuum are business models in which social goals dominate and economic goals play a very minor role. At the other end are business models in which economic goals dominate and social goals play a very minor role.

A Vision for Clean Water, for example, maximizes social goals. In order to achieve the highest number of beneficiaries, the organization gives away household water filters "for free". Economic goals, such as donations to finance the water filters, play a minor role here. *Grameen Veolia* offers simplified surface-water treatment systems to provide rural populations with affordable access to water distributed at village drinking fountains or via cans. *Grameen Veolia* applies economic goals such the recovery of investment and operational costs through water revenues. It also has a broad set of social goals such as distributing water to rural areas and thereby creating jobs for rickshaws drivers ("Grameen Boys") distributing the water, and keeping the water affordable for all income levels (Yunus et al., 2010). Economic goals dominate for *Unilever*'s *Pureit* water filters. *Unilever* maximizes profits by achieving retail prices that are higher than the manufacturing and distribution costs.

Business model innovations describe the development and/or modification of the elements in a business model. *A Vision for Clean Water*, for example, has developed a partnership with the Nepalese non-governmental organization *ENPHO* for marketing water filters. *Grameen Veolia* has established prepaid card systems to make money collection more efficient. *Unilever* has developed different water filters (e.g. in the 19–45 USD range) to maximize market penetration. Supplementing the initial direct-to-home distribution channels with a distribution approach to embrace commercial retail channels accelerates market penetration further.

Organizations need to integrate other actors, such as non-governmental organizations (NGOs), governmental agencies, research institutes and other private firms (Gradl and Jenkins, 2011; Hammond, 2011) if they are to succeed with such business model innovations. *Unilever* develops, for example, partnerships with doctors as key opinion leaders in urban areas to facilitate the promotion of their *Pureit* filters.

The following section devises a framework for business models for water services. These models must be neither too general nor too specific if they are to be useful. The advantage of having such a business model framework is that it allows organizations to articulate clearly how they intend to succeed in providing water (Foster et al., 2009). Moreover they should not only highlight the existing situation but also depict

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