

Community Networks: Ownership and Operating models

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Photos from TooMuchWifi and AirJaldi

FINANCING MECHANISMS FOR LOCALLY OWNED INTERNET INFRASTRUCTURE

Connectivity Capital in collaboration with Association for Progressive Communication (APC), Internet Society (ISOC), and Connect Humanity

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Context

- There has been minimal research about innovation in financing of locally-owned community connectivity providers.
- Despite a growing number of success stories of Community Connectivity Providers (CCPs), most of which have required innovative financing, there has been limited written about these approaches.

Purpose

- Document and analyse the ecosystem of investment and sustainability strategies that Community Connectivity Providers (CCPs) including community networks and municipal networks have employed in recent years.
- Identify how existing financing mechanisms can be adapted to finance CCPs.
- Identify financing and sustainability strategies from other sectors that may have application for CCPs.
- Reduce friction between community connectivity providers and funders, thereby catalyzing more funding towards community-owned internet infrastructure.

Community Connectivity Provider

What makes a Community Connectivity Provider (CCP)?

COMMUNITY



- **'Community'**
 - People-built around a common interest or goal
- **Participation**
 - Build, maintain, operate or simply benefit from the infrastructure
- **Local Ownership & Governance**
 - Locally owned as a common-pool resource

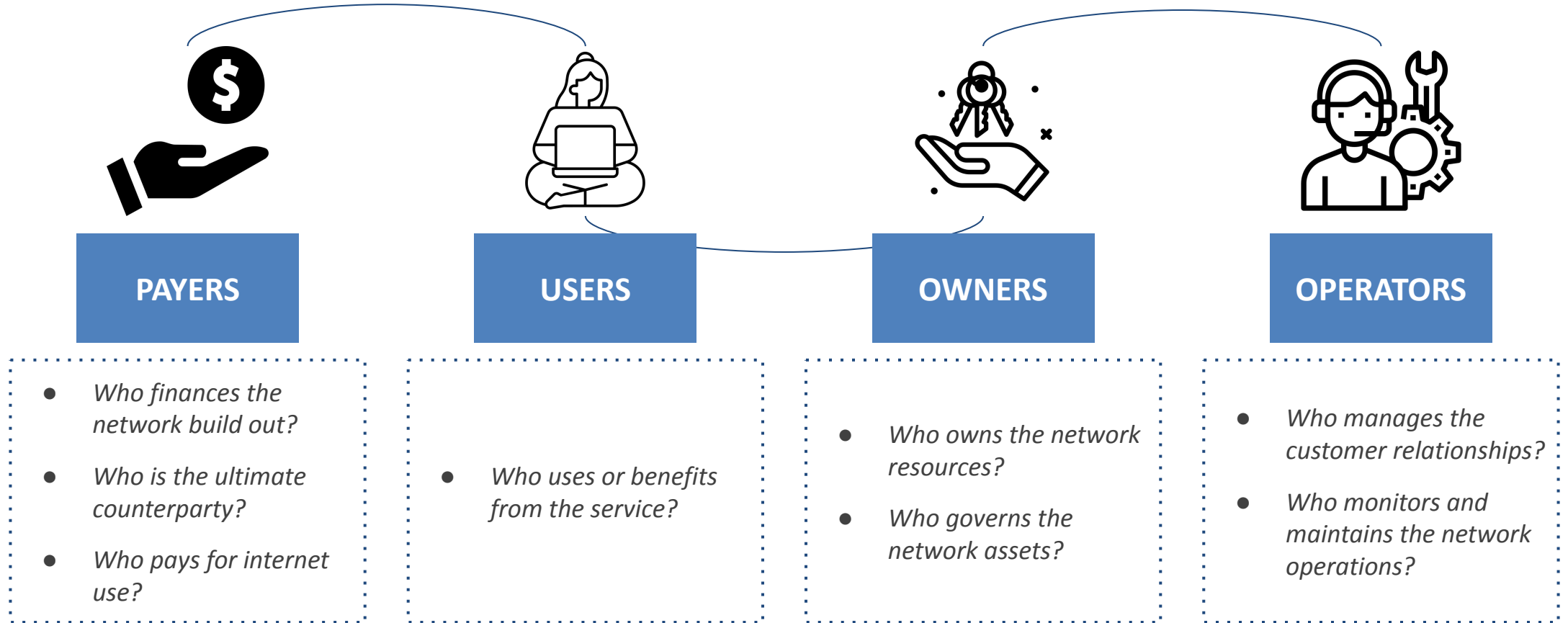


CONNECTIVITY

- **Nodes**
(points of redistribution or delivery)
 - Routers
 - Clients & Servers
- **Backhaul**
(interconnection within & between network)
 - Links (Wireless or Fiber) & Backbone
 - Gateway to the Internet

Community connectivity providers refer to a wide variety of efforts by local communities to build and manage all or parts of the infrastructure required to enjoy and co-create the internet.

Stages of network development: The owners of the network often overlap with the beneficiaries in the case of community connectivity providers



Goal: Alignment of incentives between different actors to push through difficult periods

The Role of CCPs

CCPs come in a variety of different sizes, setups, purposes, governance models and levels of professionalism

1. Purpose

- Gain access
- Improve affordability
- Local ownership
- Greater openness
- Autonomy & self-determination

2. Governance

- Non-profits
- Community networks
- Cooperatives
- Small businesses
- Projects & partnerships
- NGOs
- Network operators
- Academia

3. Infrastructure & Services

- Voice / SMS only
- Mobile Data
- Fixed Wireless (Licensed or Unlicensed)
- Fiber
- Local Content
- Skill Development

4. Size

- Geographic coverage
- Users: 50 to 500,000
- Backhaul (upstream):
- 100 Mbps - 10 Gbps

Diversity in the service provided

- Offer financial literacy programs and resources to educate community members about digital financial services
- Facilitating access to government services and information through digital platforms
- Promoting environmental awareness and sustainability through eco-friendly practices, conservation initiatives, renewable energy solutions, and recycling programs
- Using digital platforms to preserve and promote local culture, traditions, and heritage such as showcasing local arts, music, traditional knowledge, storytelling, and cultural events hence fostering a sense of identity within the community

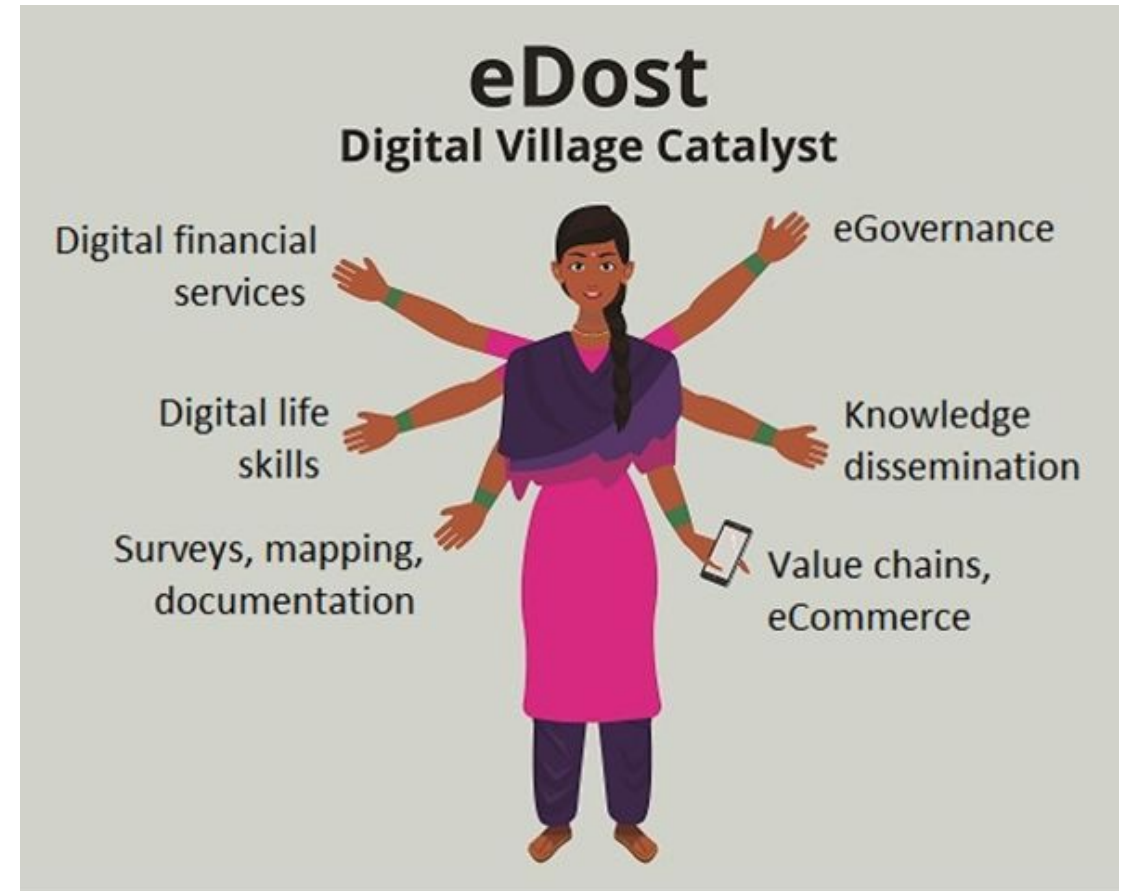


Figure 1: A schematic depicting the roles of an eDost

Diversity in the service provided

- Support local businesses to reach a wider customer base by providing platforms for marketing, e-commerce that products or services contributing to economic growth and entrepreneurship in the community.
- Empower community members to effectively and take advantage of the opportunities offered by the internet through offering digital skills training programs
- Encourage digital adoption by tailoring content and applications to cater to the unique needs and interests of the community. This involves developing local news platforms, educational resources, health information, agricultural tips, and cultural content that resonate with the community members.



Photo Credit: Mamaila CN

The Role of CCPs

Defining features & characteristics: CCP vs Traditional Operators

COMMUNITY CONNECTIVITY PROVIDER



- Socially focused & purpose-driven
- Community-led
- Open and carrier-neutral networks
- Decentralised nature
- Localised - locally owned or operated
- Not for profit / cost-recovery model
- Grassroots / bottom-up
- Collective ownership
- Self-deterministic

vs.



TRADITIONAL OPERATOR

- Profit-driven
- Commercially-minded
- Centralized infrastructure
- Privately or state-owned
- Profit-extraction
- Professional and top-down
- Knowledge concentration / specialization
- Investment from traditional sources
- No / minimal user participation in network governance (design, deployment, operation)

The Role of CCPs

Community connectivity providers are often complementary - filling gaps and providing access where traditional commercial networks do not

The large-scale, commercial, telco network model has done wonders for coverage but, on its own, is insufficient to connect everyone affordably.

CCPs are feasible alternative solutions in environments where traditional networks fail or are reluctant to operate.

- **Traditional solutions are showing signs of having reached their limits:** Mobile network operators, who have been efficient in high-income & urban areas, are struggling to find viability in markets with subsistence-level incomes and/or in sparsely populated regions, where ROI is scarce.
- **Varied attempts to address this problem,** through universal service strategies/ funds, private sector initiatives or philanthropy, **have met with limited success.**

- **CCPs can move towards closing connectivity gaps:** They often service unconnected areas that are not profitable for commercial operators or precede other forms of internet development.
- **CCPs also bring connectivity to those otherwise excluded:** Either because of geography, topography, size, or income level, and enable local development, lead to local business development, and encourage civic participation.
- **CCPs help keep profits local:** Generally reinvest any proceeds in the local community and its network.

Three broad categories of community connectivity providers

Community Connectivity Providers (CCPs)

Main Objective:

- Deliver affordable broadband connectivity to underserved urban, rural, and remote communities

Key Criteria:

- Local ownership structure (reinvestment criteria)
- Accountability to the social mission (measurement)

Community-owned

Community Networks (CNs)

CNs are owned by the local community of users and any returns are reinvested into the community or returned to members

Publicly-owned

Municipal Networks

Municipal networks are owned by the government within defined jurisdictions and any returns are used to service financial obligations or returned to government

Privately-owned

Social Enterprises

Social enterprises are double bottom line businesses that seek both financial and social returns, and any returns are reinvested for growth or returned to shareholders

Value retained within local community



Ownership models: Choice of legal structure is driven by regulatory compliance and affects capital availability and tax efficiency

By owner type

1 **COMMUNITY**

owned by the local community of users and any returns are reinvested into the community or returned to members

Ex.: B4RN, Guifi, RS Fiber, Murambinda, CommonRoom, Zenzeleni etc.

2 **PUBLIC**

owned by the government within defined jurisdictions and any returns are used to service financial obligations or returned to government

Ex.: City of Ammon Fiber, EPB Chattanooga, Stokab

3 **PRIVATE**

owned by its founders, management, or a group of private investors. Owners can choose to have an explicit social purpose.

Ex.: Habari Node, AirJaldi, Althea, Net2Home

By (*explicit*) legal entity

Company

Shareholders with limited liability. Could be a private or a public limited company.

Govt-Owned Enterprise

Government or state has significant control through full, majority, or significant minority ownership.

Social Enterprise

Applies commercial strategies to maximize improvements in financial, social and environmental well-being. Can take various forms depending on local jurisdiction (ex. benefit corps, social business etc.)

Co-operative

an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned enterprise

Non-Profit

organized and operated for a collective, public or social benefit; subject to the non-distribution constraint; usually with tax-exempt status

Other

Other unique types of legal entities depending on local laws and regulations (for example - associations, societies etc.)

Operating models: Community managed operator models can be further defined by degree of participation in the network architecture stack

A community network can choose to build, operate, and maintain one or several layers of the network

3-layer network architecture

A broadband network typically consists of passive infrastructure, active equipment components implementing the technology and services that are delivered on top of the infrastructure.

[P]

PASSIVE INFRASTRUCTURE: The physical non-electronic medium over which information can be transmitted; typical lifespan of >50 years. Examples are ducts, Masts, Poles, NOC, Fiber etc.

[A]

ACTIVE INFRASTRUCTURE: Electronic equipment needed to encode information sent over the network into physical signals; typical lifespan of 5-15 years. Examples are switches, routers, servers

[S]

SERVICES: Sales, Customer Care, Billing, Internet, Conferencing and other services for end-users

Common CCP operator models*

1. Integrated operator

Operates across all layers of the network architecture

[P]

[A]

[S]

► Ex: B4RN, RS Fiber, EPB Chattanooga

2. Open Access

Builds physical network infrastructure and offers wholesale services

[P]

[A]

[S]

► Ex: Guifi, City of Ammon, Stokab, Dark Fiber Providers

3. Service Provider

Builds small sites or leases space on towers; installs own equipment to offer retail services

[P]

[A]

[S]

► Ex: Murambinda Works, Common Room, Net2Home

4. Reseller

Does not own network infra over which it operates and provides services

[P]

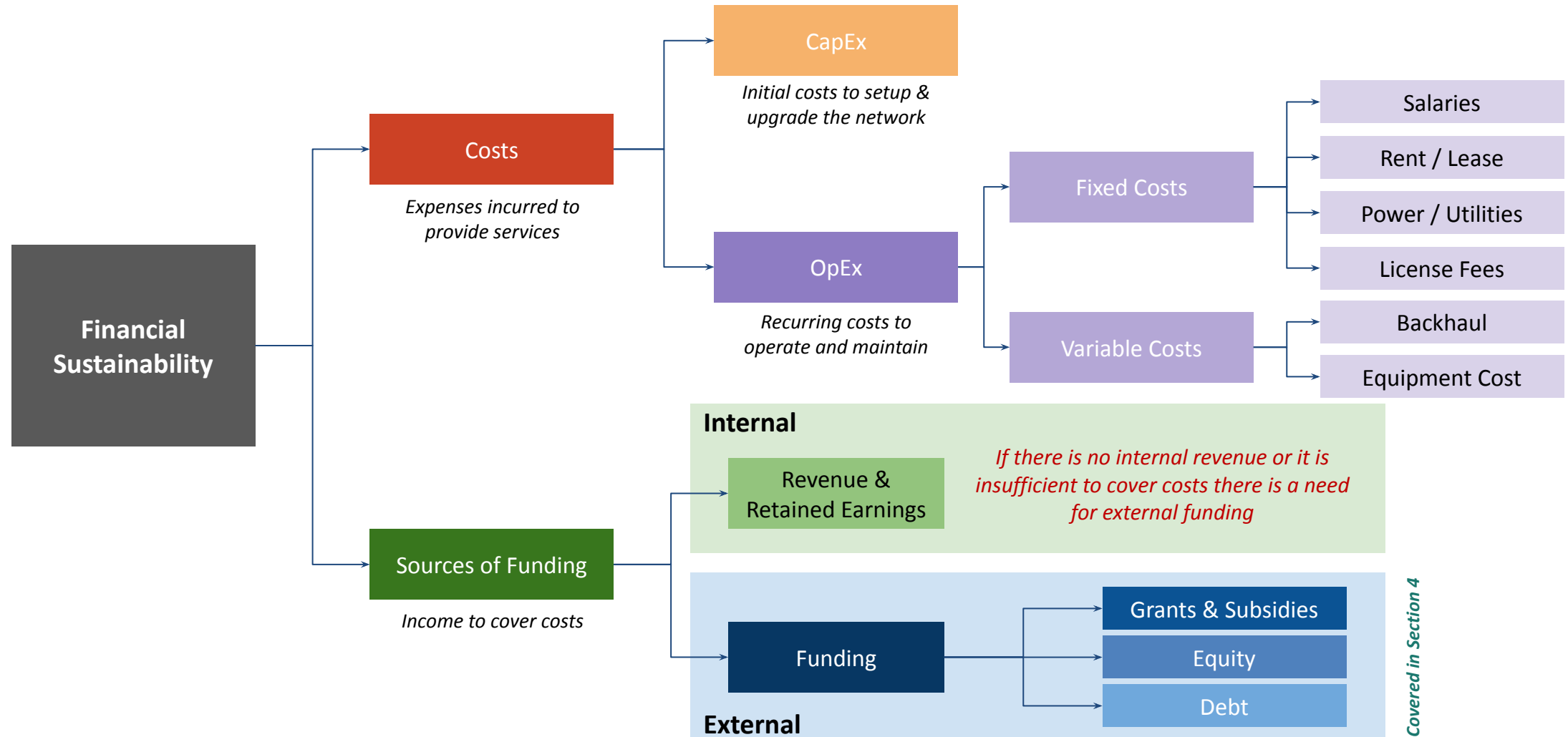
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► Ex: Wiki Katak

*Operator models listed here are a sampling of some of the most common types and are not meant to be an exhaustive list

Economics of operating a network: Financial sustainability is achieved by offering services in a manner that completely covers the cost of providing such service



Economics of operating a network: Generating revenue through a variety of business models can also decrease the dependence on external funding and increase self-sustainability

Model	Description
Usage-Based (Prepaid)	<ul style="list-style-type: none">The standard pricing system for consumer connectivity services in LMICs. Here the consumer pays for data services through a pay-as-you-go model.
Usage-Based (Postpaid Subscription)	<ul style="list-style-type: none">A subscription refers to a service where consumer is billed for the service on a monthly basis at the end of each monthly bill cycle after consuming services they are entitled to use.
Value-added services	<ul style="list-style-type: none">Operating expenses are covered by services other than data usage such as value-added services that subsidizes data provision (Ex. printing, internet cafes).
Limited revenue/Subsidized free services	<ul style="list-style-type: none">Operating expenses are covered by in-kind contributions or ongoing grant/subsidy. Typically relies on local authority paying for the build and operation of network.
Very low cost incremental pricing	<ul style="list-style-type: none">Provide users with very low cost, time-based packages for internet connectivity.
Action-based payment	<ul style="list-style-type: none">Customers undertake certain actions to receive blocks of connectivity time or capacity; This is a nonfinancial method to pay for connectivity but can be helpful to drive adoption outcomes.

For many CCPs in emerging markets, revenue is often insufficient to cover costs.

Source: [Last-Mile Internet Connectivity Solutions Guide, ITU](#); [Innovating Business Models, World Bank](#)

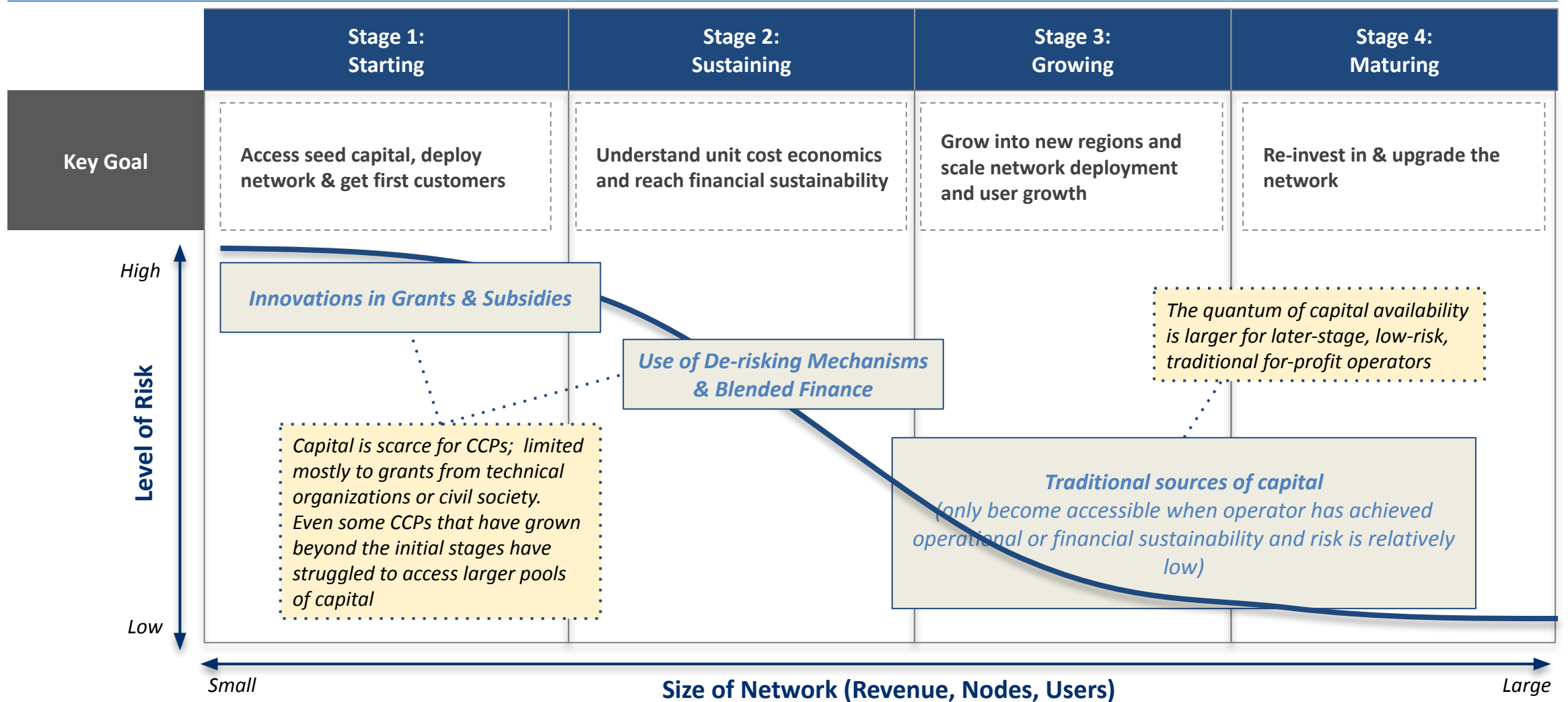
The choice of owner-operator model also dictates, to a certain extent, the sources of financing available to a CCP

<i>Sources of Financing</i>	Community Networks	Municipal Networks	Social Enterprises
<i>Current</i>	<ul style="list-style-type: none"> ● Customers and community members ● Individual donors and volunteers ● Grant-providing institutions ● Government subsidies 	<ul style="list-style-type: none"> ● Public funds & budgetary resources ● Municipal and infrastructure bonds ● User financing (pre-sales) 	<ul style="list-style-type: none"> ● Bootstrapped by individuals ● Seed funding from friends, family and angel investors ● Impact investors
<i>Future ?</i>	<ul style="list-style-type: none"> ● Universal service funds ● Impact-first Investors ● Multilateral development agencies ● Cooperative or community banks 	<ul style="list-style-type: none"> ● Development finance institutions ● Multilateral development agencies ● Social Impact Bonds ● Impact Investors ● Financial Institutions 	<ul style="list-style-type: none"> ● Development finance institutions ● Institutional investors ● Commercial banks

Stages of network development: Key characteristics of each network stage

	Stage 1: Starting	Stage 2: Sustaining	Stage 3: Growing	Stage 4: Maturing	
Key Goal	<p>Operational</p> <ul style="list-style-type: none"> Plan and get equipment Find initial customers <p>Financial</p> <ul style="list-style-type: none"> Seek seed funding - grants or support to help maintain the network 	<p>Operational</p> <ul style="list-style-type: none"> Understand economics to reach sustainability <p>Financial</p> <ul style="list-style-type: none"> Getting to operating break-even (EBITDA) 	<p>Operational</p> <ul style="list-style-type: none"> Grow into new regions <p>Financial</p> <ul style="list-style-type: none"> Getting to total cost & financial break-even (EBIT) 	<p>Operational</p> <ul style="list-style-type: none"> Scheduled CapEx upgrades <p>Financial</p> <ul style="list-style-type: none"> Moving beyond break-even to reinvesting 	
Core Activities	<ul style="list-style-type: none"> Identified local community network champions “Digital Stewards” to manage network Identified need and coverage network area Established community partners that will develop, plan, and maintain the network Procured resources (fiber, active and passive infrastructure) Installation in key locations in a community (anchor institutions) 	<p>Network</p> <ul style="list-style-type: none"> Increase node or fiber deployed <p>Customers</p> <ul style="list-style-type: none"> Generate enough revenue to sustain the initiative; grow customer base <p>Finance</p> <ul style="list-style-type: none"> Explore business monetization models Cost saving or cost recovery strategies 	<p>Identify adjacent areas to provide service coverage</p> <ul style="list-style-type: none"> Assess needs Skill sharing related to maintenance and sustainability of community network implementation <p>Explore more granular cost savings</p> <ul style="list-style-type: none"> Local content cache 	<ul style="list-style-type: none"> Adding network in new locations SLOs around network performance 	
Examples	<ul style="list-style-type: none"> Mamaila, South Africa Chak 26 S/P, Pakistan Murambinda Works, Zimbabwe Tusheti Community Network, Georgia Suusamy, Kyrgyzstan 				

Stages of network development: The stage of the network determines the financing mechanism available to an operator



South Africa: Zenzeleni



SA's first cooperative-owned ISP, Zenzeleni is pursuing financial sustainability aided by grant funding and anchor client revenue

Company:	Zenzeleni Networks
Location:	Rural Eastern Cape, South Africa
Year Founded	2012
Legal Registration	Non-Profit Company registered in 2017
Technology	Wireless Mesh & Fixed Wireless
Network	Several communities in the rural Eastern Cape province, specifically in Mankosi, Nomadolo and Zithulele

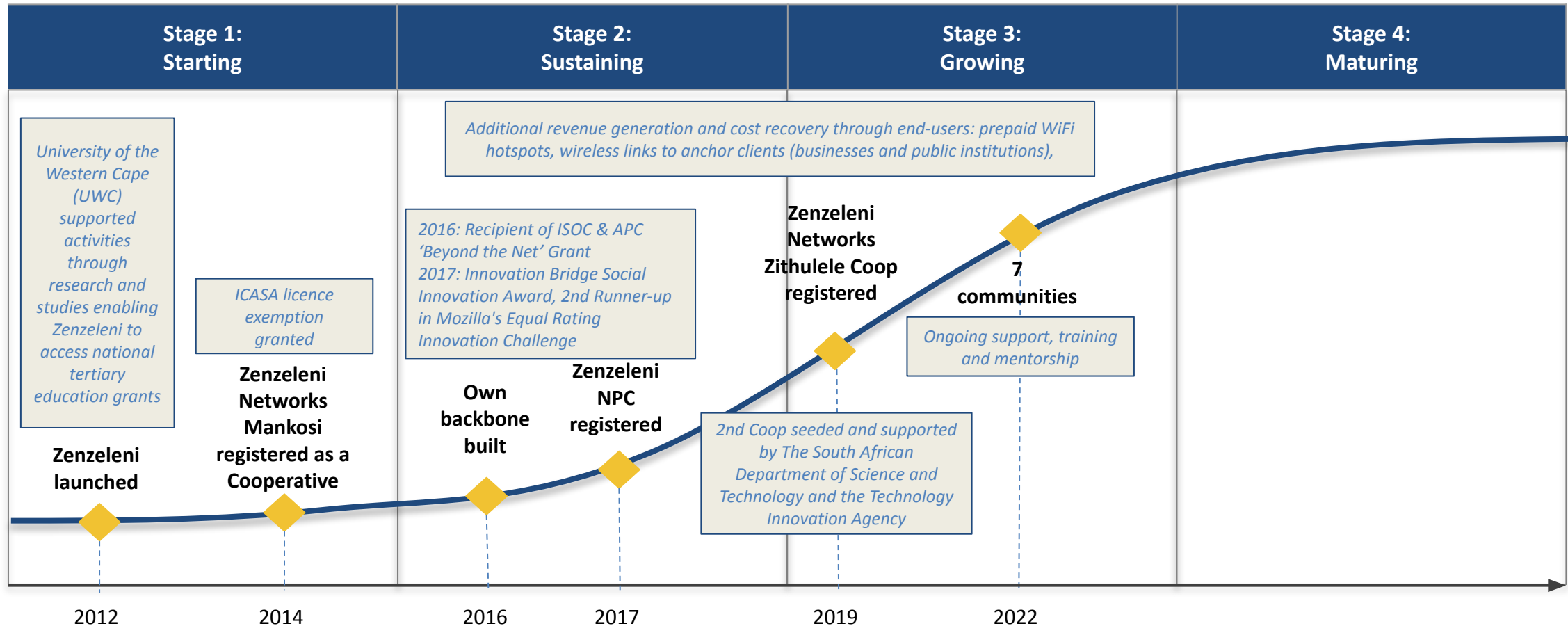
Ownership & Operating Model	<ul style="list-style-type: none"> Zenzeleni is made up of community cooperatives and an umbrella non-profit company (NPC). The coops are the legal internet service providers that own, govern, operate and maintain the network within their respective communities. The NPC supports communities in seeding new cooperatives. Communities help maintain the network and keeps it safe. All hotspots and backbone nodes are hosted and secured by families and individuals. Common assets and services are shared and aggregated to bring down costs. In 2014, Zenzeleni established its first legal cooperative ISP and subsequently received full ICASA licence exemptions to offer communication services. In 2017, Zenzeleni secured its first private sector client (anchor tenant), the local branch of a large corporate and continues to pursue this model
Financing Mechanisms	<ul style="list-style-type: none"> Funds from various local and international awards allowed Zenzeleni to create its own wireless backbone (ISOC Grant, Mozilla Equal Rating Innovation Challenge and South Africa national award for Best Innovation with Social Impact): At this stage, the coops generate enough income to pay for its own bandwidth, replace infrastructure and grow its network by adding more access points. Coops contribute a nominal fee to the NPC for the shared cost of a technician The NPC has until recently run on a volunteer basis, with intermittent support from grants. Zenzeleni's ecosystem (NPC and different coops) will reach sustainability when several coops serving different communities contribute a fee towards maintaining a network that is treated as a common-pool resource and managed by the NPC.
The Impact	<ul style="list-style-type: none"> Just Zenzeleni Networks Mankosi Co-op Ltd, a 100% Black, 40% women-owned cooperative has connected more than 13,000 people and 10 institutions, offering prices as much as 20 times lower than those offered by existing operators.

Source [Zenzeleni](#)

South Africa: Zenzeleni



Financing mechanisms over the lifecycle



Source [Zenzeleni](#)

Rhizomatica



Demonstrates how flexible regulation can enable local sustainable economic development in underserved localities through community-owned infrastructure

Company:	Rhizomatica
Location:	Americas (Mexico, Brazil, Colombia)
Year Founded	2009
Legal Registration	Not-for-profit organization
Technology	Licensed IMT (mobile) spectrum
Network	20+ active networks across Central & South America

Ownership & Operating Model

- Rhizomatica is a non-profit that helps create regional community telecommunications cooperatives that enable low-income communities to own and operate their own small, local mobile networks.
- As a result of Rhizomatica's ongoing advocacy in Mexico, the regulator officially allocated parts of the 850 MHz spectrum band to be designated for social use.
- Networks are operated and managed locally. Rhizomatica works with in-country organisations to set up the network and troubleshoot problems. Rhizomatica supports ground operations teams to provide technical services, including backhaul & remote network management.

Financing Mechanisms

- Communities invest ~US\$10,000 in CAPEX required for network installation.
- The revenue model features fixed monthly membership fees that entitle users to unlimited calls within the local or any other Rhizomatica partner network. The monthly user fee is \$2.00 USD, with \$0.75 go to management fees, and \$1.25 staying in the community to cover operating expenses and recover investment costs. Users also can purchase air-time credit to make long-distance calls. Any revenue generated above operating costs stays within the community.
- Rhizomatica itself is supported through grants from various international organizations (ISOC, Mozilla, APC, Ford Foundation, etc.)

The Impact

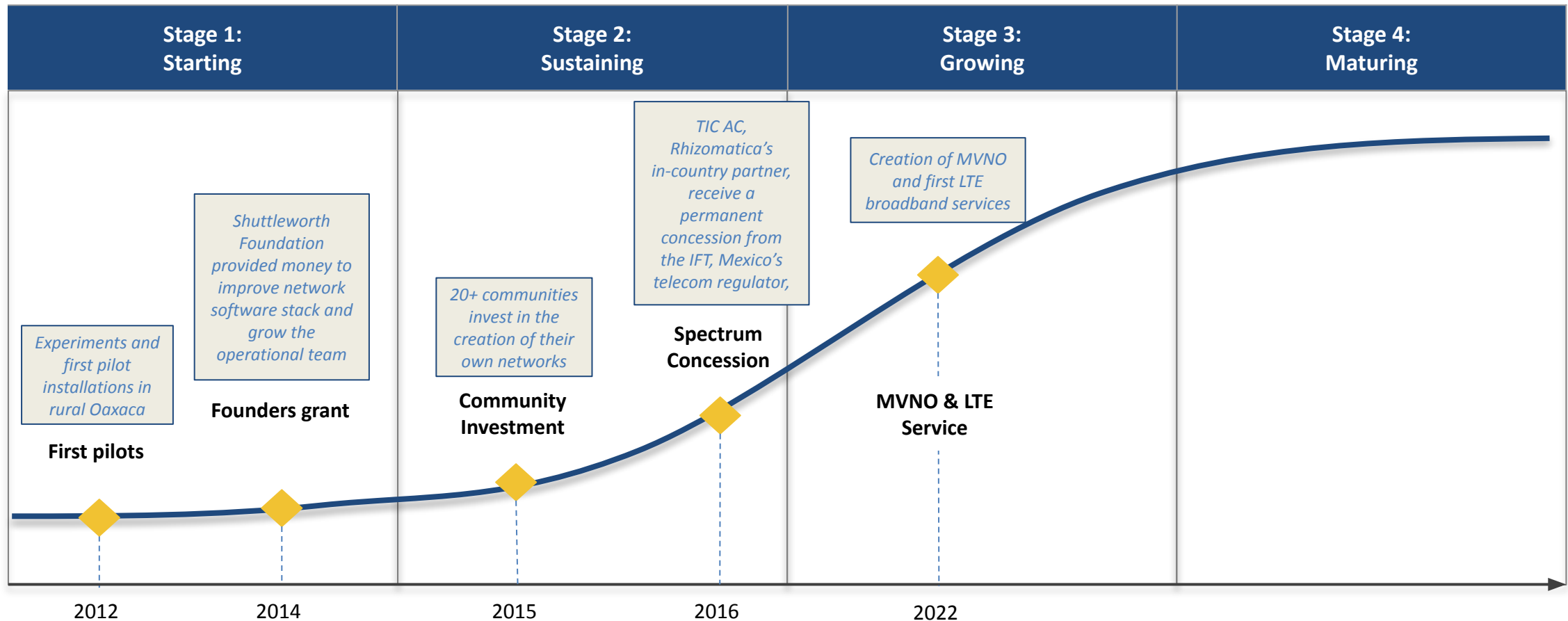
- A key enabler of Rhizomatica's approach was gaining the Mexican regulator's approval to use licensed, but unused, spectrum for community-based networks where traditional service providers choose not to operate.
- Rhizomatica's has supported the creation of 20 active networks with over 4,000 active users per month.

Source: [USAID, Closing the Access Gap \(2017\); Rhizomatica](#)

Mexico: Rhizomatica



Financing mechanisms over the lifecycle



Source: [Rhizomatica](#)

Barriers for growth of community networks

- Licensing frameworks - Non existent frameworks for non profit operators in the current frameworks. Beyond this the financial, technical, and reporting requirements are also often beyond the reach and capacity of community network operators.
- Access to backhaul capacity remains the largest expense for community networks. The cost of minimum volume purchases for wholesale fiber backbones is costly and limits the communities' ability to obtain affordable backbone capacity.
- The available radio frequency spectrum for Wi-Fi is limited and shared with other wireless technologies. As the demand for wireless connectivity grows, there is a challenge in managing spectrum allocation and minimizing interference with other wireless services.
- High cost of licensed spectrum
- Unreliable electricity especially in rural areas results in service disruptions forcing the community networks to invest in solar panels and batteries to power equipment
- Limited access to financing


Stay tuned

Podcast: Routing for Communities

- <https://www.apc.org/en/podcasts/routingforcommunities>


CN Newsletter - APC - 59th Edition

- <https://www.apc.org/en/news/community-networks-newsletter-women-connecting-village>



Community Networks and Local Access Monthly Newsletter - Number 32

Home / News / Community Networks and Local Access Monthly Newsletter - Number 32



By APCNews

Published on 25 January 2021
Page last updated on 17 February 2021

Welcome to the 32nd monthly round-up of developments impacting your local access networks. We have created a new platform for community networks to share our experiences and grow together. Please join us at <https://communitynetworks.org/>.

APC shares highlights of its work to promote affordable and sustainable connectivity between 2016 and 2019. [Read more](#).

Events and conferences

New Study on CNs and Financial Sustainability

Currently being developed by APC and partners

Goal

Provide a strong evidence base for an accurate estimation of the potential costs of connecting the unconnected using different models, as well as addressing the needs of those without affordable connectivity, especially vulnerable and marginalized groups, in particular women and the extreme poor.

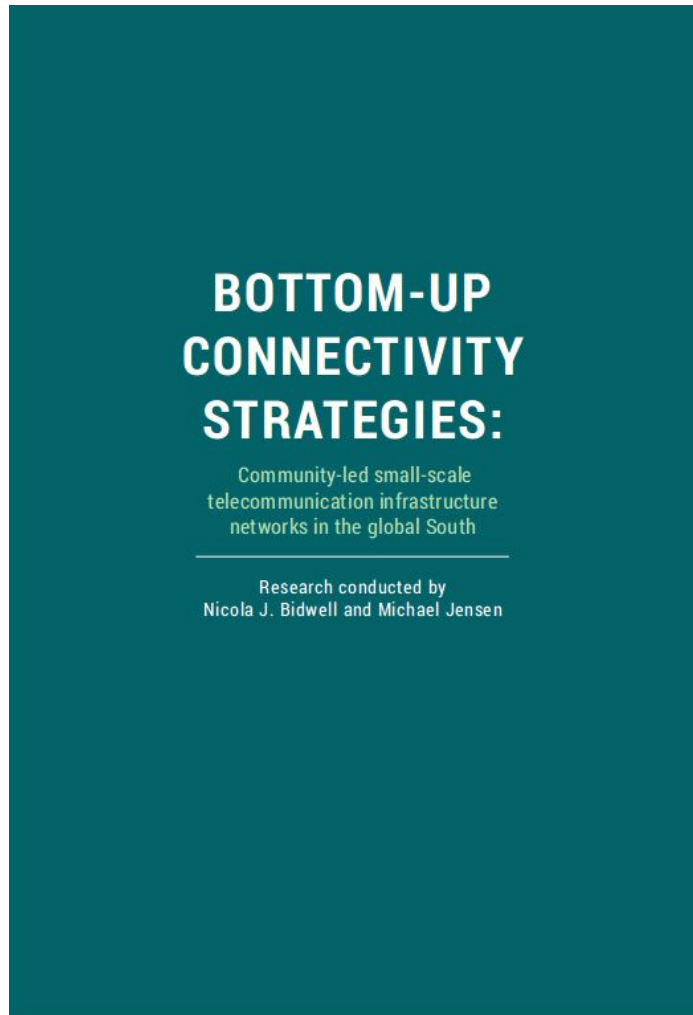
Activities

- Analyse a range of business models
- Identify key data points for regular collection
- Gather data from small-scale operators
- Identify network management and accounting systems
- Develop a set of cost models
- Assess challenges to growth

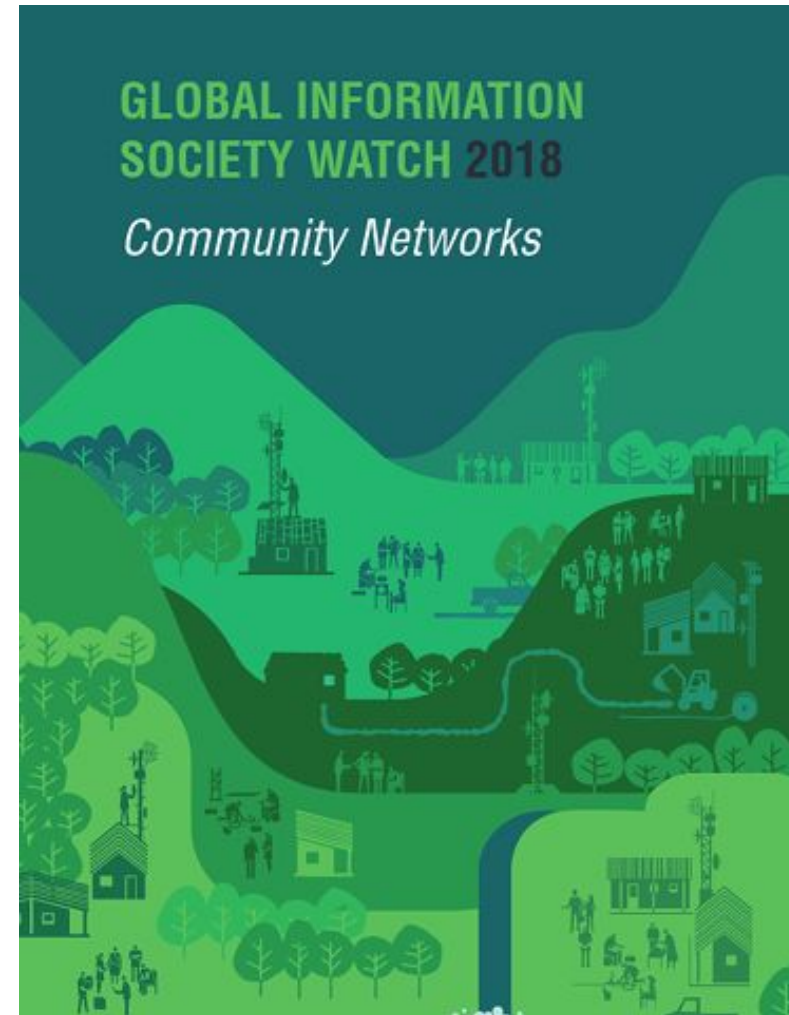
Elements to be analysed

- Geographic scope
- Level of service vs user fees
- Regulatory and business cost of setup
- Capital costs
- Operating costs
- Role of non-infrastructure elements
- Interconnection, hosting agreements
- Cost of finance
- Circulation of funds
- Social impact





<https://www.apc.org/connectivitystrategies>



<https://www.giswatch.org/community-networks>

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