Photo: David Nilsson

POLICY BRIEF

Paving the way for pro-poor and sustainable WASH: *The role of local innovation*

Although billions of people worldwide have gained access to basic drinking water and sanitation during the last two decades, data suggests that 'leaving no one behind' by 2030 would require doubling the current annual rate of progress[1] sanitation and hygiene targets within the Sustainable Development Goals (SDGs. In peri-urban areas, the increasing number of unconnected customers poses additional challenges. Business-as-usual will not address the problems of low coverage, inadequate service levels and poor sustainability of water and sanitation systems. A combination of new technologies with innovative models of service delivery will be needed to close the existing gaps and reduce inequalities. In particular, service providers will need to simultaneously adopt new, informal solutions for unconnected users and more traditional, formal mechanisms to connect more users to the centralized piped infrastructure, through an ambidextrous strategy.

Innovation in water and sanitation

We are running out of time to achieve SDG 6. Despite recent progress, many countries still have a long way to go to fully realize the ambition of achieving 'universal' access 'for all'[1] in sanitation and hygiene. Particularly in urban contexts, with over 2 billion new urban residents anticipated by 2050, there is a growing need for urban water management that ensures consistent, adequate and high-quality water services for cities[2]. However, the scale and complexity of this need present a challenge to city decision-makers across multiple sectors.

The commitment to 'leave no one behind' requires a specific focus on peri-urban areas, where low coverage rates and lack of sustainability result in recurrent shortages of water and poor quality of services[3]. In addition, residents in slums live in worse economic conditions, and these affordability issues reduce the attraction of private sector investment. This seriously challenges current approaches to delivering urban water supply and sanitation (WSS).

It is well known that providing basic services for all requires not only significant investments, but a change of paradigm to close the gaps in access to clean water and secure sanitation services. The variability of WSS problems demands a range of solutions, varying from place to place and from time to time. Customized WSS services that capitalize on existing local knowledge of conditions are needed since one-size-fits-all solutions have not

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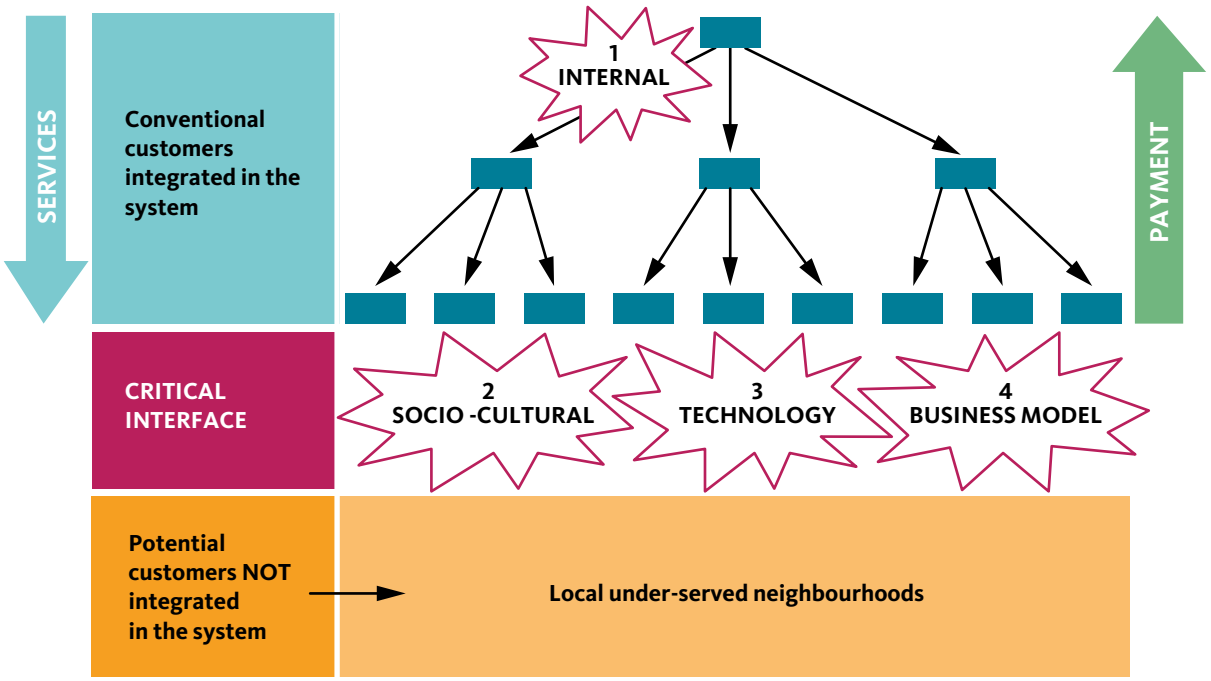

Figure 1. Four types of misalignments that can arise in local innovation processes.

worked and cannot be the strategy to scale up reach. In short, there is the need to move from the business-as-usual approach to new ways of approaching development and planning in line with available local resources.

Against this background, much emphasis has recently been placed on innovation and new technologies. For instance, pre-paid water dispensers are being tried out in Africa and elsewhere[4,5] as well as the coupling of information and communications technology (ICT), mobile payments and business models[6]. In addition, new types of collaborative arrangements are attracting attention[7]. However, this surge of experimentation is often grounded in what we see as an outdated understanding of the socio-technical change process of WASH. For decades, governments and service providers thought of their job as "rolling out" services by expanding into new areas. But it is difficult to expand into informal areas with low-income, fluid, and heterogeneous populations often without land tenure[8]. As a result, a range of innovations have emerged outside the formal systems, aiming to provide informal services for unconnected users. These two forms of expanding service delivery are most often managed by different actors, and up until recently, we could see few attempts on successful cooperation and coexistence between traditional system builders and informal actors, building systems from below[9]. Innovation and development pathways are too slow, and the results are insecure. It takes time and resources to connect peripheral users by extending the piped network. In addition, system building from below often ends up as pilots, where promising attempts are hard to scale up and often do not survive[10,11]. Simply speaking, service provision models need to have a good fit with the actual conditions on the ground, and the larger system environment. When this is not the case, innovative solutions rarely adapt to the changing context and needs, and misalignments occur, jeopardizing service provision. Through empirical studies, four different types of misalignment have been identified[8,12]. Social-cultural, technological, and business model misalignments occur around innovations in the critical interface, i.e. the boundary space between the system (conventional service model, connected customers) and the unconnected potential customers. Internal misalignment occurs within the utility due to organizational friction. Figure 1 illustrates where these misalignments take place, and how they relate to the system. They are all then exemplified by concrete findings observed in four different case studies, summarized in Boxes 1 and 2 (page 3–4).

Pre-paid water dispensers (PPD) in Kampala (Uganda)

Public standpipes and water kiosks in Kampala, aimed to offer affordable water to the poor, were typically under the control of water vendors who often made the customer pay a 5 to 10 times higher water tariff. The National Water and Sewerage Corporation (NWSC) launched a new payment method, through automated water dispensers, each designed to serve 20 households or approx. 100 people. The customers use an electronic token to draw water from the dispenser and top up the tokens at official sales points.

Photo: Pre-paid water dispensers (PPD) in low-income informal settlements in Kampala.

Self-read water meters (Jisomee Mita – JM) in Nairobi (Kenya)

Illegal water connections are common in informal settlements, with a few people making a business from them. The JM model, implemented by the Nairobi City Water and Sewerage Company (NCWSC), allows customers with an individual connection to read the water meter at the end of the month and send the number of water units consumed to the water company, then obtaining an automated response with the billing information. The customer then pays the water bill via a mobile money transfer platform.

Photo: Water meters (Jisomee Mita– JM) in household connections, Nairobi.

Pre-paid water dispensers (PPD) in Nairobi (Kenya)

The NCWSC aims to install 4,000 new PPDs in informal settlements. Payments are done via a token held by the user, which is recharged by uploading new credit through a sales point, managed either by the company or by an appointed salesperson manning the PPD. NCWSC is responsible for installing and maintaining the PPD, and for issuing the tokens and sales points. This model addresses the problem of intermediaries who re-sell water at inflated rates. Other advantages are that the utility receives payment in advance, offers a 24-hour service, and there is no risk of disconnection due to non-payment.

Photo: Electronic token to draw water from the dispenser.

Delegated management model (DMM) in Naivasha (Kenya)

The model has been built on contractual relationships between a community-based operator, the private bulk water supplier, and the municipal water company. The operator delivers water through 14 water kiosks plus a few household connections. Each water kiosk has a decentralised treatment facility to remove fluoride. The DMM involves a dual product: consumers can buy treated water (without fluoride) at a higher cost, and untreated water. The water company only oversees the operations, including water quality testing. The operator is meant to cover major repairs of the system, with O&M costs being included in the tariff.

Photo: Water kiosk, including a decentralized treatment facility to remove fluoride, in Naivasha.

Box 1. Summary description of case studies.

All photos: David Nilsson

INTERNAL MISALIGNMENT: innovation in conflict with practices and objectives within the utility

PPD in Kampala: Installations depend on external donor support. They are considered too costly and not aligned with cost recovery goals.

PPD in Nairobi: The utility is increasingly dependent on tanker trucks for distributing water to the PPDs, but road-based transport services are not a core area of operations for the water utility.

DMM in Naivasha: The innovation shifts the utility's main role from being a service supplier to an asset developer and regulator, which requires new skills.

CRITICAL INTERFACE MISALIGNMENT: Innovation poorly adapted to the local (user) level

SOCIO-CULTURAL

PPD in Nairobi: to boost pressure locally, NCWSC installed elevated tanks on top of dispensers, some of which have to be filled by tanker trucks. This has reduced some consumers' trust in the quality of the water. Incidents of theft and vandalism have been also reported.

JM in Nairobi: utility staff fear violence when visiting the site due to poor security and distrust.

PPD in Kampala and in Nairobi, JM in Nairobi: local elite groups take over service provision, and they find new ways of controlling both access to and pricing of the services.

DMM in Naivasha: consumer awareness is needed about what the untreated water is good for, and when to use the treated water.

TECHNOLOGY

PPD in Nairobi: low pressure in the distribution network makes the automated dispenser unreliable.

PPD in Kampala and in Nairobi: installation of new machinery in the field has increased the need for maintenance and spare parts, some of which (e.g. batteries) cannot be found locally.

JM in Nairobi: maintenance deficit with 40% of meters found to be non-functional, and software is costly and not available in the country.

DMM in Naivasha: technical challenges, such as the fluoride treatment, need to be addressed by a local operator with limited capacity.

BUSINESS MODEL

PPD in Kampala: the pro-poor tariff at the water dispenser has resulted in a shift by non-poor customers from a regular (more profitable) supply to the PPD.

JM in Nairobi: to force the competing private vendors out of the market you need a regular supply, but the network system can only deliver water for 8 hours per week.

JM in Nairobi: builds on a business model of billed consumption, but the property owners recover costs using a flat monthly rate. This favours the property owners and has a negative effect on the poor: the end users.

Box 2. Examples of misalignments observed around the innovations in four case studies[12].

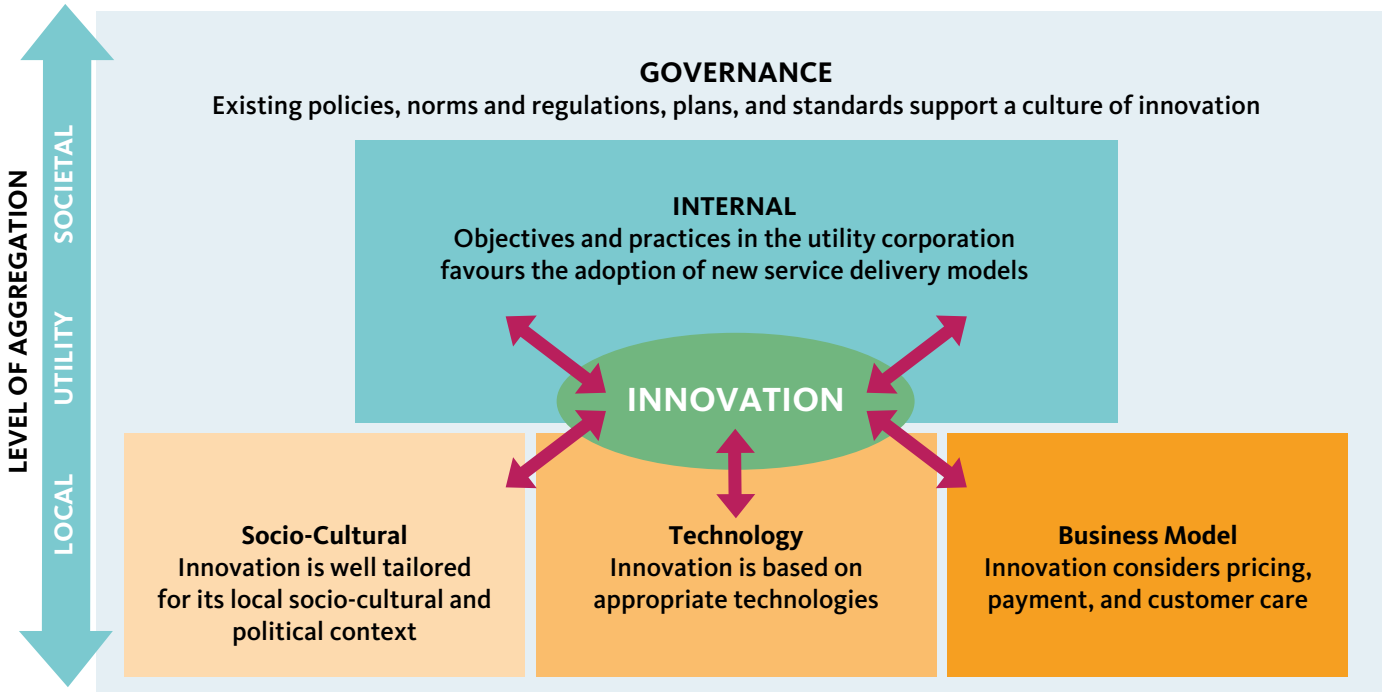

Figure 2. An enabling environment for ambidextrous innovation.

Developing an ambidextrous service delivery strategy

Given the difficulties of conventional approaches in low-income areas, governments – national and local – and service providers alike are trying to adopt new models of provision. The case studies show that the challenge is to achieve harmonious coexistence between the formal and informal parts of the water and sanitation sector. This suggests that the only realistic way forward lies in the creation of a strong commitment to a dual or ambidextrous (two-handed) service delivery strategy.

Using an ambidextrous strategy means that the traditional utility adopts a dual service delivery model, combining the piped network with other forms of service provision[9,13]. This entails the creation of an "Ambidextrous Organization" with a new "exploratory" unit while still maintaining the traditional parts of the business.

Finally, innovation is not about a single silver bullet invention. Affecting positive change and fostering an innovation culture require a system-wide approach that tackles several dimensions simultaneously, including policy, financing, institutions, and other key processes of the enabling environment. As a consequence, a fifth **misalignment** might occur in relation to **governance**. It encompasses, among other things, laws, regulations, and standards that militate against the adoption of certain innovations.

In conclusion, moving towards a new paradigm where the service providers are deeply involved in innovation activities outside system boundaries can be challenging. However, in new types of scalable and sustainable solutions in the water and sanitation sectors, ambidextrous innovation is a cornerstone.

Recommendations for policymakers, corporate managers, and researchers: what is needed in order to close the urban WASH service gap

1. An enabling environment for innovation:

Earmark resources for innovation | Innovation requires a long-term and protected commitment of resources. It means that an appropriate percentage of national and local government budget should be set aside to further innovation – and it should not be decreased if there is a budgetary shortfall. However, investments in innovation remain at low levels in developing countries. In addition, few governments can answer with confidence the basic questions of how much is being spent, by whom, for what purpose, and with what results[14].

Review regulatory barriers | Advice is needed to ensure that innovation is aligned with existing regulations. However, the regulator can ease the initial regulatory burden during the experimental stage and also allow greater flexibility. Similarly, norms and regulatory incentives can be set to drive and reward innovation, e.g. stimulate innovation towards a specific outcome.

Promote collaboration for innovation (utilities, universities, users) | Sector-wide and peer-to-peer collaboration and networking, together with information sharing and learning, is crucial to set the conditions for an innovative environment. Networks also play pivotal roles in spreading innovations. Participation is important, working closely with communities and listening to users, to understand their needs and build trust. The four cases presented above show social misalignments caused partially by a lack of understanding of societal norms and behaviours.

2. A strategy for ambidextrous WASH innovation

Assess scalability of innovations early to avoid the "pilot curse" | Rapid assessment and adequate understanding of what is working and not working in services delivery is the first step, taking into account both 'hard' and 'soft' components. Translating and adapting knowledge from setting to setting is the second step. Thirdly, influence and advocacy, as opposed to position and authority, are more effective when it comes to maximizing market uptake of innovative solutions.

Balance generic tools with specific and adapted solutions | Despite the need for innovation frameworks and tools that provide a structured approach to foster innovation, innovation is best achieved when solutions are context-based. The PPD model, for instance, is facing different misalignments in Nairobi and Kampala.

Combine long-term strategy with windows of opportunities | Individual best practice solutions can be important but must fit into the overall strategy and contribute to shared goals. Establish a strategy that promotes alignment among stakeholders, with clear objectives and priorities, to help focus efforts. Stop looking for the perfect toilet or perfect tap – look for opportunities!

3. A culture of innovation and collaboration at utility level

Innovation leadership and innovative organizational culture | Strong leadership is necessary but not sufficient: a strong innovative culture needs to be in place. Organizational culture refers to normative beliefs and shared expectations, and directly relates to encouragement of creativity at all levels.

Balance explorative and exploitative innovation, diversifying the competence base | An ambidextrous organization needs to combine exploratory innovation, characterized by experimentation and risk taking, with a focus on generating new ideas, and exploitative innovation, which focuses on building and extending already existing ideas. Explorative and exploitative innovation require a diversification of structures, strategies, processes, capabilities, and cultures.

Motivation for innovation | One of the greatest assets for innovation is motivation, and particularly, involving top-performing staff in new ideas and processes. Another resource to support innovation is giving personnel time to think, create, design, and develop new and progressive services, products or processes (again: earmark resources).

Measure and reward innovation | The right balance of financial incentives (e.g. bonuses, cash, shares, additional holiday, etc.) and non-financial incentives (e.g. acknowledgment and pride, promotion opportunities, job rotation, international assignments, etc.) helps leverage the true creative and innovative power of staff members.

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Photo: Technical University of Kenya

About this publication

The findings and recommendations of this publication are based on the conclusions from the research project "The role of Local Innovation for a Transformative Shift towards sustainable water and sanitation in African cities", which was aimed at understanding how the large systems for urban water and sanitation change in sub-Saharan Africa contexts, and in particular, how local innovation can contribute to system-level change. The project was led by Associate Professor David Nilsson at KTH Royal Institute of Technology in close collaboration with Associate Professor Pär Blomkvist at MDH Mälardalen University, with financial support from the Swedish Research Council FORMAS (Grant ID 2015-13709-31069-42). The recommendations are largely based on a Policy Workshop with East African policy makers, utility managers and academia, held in Nairobi, November 2019.

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About SIWI

SIWI is a leading water institute, focused on water governance and capacity building in order to reach a just, prosperous and sustainable water wise world. It is well-known for its research, knowledge generation, and applied science, which helps to develop policy recommendations and supports the implementation of programmes. In addition, SIWI uses its trusted convening power to facilitate multi-stakeholder dialogues, most evident in its annual event, World Water Week.

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