Using Mobile Technology to Fight Disease: Three Tips for Social Startups in the Developing World

Editor's note: This post is part of NextBillion's series, "Startup Showcase" — one of several topic areas we'll be covering through special series this year. Click here for more details on our 2018 series.

Today's startup scene is buzzing with stories of innovative apps and promising new solutions. In fact, U.S. startups alone collected more than $67 billion in venture capital funding last year, a new record that surpassed the previous high in 2015 by more than 5 percent.

It's certainly an exciting time, with massive opportunity, in the startup space. However, the industry is also incredibly crowded — particularly when it comes to mobile app-based startups. It's estimated that 6,140 applications are launched on Android alone every day, so it can be hard for a new entrant to gain traction. And entrepreneurs with a focus on social good often face even greater challenges in gaining visibility and funding than traditional startup founders.

How can an entrepreneur with a focus on the developing world generate interest and funding in their cause? As a pioneer in the medical technology space, I've found the path to success is rooted in three key factors: a deep understanding of the problem you are trying to solve and the needs that must be met; a focus on developing breakthrough solutions that are affordable and usable in the target market; and a willingness to work with multiple partners that bring key expertise and scale, so that the entire delivery chain can be affordable and sustainable.

IDENTIFYING THE CAUSE

According to a report by the World Bank and the World Health Organization, nearly half of the world's population is too poor to access essential health services. Preventable diseases still claim countless lives – malaria alone is responsible for the deaths of over 1 million people each year.
Recognizing this crisis, I co-founded Hemex Health with my partner, Peter Galen. With extensive backgrounds in global and commercialized medical technology, we set out to find a low-cost solution to detect both malaria and sickle cell disease, two diseases that disproportionately impact communities in the developing world.

We recognized that many of the solutions with the greatest potential for impact never actually make it out of university laboratory testing because large companies are not looking for affordable innovation. We resolved not to let that happen with our innovations, which also originated in the university setting. The idea for an inexpensive microchip version of electrophoresis – the process that can diagnose sickle cell disease – originated with Umut Gurkan, and the magneto optical detection system to diagnose malaria originated with Brian Grimberg, both of whom are researchers at Case Western Reserve University. Through a collaboration between Hemex Health and Case Western, we launched SMART (Sickle Cell and Malaria Accurate Remote Testing), an integrated point-of-care technology platform that diagnoses, tracks and monitors sickle cell disease and malaria patients in low-resource settings. The platform takes the solution out of the lab and provides affordable remote testing for sickle cell disease and malaria in local communities in developing countries. The SMART system consists of the Hemex device and the eHealth Africa mobile health application and electronic medical record system.

**THE SMART ADVANTAGE**

In just one minute, the Hemex malaria test (a component of SMART) can detect minute amounts of hemozoin, a waste product produced by all malaria parasites. The Hemex test can determine the presence of malaria much faster than either of the standard tests, RDTs (rapid diagnostic tests) or microscopy, which take about 20 minutes and 45 minutes respectively. Hemex has a lower level of detection than either test (that is, it can identify very low-level infections), which is important for areas looking to not just control, but also to eliminate malaria from their borders.

The sickle cell test uses microchip electrophoresis technology, which is a faster, cheaper and more automated approach to electrophoresis – a gold standard laboratory test for sickle cell disease that requires a skilled technician. Hemex delivers affordable, lab-quality results in just 8 minutes for regions that do not have the infrastructure or resources for complex laboratory testing found in most of the developed world.

In addition, the Hemex device can store patient data digitally or transmit it wirelessly (including GPS location) to a laptop or the cloud. SMART integrates Hemex's data management capabilities with eHealth Africa's mobile health application and electronic medical record system to create a robust, integrated point-of-care system for these tests.

**PUTTING DESIGN INTO ACTION**

There are countless challenges entrepreneurs endure while engineering their solutions, but these challenges often lead to the greatest insights. While developing the diagnostic technology behind SMART, we saw that it was critical to create a product that was fast, accurate and affordable – but most importantly, usable. Our challenge was creating a product that worked as seamlessly in the field as it did in laboratories. In the developing world, where malaria and sickle cell disease are major problems, conditions are very different from the controlled lab environment that we had tested in. To better understand communities' needs, we had to spend time in the field and watch the typical users at work.

Putting our design into action with health workers on the ground was a crucial step in the engineering process that allowed us to refine many aspects of SMART. While in the field, we realized many locations don't have consistent power, internet or cellular service. Locations ranged from air conditioned spaces to areas that were hot and dusty. There was even extreme variability in the backgrounds of users themselves, whose skills ranged from semi- to very highly literate. We integrated these insights into our final product, knowing these real-world factors would define its success – and this would have been impossible to predict without taking our solution beyond the lab. Through this process, we learned that we had to create a flexible, dependable and durable tool.

**IT TAKES A VILLAGE**

Another crucial aspect to a social startup's success is its approach to collaboration. Social entrepreneurs should seek to work with a variety of partners, as this often opens opportunities for funding and growth. In SMART's case, three major partners have helped Hemex Health in our development, deployment and continued progress: Case Western Reserve University, eHealth Africa and the International Foundation Against Infectious Disease in Nigeria, in collaboration with the University of Nebraska Medical Center (Omaha). We've also been fortunate to secure funding through the Vodafone Americas Foundation. In June, they named SMART the first place winner in their 10th annual Wireless Innovation Project, a competition that awards grant funding to connected tech innovations with the potential to deliver social change. SMART was recognized as a breakthrough solution for social impact, and we were awarded a $300,000 grant. We are using the grant to further develop and deploy our mobile platform. This experience has taught us that funders will be willing to invest in social good initiatives, if those initiatives solve real-world problems in an accessible way.

I encourage technology entrepreneurs with a focus on social good to consider these three key factors that have made SMART successful: Have a deep understanding of the problem you seek to solve and the people impacted by it, innovate to keep your solution affordable and sustainable, and seek partnerships that will propel your concept forward. By building their work around these essential elements, entrepreneurs will greatly increase their likelihood of both business success and lasting social impact.

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