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# A Smarter Way to Design Business Strategies to Serve the Poor



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**With intelligent modelling, a little data can go a long way when it comes to predicting the performance of bottom-of-the-pyramid strategies.**

The first thing you realise when you go to Rwanda is that it isn't called the "land of a thousand hills" for nothing. Outside of the capital Kigali, the land is sparsely populated. With dry weather most of the year, the dirt roads of rural areas kick up red dust that settles even on your teeth.

When two of us (Bhavani and Rowan) visited Rwanda, it illuminated the business problem we had been working on from our offices in Singapore and South Africa: Why did poor, off-grid Rwandans prefer to use kerosene lamps when they had access to healthier and overall cheaper rechargeable lamps?

Our research partner in Rwanda was Nuru Energy, a firm that manufactures and sells rechargeable LED lamps that cost three times less than kerosene

per hour of usage. Lamps are sold at a fraction of the manufacturing cost. The firm then recoups the subsidy through largely affordable recharge fees. At least, that was the business model. But it wasn't working.

As we had come to suspect, maybe the problem had less to do with pricing, and more to do with the practicality of needing to walk up and down hills to visit the nearest charging centre. There, lamps are charged by an employee pedalling on a stationary bike, or by solar panels.

## **Seemingly irrational consumer behaviour**

At the start of our [research project](#), we found that Nuru lamps were used much less than expected, based on earlier surveys that showed consumer interest in, and satisfaction with, the product. Consumers were only recharging their lamps on average 1.2 to 1.6 times per month, which wasn't enough to sustain the business.

We set out to measure the impacts of price and inconvenience, but also to figure out what changes could be made to the business model. We distributed 2,500 lamps – one per household – in 29 Rwandan villages. We then randomly assigned these households to different recharge prices, ranging from free to 120 Rwandan francs (US\$0.10). The distances that consumers had to travel to reach a recharge centre were randomly allotted as well.

Using technology, we recorded and downloaded to our cloud database the ID of each lamp and timestamp of each recharge. Our experiment lasted three months, from December 2016 to March 2017.

This is what we found:

- As expected, the number of recharges dropped sharply as the price and distance from the recharge centre increased.
- However, even when the recharge was free, lamps were recharged twice a month on average, not enough to support the business.
- Every half-kilometre increase in distance from the recharge centre resulted in a significant drop of one recharge per household.

## **Reviewing the business model**

Now that we had data, we got to work. We translated our customer behaviour data into the language of equations, in effect creating a business

model query engine. We used that query engine for two critical purposes.

First, it allowed us to effectively brainstorm many alternative business models. Could we simply drop the price, or give more hours of light per recharge? Could we place more recharge centres in each village or encourage consumers to pool their lamps and take turns travelling? We also considered door-to-door recharge services and flexible payment schemes, among other solutions.

Second, and this is where it gets interesting, our intelligent query engine allowed us to estimate the revenue impact of each strategy we had thought up using the variables we knew mattered.

It is one thing to dream up new strategy models; it is quite another to test them. Due to time and money constraints, we couldn't test all our ideas in the field. We needed to predict what would work for Nuru Energy. Many businesses face a similar challenge: They have ideas on how to improve their model, but can't quite afford to test them all.

Aside from generating insights, intelligent consumer-behaviour modelling enabled us to rule out many business strategies Nuru Energy could have wasted money on.

### **Quantifying the potential success of business strategies**

Our model confirmed that inconvenience and – even more so – liquidity constraints were the biggest issues to address. However, removing all inconvenience meant moving to an on-demand, door-to-door recharge service. Unrealistic in the short term. Same for the fully flexible payment schemes that would solve the problem of consumers' cash flow and potentially improve revenue by 126 percent.

On the bright side, several shorter-term strategies went a long way. For example, offering door-to-door service once a week could capture nearly half the same revenue increase, compared to a fully on-demand service. We also found that Nuru Energy could increase its revenue by 76 percent by allowing one recharge on credit.

When adoption is low among poor consumers, it is tempting to just reduce the price. However, this is often not possible or sustainable, or, as in our case, may be missing the mark. Instead, as our model showed, simple changes to business operations can be very effective. The beauty is that

firms don't necessarily need big data and a lot of experimentation to estimate the revenue impact of various strategies. They need a smart model and a genuine desire to understand their consumers' pain points.

#### **Find article at**

<https://knowledge.insead.edu/strategy/smarter-way-design-business-strategies-serve-poor>

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#### **About the author(s)**

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#### **About the research**

The paper "[Design of Off-Grid Lighting Business Models to Serve the Poor: Field Experiments and Structural Analysis](#)" is published in *Management Science*.