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DESIGN FOR SCALE: THE CASE OF APOPO

In 2002, APOPO, a non-profit organisation, began researching the ability of African giant pouched rats to reliably detect tuberculosis in response to high prevalence rates and the challenges in detecting the disease in many sub-Saharan African countries. The organisation set up a rat breeding, training and testing facility on site and in partnership with the Sokoine University for Agriculture in Morogoro.

Since 2007, APOPO has been scaling up its efforts in Tanzania to support local clinics and help significantly increase tuberculosis (TB) detection rates. Research operations began with one laboratory facility in Morogoro, and in 2016, with support from HDIF, a new testing facility was opened in Dar es Salaam. The rats, also known for their ability to detect landmines and other explosives, are now appropriately referred to in Tanzania as ‘Hero Rats’.



A lab technician tests sputum samples using a TB-detection ‘trained’ Hero Rat.

Tanzania is one of 30 countries to be recognised by the World Health Organization as a tuberculosis (TB) high-burden country. The impact of TB on individuals and communities is very significant. Annually, 6,000 Tanzanians die due to tuberculosis, more than 65,000 people have the disease, only 50 per cent of the most infectious patients are detected, and many of those detected fail to complete treatment. This is exacerbated by a lack of accurate diagnostics, complications from co-infection with HIV, systemic shortages and management of essential equipment, supplies and health professionals, and the stigma surrounding the disease.

Since its first innovation – using rats to improve the detection time and rate of TB in samples, supported by an approved confirmation test – APOPO has faced a number of challenges. Key among these is how to systematically follow up positive diagnoses to initiate treatment with hard-to-reach patients who may have travelled a considerable distance from their homes or jobs to be tested. Even as APOPO successfully detected additional cases, the vast majority of these patients were still being ‘lost to follow up’: in the early years, when samples had to be transported from Morogoro: less than 10 per cent of patients who

were diagnosed by APOPO initiated treatment. These challenges prevented APOPO from reaching the scale of impact it was aiming for.

Among other recommendations, the Design for Scale principle suggests that innovators should identify institutional partners and make technology choices specifically to help overcome challenges and reach scale. In applying for a grant from HDIF, APOPO joined forces with Operation ASHA and Mapambano ya Kifua Kikuu na Ukimwi Tanzania (MKUTA). Operation ASHA is a well-established India-based organisation with a strong focus on mHealth applications aimed at improving case management and treatment of TB. MKUTA is a community-based organisation employing survivors of TB and focused on improving health behaviours and community health initiatives, including educating against TB stigma.

PRINCIPLES FOR DIGITAL DEVELOPMENT: DESIGN FOR SCALE

- ▶ **Plan and design for scale from the start.**
- ▶ **Develop a definition of *scale*** for your initiative.
- ▶ **Keep your design simple, flexible and modular** to make it easy to change your content and adapt to other contexts.
- ▶ As you make **technology choices**, think about whether they will make it easier or harder to scale.
- ▶ **Identify partners** early who can help to scale your tool or approach.
- ▶ **Consider your funding model**, including revenue-generation options, social business models, the cost per user and financial paths to sustaining the initiative.
- ▶ **Gather evidence and demonstrate impact** before attempting to scale.
- ▶ Don't attempt to scale without **fully validating that your initiative is appropriate** in a new context and addresses a priority need.

REDESIGNING FOR SCALE

APOPO and its partners have successfully designed and adapted a model that extends APOPO's original innovation in TB diagnosis. The model allows the team to address TB diagnosis, treatment initiation and adherence. The team is scaling up in two important and re-enforcing ways.

First, APOPO has expanded testing capacity from its original base in Morogoro and achieved same-day TB testing and result turnaround within 24 hours. Since September 2017, APOPO has been fully operational in all 41 clinics and labs providing TB services in Dar es Salaam and periphery areas. This reduces the four-hour time lag of transporting samples to the original base in Morogoro for testing, which had been undermining the efficiency gains of the detection algorithm.

Second, APOPO has been scaling up direct observed therapy (DOT) and tracking hard-to-reach patients in peri-urban and urban slums. MKUTA's community-level knowledge and reach has been essential to the success of patient follow-up. The model is further boosted by applying Operation ASHA's eCompliance fingerprint technology, which allows clinics to quickly and correctly identify and track a patient and their drug regimen in the patient's home, thus helping to improve adherence and cure rates and reducing the number of clinic visits and associated transport costs. In the future, the partners will explore the possibilities of rolling out such digital technology beyond Dar es Salaam.

APOPO has achieved remarkable success in two of its primary indicators – increases in case detection and in treatment initiation. In 2017, the model increased case detection by 32 per cent: 30,692 patient evaluations were completed between January-December 2017, which is far greater than the targets set. Initiation of treatment among those diagnosed with TB has increased to 81 per cent of those tested and diagnosed through APOPO's diagnostic algorithm compared to 71 per cent in 2016. APOPO and the team have ensured that 1,244 patients have been accurately diagnosed, 1,005 of whom have initiated treatment – curing patients and preventing potentially thousands of new cases.

LESSONS AND RECOMMENDATIONS

APOPO's experience offers significant lessons to other social enterprises searching for innovative healthcare solutions. It successfully developed and deployed a diagnostic tool for research use under field conditions, but the impact was limited by structural barriers preventing increased case detection from translating into increased treatment initiation and cure rates.

▀ **A single innovation can scale by connecting to a system.** In order to scale up, APOPO needed to connect better with both the health system and the patient community. Although APOPO's original innovation addressed only part of the system, its success came from connecting to important parts of it to provide better service delivery and lay the foundations for its impact to benefit the full spectrum of TB care.

▀ **Remaining flexible is crucial to achieving scale.** Many innovations, like APOPO's, solve a problem by

creating efficiency that is best realised at greater scale, but need support to achieve it. By opening an urban lab facility, improving the service delivery model, working in partnerships and expanding operational collaboration to 41 clinics and labs in Dar es Salaam, APOPO brought its innovation closer to the population it was designed to serve and achieved the scale it had not been able to reach when it was based four hours away in Morogoro.

▀ **Planning for design from the start will inform partner and technology choices.** Selecting the right partners to take an innovation to scale requires a plan, a definition of scale and a genuine understanding of the problem. APOPO needed to improve reach and follow-up to achieve scale. By partnering with a community-based organisation that employs TB survivors and people who are HIV positive, APOPO gained immediate entry to the communities where its model would have the most impact. By partnering with Operation ASHA, the organisation was able to access the technological tools it needed to extend its outreach and take the innovation to scale.



A Hero Rat takes a break from evaluating human sputum samples at an APOPO lab.

ABOUT THE PRINCIPLES FOR DIGITAL DEVELOPMENT

The Principles for Digital Development are designed to institutionalise lessons learned in the use of information and communication technologies (ICTs) in development projects. They were written by and for international development donors and their implementing partners, but are freely available for use by all. The principles are 'living' guidelines, intended to serve as guidance rather than edict, and are meant to be updated and refined over time.

Further reading

- www.apopo.org/en
- <http://digitalprinciples.org>
- www.opasha.org/about/
- www.mukikute.org/

(All links accessed 2 May 2018)

Credits

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Disclaimer: All opinions included here represent those of HDIF and not those of DFID.

HDIF'S APPROACH TO DIGITAL INNOVATION

HDIF's Digital Approach sets out actionable steps for using the Principles for Digital Development to support cross-sector technology adoption and scaling-up for innovation-related practitioners (including HDIF and its partners) and policymakers in Tanzania. The prevalence of digital innovation in the HDIF portfolio presents an opportunity to generate learning from grantees who are putting the principles into practice in a Tanzanian context.



The Human Development Innovation Fund (HDIF) aims to identify and support innovations that have the potential to create social impact in education, health, and water, sanitation and hygiene (WASH) across Tanzania. With a focus on market driven solutions, HDIF catalyses the development, testing and scaling of innovative models of service delivery, information and communication technologies for development (ICT4D), and product solutions in health, education and WASH.

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HDIF aims to contribute to the global dialogue on the principles through the Digital Impact Alliance (DIAL), the stewards of the digital principles, who facilitate lesson-sharing around digital development and promote their adoption globally. The HDIF digital framework for learning borrows from DIAL's materials and content. For more information see <https://digitalimpactalliance.org/>

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