# Rural Broadband Connectivity Infrastructure Varies by Costs (Capex/Opex) | Technical Deployment | Partner

Cost of building and operating

| | Description | Organizations |
|---|---|---|
| **$250K Tower**  | • High capital construction by mobile network operators<br>• Mobile phones connect to a cell tower which reaches the internet cloud and fetches data | MTN, Safaricom Twaweza, airtel, Equitel |
| **$100K Tower**  | • Low-cost tower solution<br>• Reduces the total cost of building and running a mobile network site by up to 70%<br>• Reduces RoI to less than 5 years | HUAWEI, ERICSSON, Safaricom Twaweza |
| **$100k – $200k Satellite**  | • Internet signals are sent and received by orbiting satellites<br>• Lower cost compared to cables or setting up a tower in remote areas<br>• More efficient than dial-up | EQUITY Bank, avanti, inmarsat |
| **$50K Fixed Wireless Microwave**  | • Tower rental, equipment placement<br>• Point to Point microwave<br>• Virtual networks | VANU |
| **$500 - $1000 Hotspot**  | • Resells internet from a backhaul system, e.g. fibre cable or cell towers, to multiple users<br>• Can be managed remotely through hotspot software | MAWINGU WiFi Affordable Internet, surf |

**NB: While the cost implication for different towers are different there exists interdependencies between some of the smaller, lower-cost infrastructure and the large infrastructure e.g. Wi-Fi hotspots depend on the cell towers**

# E-choupal (India) – Off-taker-led ICT-enabled agricultural trade system, evolving into services and FMCG retail points

**OVERVIEW**

**Core offering:** Information and market hub for agricultural trade, extension services, and rural retail (sales) points.

**Target users:** Farmers

**Led by:** ITC Limited (an Indian Conglomerate)

**Launched in:** 2000

**Reach:**
- 6,000+ hubs, 4 mil. farmers in total (as of 2011)
- Each e-Choupal serves ~600 farmers in 5km radius

**Infrastructure:**
- Phone line or VSAT connection, powered by solar
- Installed at Sanchalak's house

**Key partners:**
N/A

***E-choupal***

**Services offered**
- Web-based market information, incl. price at various procurement hubs
- Secure a floor price with a specific hub
- Training opportunities
- FMCG products for purchase, and Link to Choupal Sagar for greater services
- Order system for ag inputs

***Choupal Sagar***

**Services offered**
- One-stop retail supermarket – agricultural inputs, FMCG, and financial product
- Additional training and healthcare services
- Service as doubled-up hub with electronic weighbridge, etc.

***ITC Procurement Hub***

**Services offered**
- Purchase produce at pre-negotiated price via e-Choupal's internet, or higher.

**Site set-up**
- Sanchalak's (entrepreneur) house used as kiosk
- Computer and Internet

**BUSINESS MODEL**

Some soft finance from ITC to cover costs, while entrepreneurs (Sanchalak) also bear costs and raise revenue from e-Choupal.

**CapEx: (borne by ITC)**

~$800 to establish an e-choupal with dial-up connectivity and ~ $2,000 if a VSAT has to be mounted

**OpEx: (borne by Sanchalak)**

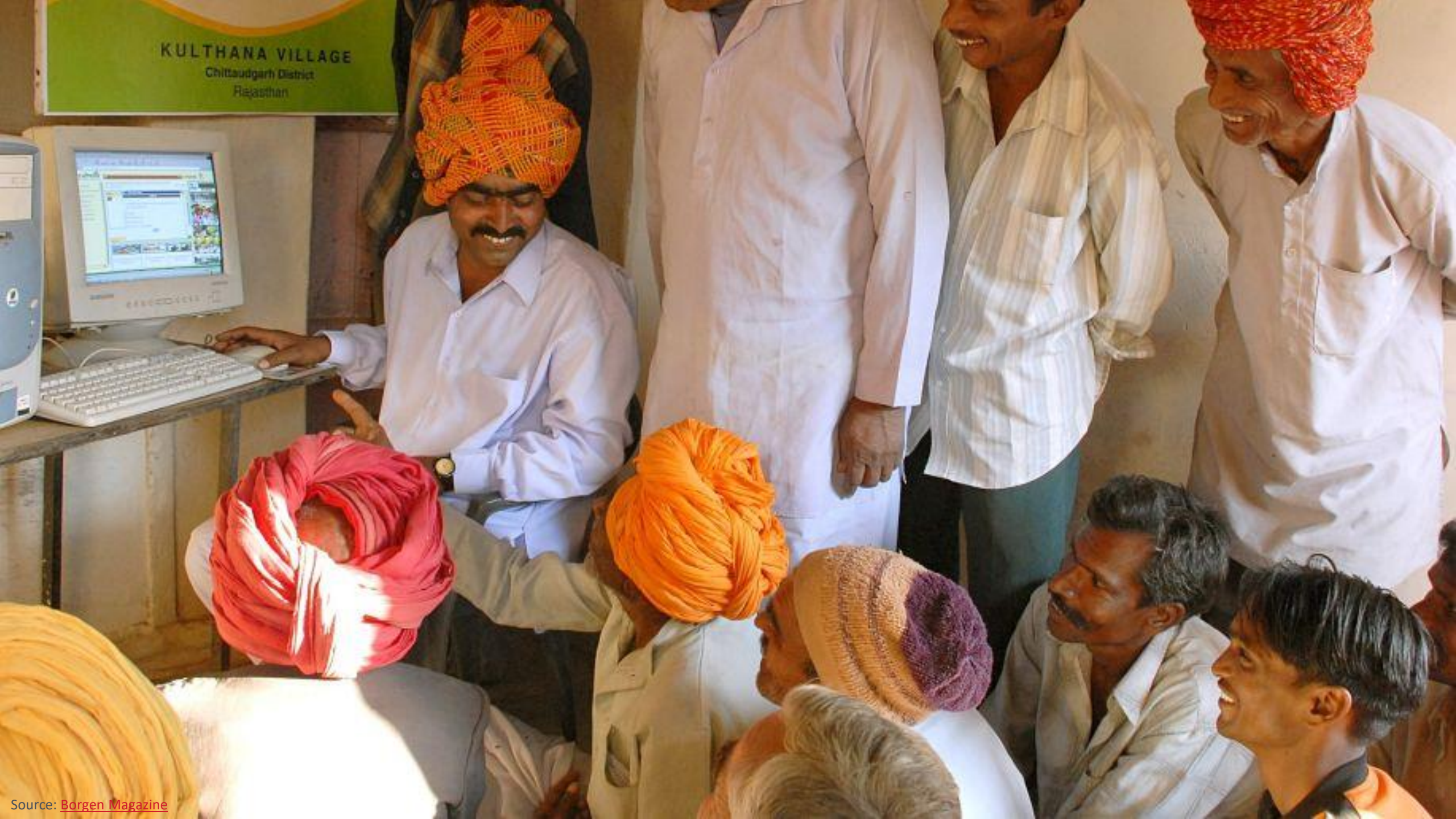
Electricity and internet – ~ $60 to ~ $160 p.a.

Support and maintenance – ~ US$100 p.a.

**Revenue:**
- Sanchalak earns income from commission on processed product

**SUCCESS FACTORS**
- Anchors on existing village institutions
- Tries to understand the communities' needs using ex-middlemen to conduct surveys in setting up new e-choupals
- Provides support to Sanchalak, incl. ICT and management training, and encourages them to offer other services
- Partnerships with academic institutions and NGOs to provide appropriate info
- Trades a wide varieties of produce, including soybeans, coffee and oil seeds limiting seasonality of transaction volume

Sources:World Bank, "E-choupal: ITC's Rural Networking Project"; IT for Change; "e-Choupal – An Initiative of ITC", 2008




Source: Borgen Magazine

# VANU (Rwanda) – Low-energy, solar-power cellular network

**OVERVIEW**

**Core offering:** Provides voice and data connectivity, as well as mobile money in areas which previously had limited to no coverage.

**Target users:** Rural population

**Founded by**: Vanu Bose

**Launched in:** 2016 (in Rwanda)

**Reach:**
- 31 cell sites asreaching 100,000 people
- Plan to reach 1 million people in Rwanda once agreements with MNOs have been firmed up

**Infrastructure:**
- A mini-server contained in a water proof case, powered by solar
- Masts cover the road and 2km on each side of it

**Key partners:**
MTN
Airtel
BRCK
Facebook

***VANU***

**Services offered**
- Low energy cellular network that can be used across mobile service providers

***Mobile Service Provider***

**Services offered**
- Regular voice and data connectivity as well as mobile money

***Rural Population***

**Uses**
- Payment for alternative energy

(Use cases are still in their early days and are projected to expand)

**Site set-up**
Low power technical innovation (50W-90W of power) transmitting 2GSM carriers

**BUSINESS MODEL**

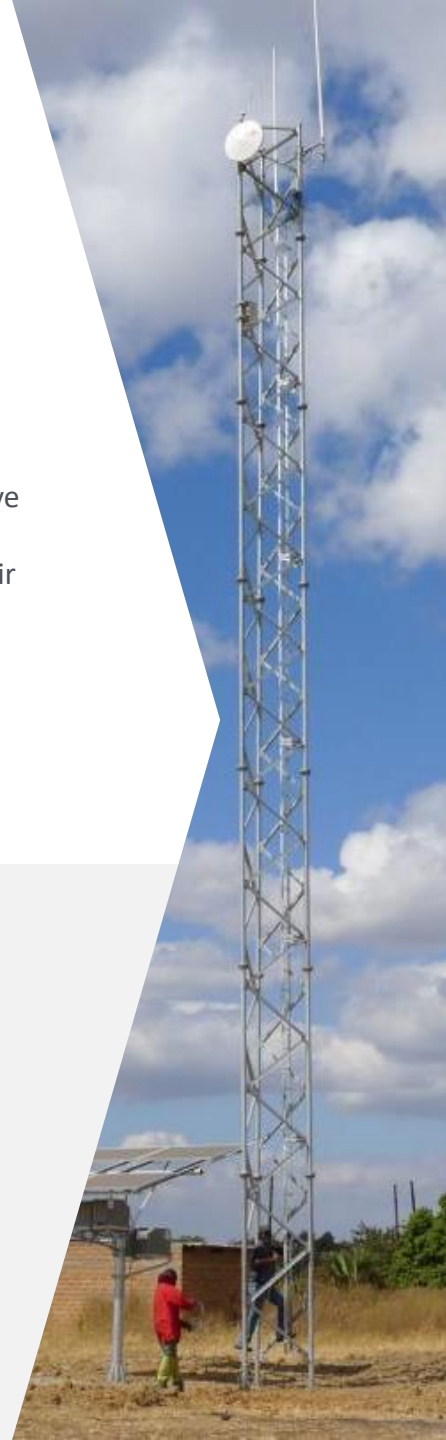
VANU provides coverage as a business – they don't have any subscribers but work with carriers to extend their networks to the rural areas

**CapEx:**
~$27,000/site initial set up

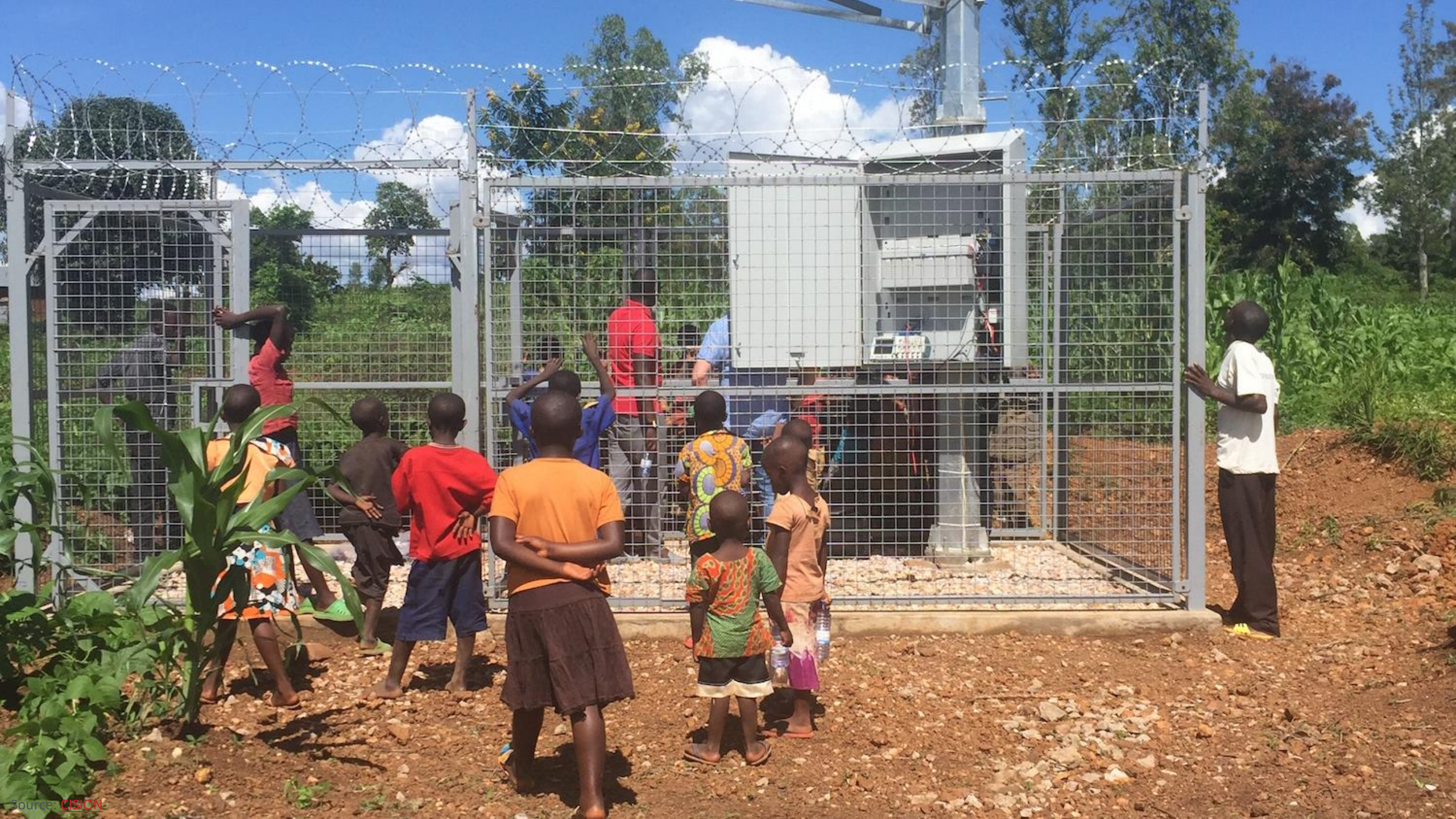
**OpEx:**
~$8,400/year

**Revenue:**
- ARPU - $1/ month paid by the users
- It is market driven and therefore sustainable w/o subsidies
- There is a 70:30 revenue share between VANU and the MNOs

**SUCCESS FACTORS**
- Reduce the power usage of their sites which results reduction in power needed for these networks i.e. they can use solar
- Works as a wholesale mobile network; they don't have subscribers each carrier use the network and pays VANU when their subscribers use it
- Government support in adopting a solution relevant to the Rwandan market



Sources: Interviews with organization's management; The NewTimes, "How US firm plans to extend wireless connectivity across rural Rwanda", 2016; The NewTimes, "MTN, Vanu deal to increase connectivity in rural areas – officials", 2018; Forbes, "How Vanu Can Make Rural Cellphone Networks Profitable On $1 A Month And Connect Rural Africa", 2017



Source: CISION

Case Study 3

# Rural TaoBao (China) – Rural e-Commerce Platform

**OVERVIEW**

**Core offering:** Facilitates C2C, and recently B2B transactions between SHFs in rural China and consumers in urban centres.

**Target users:** Rural population

**Led by:** Alibaba

**Launched in:** 2003

**Reach:**
- 30,000 service centres across 700 counties in 29 provincial-level regions
- Served more than 1 million farmers in 2015

**Infrastructure:**
- Installed at entrepreneurs shop
- Connectivity enabled by Alibaba in collaboration with the local government

**Key partners:**
Central and local government
Ant Financial

***Buyers and sellers***

- List products on the platform for free directly or with the help of service centre agent
- Browse listings and buy directly or contact agent to make orders and deliveries

***TaoBao Service Centre***

**Services offered**
- Post agricultural products online on behalf of farmer
- Help farmers source items online e.g. agricultural appliances,
- Sell and deliver product (at times it is outsourced)

***Ant Financial & Alibaba***

**Services offered**
- Alibaba finances the setup of TaoBao centres and trains the entrepreneurs
- Ant provides complementary services for rural inhabitants and entrepreneurs i.e. loans, insurance and training

**BUSINESS MODEL**

Rural service centre agent charges farmer commission for selling products to buyers, and either directly deliver or work with small delivery companies to get goods to urban buyers

**CapEx:**

Alibaba establishes the service centers (plans to invest $1.6 billion in 100,000 service centres by 2019) ~$16,000 per centre

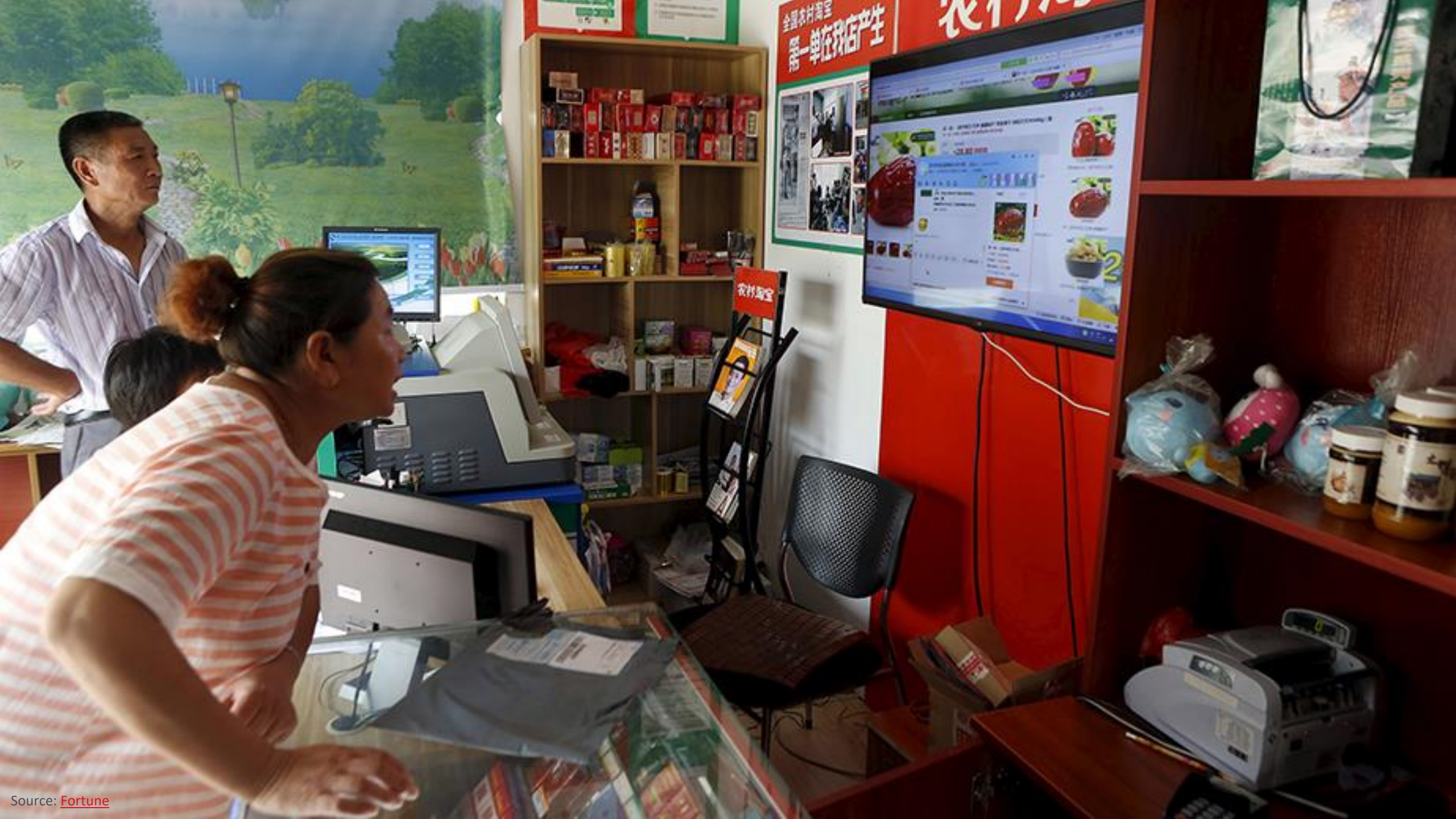
**OpEx:**

Incurred by the store owner

**Revenue:**
- Commissions for facilitating e-commerce
- Advertisements

**SUCCESS FACTORS**
- Holistic provision of services required by the rural population e.g. connectivity, some training, and financial service products (payments, loans and insurance through Ant Financial)
- Government support to provide easier access to computers, tax credits, store space etc.

Sources: China Daily, “Rural Taobao brings e-commerce to the countryside”, 2017; Business for eTrade Development, “Rural TaoBao: Alibaba’s Core Rural Ecommerce Business Development Initiative”,2017; China Daily, “Rural Taobao yields benefits for farmers by analyzing big data”, 2018; Dalberg Analysis




Source: Fortune

**OVERVIEW**

**Core offering:** Bundle the procurement activities of USAID Implementing Partners (IPs)

**Target users:** Refugees (Initially)

**Led by:** NetHope and USAID

**Launched in:** 2018

**Reach:**
- 10 members (1 per site) in northern Uganda with NGOs distributed across the region with 2MB per site.

**Infrastructure:**
- MNO cell towers

**Key partners:**
USAID
USAID Implementing Partners
MNOs

# NetHope (Uganda) – Demand Aggregation enabling ISPs to serve low-ARPU customers


**Services offered**
- Source of sustainable and profitable business for the ISP/MNO

**Services offered**
- Demand Aggregator – negotiate agreements

**Services offered**
- Provide connectivity to improve the quality of programming
- Innovation within the MNO to deliver last mile connectivity access

**BUSINESS MODEL**

The communications service provider enters into a new business and partnership with an implementing partner or with governments to improve programming

**CapEx and OpEx**
- NetHope membership model negotiated w/ MNOs

**Revenue:**
- Aggregation and projections incentivize MNOs to negotiate price and expand customer base
- Two savings negotiated: (i) price per MB (+/- 50% per MB) and ; (ii) relocation savings reduced by 65%

**SUCCESS FACTORS**
- The use of non-exclusive agreements

Sources: Interviews with the organization's management

# Key learnings from programs deployed in Kenya

| Mawingu Networks | Equity Bank Rural Connectivity | Safaricom Digital Village | Surf Express WiFi by Facebook | Arid Land Information Network |
|---|---|---|---|---|
| **Rural hotspot run by TV white space spectrum band** | **Satellite connectivity for digital financial inclusion** | **Rural Hotspot service run via MNO existing agent network** | **Hotspot service in public spaces supported by ISP backhaul** | **Community knowledge and ICT training centres** |
| • Remote management easily deployed/managed even in rural areas<br>• PPP model leverages TVWS to bridge middle mile where commercial solution not viable<br>• Success Factors: Global companies, e.g. Microsoft, with significant scale and resources can facilitate testing new approaches to extend access<br>• Local integrators can deploy and maintain the software and hardware with minimal training<br>• Policy exemptions can be a blessing and curse, with expiration of exemptions a significant risk on deployment | • Business Models: Sustainable models require innovation that will decrease the high operating expenditures<br>• Infrastructure: The minimum viable product of the technology utilised has to be proven to work through pilots before scaling programs e.g. BRCK<br>• With upselling opportunities, less traditional agents can be successful in program rollout<br>• Service offerings: Content creation should not be static but revised based on insights gained from data requiring investment from the implementers | • Business Model: The set-up of connectivity hubs is most feasible when incorporated into existing, operating businesses<br>• In a joint venture set-up with communities initial capital may hinder the launch of some of the programs<br>• Service offerings: The needs of the community should be taken into account when implementing connectivity hubs to ensure uptake of the product | • Success Factors: Leveraging existing backhaul infrastructure can keep buildout costs low and enable fast rollout<br>• Partnering with local entrepreneurs for hosting and distribution can drive local revenue and engagement<br>• Partnership with global companies, e.g. Facebook, provide resources to scale and build brand awareness<br>• Subsidies can be provided for specific users through partner pays models<br>• Revenue models can be deployed to minimize costs – enabling hotspots to pay for themselves | • Service offerings: Regular assessments are necessary to ensure that the information provided at various hubs are relevant to the community needs<br>• Success factors: Strategic placement of hubs will determine access and thus success, particularly in dispersed/transient pastoralist communities. |

Sources: Dalberg analysis; Stakeholder Interviews; Interviews with organization management