



Session Title:
Making Community-Driven Networks a Reality

Next Generation Community-Driven Networks: A Pilot Experience in Cambodia

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Abstract

The community-owned ICT enterprise is an emerging business model that can provide a wide range of ICT services, including switched telephony, to rural communities. It builds as much on successful general development experience as it does on experience of ICTs, blending several components together into a cooperatively owned enterprise that is embedded in wider local development activities. This paper describes the origins and key characteristics of the model, reports on two pilot experiences in Cambodia, and suggests policy directions.

1.0 Introduction

This session comes under the *Emerging People* theme of GK3, and well it might. A community-driven ICT enterprise¹ is first and foremost about people, not emerging markets, and not even emerging technologies – though it takes advantage of both of these. Underpinning the idea of community-driven networks is the notion that markets and technologies are merely means towards an end, and not ends in themselves. If they do not work for people, then change or replace them.

This paper looks at the background to the concept of community-driven networks, why they are emerging as a possibility now, and the factors that enable them. It describes key characteristics of the model and presents some initial conclusions from the iREACH project in Cambodia. The paper concludes with policy implications.

2.0 The issue

A Cambodian claim to fame is that it was among the first countries to have achieved a higher percentage of mobile as compared fixed-line phones. Unfortunately, this is testament only to the weakness of its fixed-line network. Outside of major cities, mobile phones are the only option – and even within cities the fixed-line network is often of poor quality. It is little surprise then that people in rural areas must turn to mobiles if they want to connect to the outside. Here geographical coverage is relatively high: most rural areas at least have a signal and many areas are covered by high-speed data offerings.

But the question is whether such coverage is meaningful: What does it mean to be able to access a mobile telephony signal if you cannot afford a handset? Or if you have a handset, but cannot afford to charge the battery as there is no mains electricity? Or a high-speed data link if you have never seen a computer?

How many rural areas suffer from this same problem? Only a small proportion of the population, inevitably the wealthiest, can actually afford to use even telephony to its maximum advantage, leaving the majority of people at best with emergency use, or carefully counting the seconds. While mobile phone companies continue to reap huge profits, are they really enhancing access for everyone, or are they merely reinforcing existing inequalities within the population?

An IDRC-funded project called iREACH (Informatics for Rural Empowerment and Community Health)² in two rural areas of Cambodia is trying to find a solution to these problems. The goal is to build low-cost multi-functional networks that are run as cooperative enterprises by the communities themselves. The three-year pilots (2006-2009) have already set up their backbone infrastructure, formed a deeply committed local Management Committee, and are moving to developing services based on local needs, everything from very low-cost IP-based switched telephony to videoconferencing and health, education and economic applications. Overlaying it all will be a community radio station, animating the activities and drawing in even the most remote areas to the network.

¹ The terms *community-driven network* and *community-owned network* are used interchangeably here, and each may be referred to as an enterprise and a cooperative. Variations on the concept include the user/community-owned cooperative, the local authority-owned network, and the hybrid entrepreneurial/community-driven model and telecommunications cooperatives. See Ó Siochrú and Girard (2005). The following is drawn from this report and other sources.

² See <www.ireach.org.kh>.

Cambodia is not the only country pioneering this concept, and efforts are also underway in East Africa (see the paper by Albert Nsengiyumva). A unique aspect of the Cambodia project, however, is the very strong focus on learning from every aspect of the experience. The IDRC as a research organization is supporting in-depth documentation by the local teams of all the problems and successes, and hopefully – assuming the experience is a success – this will help pave the way for replication both within Cambodia and elsewhere.

From where has the idea of community-driven networks emerged?

3.0 Why now? Enabling factors

Several factors have converged in recent years to enable the emergence of the model of the community-owned network as a sustainable enterprise.

The first is new openings in regulation and policy, and a reappraisal of the kinds of markets and delivery institutions that are needed.

The persevering failure to provide poor rural communities with affordable access to telephony and ICTs, despite the abolition of monopolies and the introduction of limited competition, reopened debates about regulatory regimes and how they operate. In much of Africa and parts of Asia, the search is on for an indigenous model of policy and regulation suited to local needs and capable of taking advantage of the relatively 'green-field' development potential in backbone and local connectivity. 'Open access' is a current buzzword for telecoms backbone, in which bandwidth and data capacity are made available to all at cost-based prices through dedicated development-oriented companies. An emerging view is that the sector should be horizontally differentiated, so that competition and service provision will happen at each layer, all benefiting from low-cost basic bandwidth. The approach may also be used to extend low-cost backbone into rural areas.

This retreat from the idea that only huge corporations can take on the job of building networks opens the door to small local-level licenses. Several countries have already experimented with them, mistakes have been made, and lessons learned. In East Africa, such licenses are already possible in Kenya and Tanzania, and other countries like Rwanda are examining the possibility, often strongly encouraged by NGOs and civil society. Furthermore, universal access funds are being brought into the picture with a stronger developmental goal than previously. Overall, then, the reality of failure is bringing more flexibility and more imagination to policy and regulation.

A second related enabling factor is technologies, where change continues at a rapid pace:

- Ongoing growth in wireless technologies and ever lower prices mean that building high-speed local networks now costs a fraction of what it used to.
- IP technologies for voice have come of age, using new VoIP stand-alone handsets or blending with low-cost tried and tested older analog sets. Companies in numerous countries now offer VoIP packages, with quality such that customers are unaware of the technology underneath.

- These new technologies can be built and maintained with relative ease, as compared to earlier infrastructure, obviating the need for major technical expertise and corporate resources.
- Wireless technologies are small scale and scaleable: they can begin small, and grow incrementally as the need arises without huge initial investment or growth redundancy.

Rapid quantitative technology change can at some point build up to sweeping qualitative change in sector structures, when matters reach a critical mass. It seems increasingly likely that the question now is not *whether* these technologies will provide the basis for a change to major operators, including mobile network operators, but rather *when* this will happen.

A third factor is also providing a push for the community-driven model, emerging not from the technology or policy spheres, but from the practice of development, and not only in ICTs but in other core areas as well. There is mounting evidence that an *enterprise model based around community ownership* and control could indeed work in ICTs. This emanates from both within the ICT sector and outside.

In terms of rural enterprise, farmers' cooperatives that produce, process, market and sell goods to a high standard are common, from coffee to fishing to forestry. Infrastructure cooperatives include water and irrigation schemes and exist or have existed in all regions. They represent a natural, and very effective, way for communities to collectively address their needs.

Less known is that the cooperative is the standard form for rural telecommunications provision in the USA. There are about 600 of these cooperatives in existence today, all receiving a subvention from the federal government but operating efficient enterprises and offering a wide range of services. The model has been directly copied with great success in Poland. And there are others: in Pinamar, Argentina a local telephone cooperative has been operating since 1962; and in the Chancay-Huaral Valley of Peru, the irrigation commission representing all farmers in the district also operates a community-owned network which offers VoIP and others services.

India has recently become a hotbed of experiments and upscaling of community ICT activities. Among them is the Akshaya experience in Kerala, which combines community oversight and development goals with individual enterprise, underwritten by low-cost high-speed bandwidth. And the telecentre concept has matured more recently, growing beyond single centers and moving towards supporting local networking and aggregating demand to reduce costs.

The convergence of these three factors – the search for more effective regulation and policy to promote rural telephony and ICTs in developing countries; the coming of age of wireless technologies; and growing recognition of community-owned enterprises as a vehicle for local development – thus underpin the interest in the model of community-driven ICT enterprise providing a range of affordable services to local people.

4.0 Key characteristics of the model

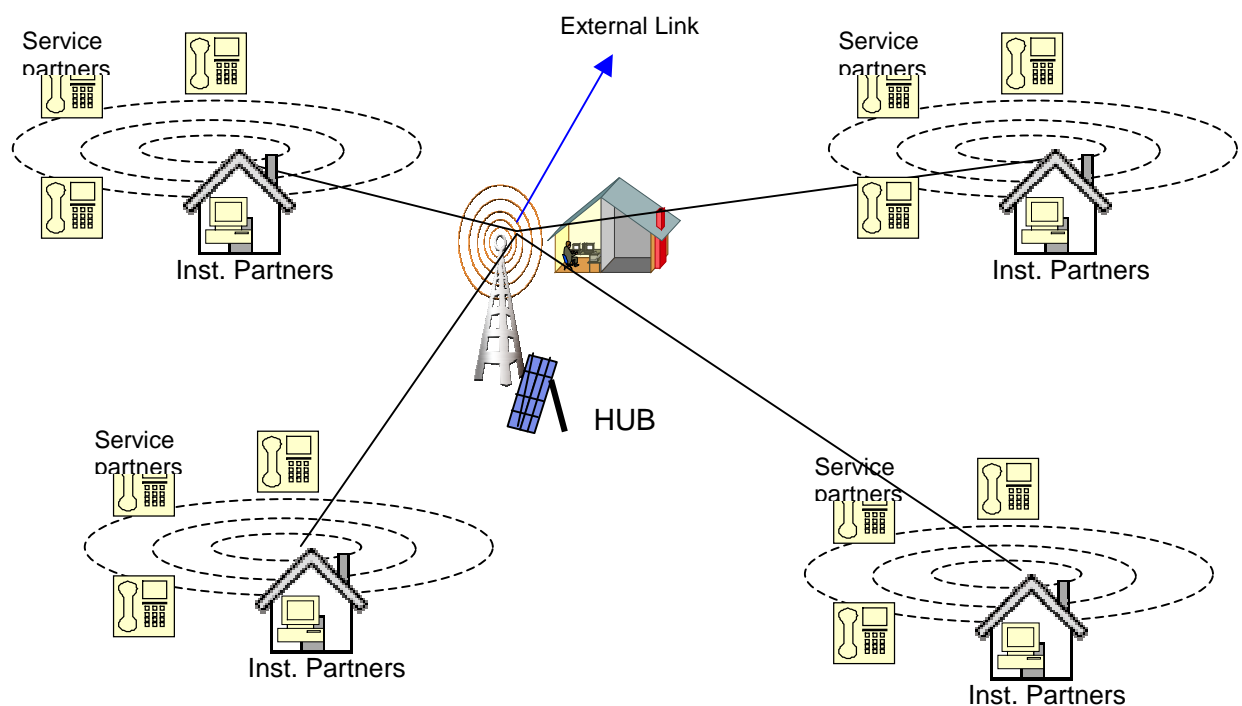
A community-owned network cooperative is an enterprise built by the community that fulfils local needs for voice telephony, data networking and internet, as well as services and development content. It can coexist with other ICTs, such as the mobile

phone, cybercafés and so forth, but its combination of activities is unique. The ‘ideal’ type would:

1. Provide a wireless high-speed network throughout the community, connecting all the major development actors to each other and to the internet, for data and video conferencing.
2. Offer very low-cost local telephony, greatly undercutting mobile phone operators (if present), at multiple points throughout the community.
3. Provide low-cost external telephony, nationally and internationally, to fixed-line phones and to mobiles at tariffs determined by minimum interconnection costs.
4. Develop content suited to the needs of the community, as determined by the community itself.
5. Become a distributed and accessible node for e-government services, from local to national level.
6. Deploy other communications technologies, such as community radio and video, that can add further value and strengthen the impact of various development activities.

Figure 1 illustrates one basic configuration, with institutional partners offering web-based and more advanced services, and service partners at the periphery offering voice telephony, all acting within the context of a community-wide cooperative.

Figure 1 – Illustration of technical network



This model does not lay claim to being entirely new. The telecentre, where it is most successful, builds on local resources and activities, strongly encourages ownership by the community, and branches into a range of sometimes multimedia services. However, an innovation is to position such an enterprise as a network service

provider – offering low-cost switched telephony to the community, for instance – and drawing on the experience of the cooperative and community enterprise more widely.

The impact of such an enterprise potentially goes far beyond the mere provision of services. A community-driven ICT enterprise can:

1. Create employment locally through the provision of services, offering jobs that would normally be located elsewhere.
2. Enhance networking and knowledge-sharing activities of local development, economic, social and cultural actors.
3. Build the capacity of the local community in enterprise development and institution building, both collectively and individually.
4. Enhance the provision and transparency of government services in the area.
5. Retain significant income in the area that would otherwise flow out.
6. Harness local private entrepreneurial skills through joint community/private service provision.
7. Reinforce overall community development efforts, through reinvesting the surplus.

In other words, it can become a central component in a community's efforts at development, enabling multiple avenues for empowerment and development.

This is what sets community-driven enterprises apart from an approach that emphasizes universal and affordable access of ICTs. Beyond simply affordable access, there are huge opportunities for capacity building, revenue generation within the community, and linking into local development dynamics and processes.

In this sense, the community-driven enterprise represents a merging of universal access and development policies.

5.0 Sustainability underpinnings

The enduring question in development is sustainability. Achieving sustainability means a lot more than staving off project closure when donor funding dries up. It must open the door to replication and upscaling, and to policy, regulatory and financing support. A sustainable business model is thus much sought after.

The generic sustainability of the community-driven enterprise is based on a number of factors, the key ones being the following:

1. The possibility of undercutting mobile-phone operators is very real and has huge potential for income generation. Research and experience have shown that demand for telephony is very strong in rural areas, even to a point of significant sacrifice of income. Demand is also elastic: a significant tariff drop leads to a larger growth in telephony. Providing local VoIP is relatively easy, though it might take a while longer to extend to all fixed lines and ultimately to full international connectivity. There are no longer any technical obstacles to this.
2. Considerable capital and current costs savings can be made by utilizing public and community resources for building the networks. Such resources range from

the provision of premises for the hub, to transmission towers and public rights of way, to voluntary labor.

3. Aggregating bandwidth usage between a larger number of social and economic actors within the community, linked together into a network, reduces the cost to each and increases the utility of the network as networking content and exchanges multiply.

These factors suggest a sound basis for creating a sustainable and profitable enterprise. An initial analysis of the business model, based on actual figures, suggests that the model, given reasonable assumptions, is well capable of generating a surplus.³ Treating the enterprise as a business from the outset, rather than a development program that must transform itself into a business, is a key factor in this.

6.0 The iREACH experience

As noted above, community-driven networks are under development in a number of areas. Perhaps the most challenging of environments is faced by iREACH, the twin pilot projects in Cambodia. This initiative is nothing if not ambitious. Cambodia is a difficult, though rewarding, environment in which to work. Aside from the deficiency in ICT access, many areas lack basic services such as water and electricity. Rural communities are characterized by high levels of poverty and illiteracy, and a very poorly organized civil society still suffers the traumas of Cambodia's history.

Ultimately, the goal of iREACH is to generate and document research results that can be applied more widely, but for the moment it is concentrating on making a success of the two pilots. So far, the results regarding the feasibility of the community-driven network model in this environment are heartening, but it will be some time before definitive conclusions can be drawn.

6.1 Basic structure

Begun in mid-2006, each iREACH pilot will by the end of 2007 have a dozen or so Village Hubs dotted around an area about 20 kilometers wide, located in publicly accessible buildings such as commune (local government) offices, health centers, pagodas and schools, each with a computer and staffed by a local Community Facilitator. These are linked together through a backbone wireless network centered on the Pilot HQ where additional computers with training and other facilities are located, alongside a community radio station serving the area and run by locals. Spread out up to a kilometer away from each of the Village Hubs are a number of (fixed) telephones – perhaps half a dozen – linked via WiFi to the Hub and by VoIP to all the other phones, each in a location that allows the public to use them. Each pilot is linked to the outside world initially via satellite, with the capacity to interconnect into mobile and fixed telephony networks.

Thus each pilot is intended to be a mini rural network with several dozen telephones accessible to local people; computers and internet training in Village Hubs no more than an hour's walk away; and a range of services focusing on local needs – health, education, agriculture, fishing, services, etc. – available and supported. All of it is animated by its own community radio station and most of it is powered by solar or other sustainable energy sources. Over time and as regulation permits, the initiative will begin to generate income from telephony and other services. Ultimately, it will

³ See Muriuki et al. (2007) and Ó Siochrú (2007).

become a sustainable enterprise owned and run by the villages, with the potential to expand into neighboring areas and, with appropriate policy and regulatory support, be replicated elsewhere.

The two pilot areas comprise several communes around Kep, a coastal fishing and farming area in the south, and around Kamchai Mear, an agricultural district in the east near the border with Vietnam. They were selected for a number of reasons, including reasonable proximity to Phnom Penh, political support for their development, their contrasting economic basis and locations, and in one case, the presence of a rural university. Led by two very committed Khmers, and guided by the IDRC and an external adviser, the preparatory phase took almost nine months.

6.2 Progress and challenges

Staff recruitment proved to be the first major obstacle. Finding high-quality committed staff, willing to work in rural areas, is difficult in Cambodia given the limited pool of third-level graduates, especially with experience. Despite a major effort in formal recruitment, most staff were in the end identified by informal means. While this approach was effective – the quality of the team is perhaps now the project's greatest asset – it was slow to fill all the positions, and a gender balance was unfortunately not achieved. Among the Pilots, recruitment of suitable staff continued well into 2007. Ongoing capacity building is also a central concern for iREACH, right down to the local village staff and volunteers, and a concerted effort is underway to enable the entire team to develop their skills and teamwork capabilities.

As the pilot teams were coming together, work began on the baseline research and on participatory methods of determining local needs and interests, led by external advisers and overseen by the research manager and pilot coordinators. An early milestone was the creation of an Interim Pilot Committee in each pilot, using a transparent and democratic process of election. These committees comprise a gender balanced and diverse group of local villagers.

A second major task at the pilot level was the renovation and equipping of each Pilot HQ, in buildings donated by the local government. Alongside this, the process of specifying the ICT technology requirements and engaging contractors for installation began. The latter involved a number of components, each with its own issues: external connectivity, of which there were various options, none ideal and all expensive; the backbone network of the pilots linking the Village Hubs; and the local WiFi networks interconnecting the voice phones and networking the computers. Alongside was to be the radio station.

The ICT infrastructure aspects were put to tender in November 2006, but a combination of inadequate specification of what was required, limited technical capabilities of supplier companies in Cambodia, and the generally slow pace of contract development there contrived to create one delay after another. Contracts were finally signed in May 2007. No progress was possible on building the radio station, though a decision by the appropriate Ministry on granting a radio broadcast license – the first of its kind in the country – is pending.

From among the community, 'content developers' were recruited in Kamchay Mear and are now working with pilot staff to create audio, video and internet content. Podcasting, vodcasting, and possibly a 'village megaphone' system (used for instance in the Philippines) will substitute for the moment for full broadcast radio, and a few programs might even be broadcast by a commercial station from a city close to

Kep. With the internet in place, and content under development, villagers will finally see long-anticipated and long-promised benefits.

iREACH's current committed funding is until April 2009 and it is clear now that accomplishing the targeted objectives will require more time. Obstacles so far were primarily around getting the prerequisites of the project in place. They bring iREACH to the starting point in the community, deploying the physical tools. The next stage is decisive: on the one side, developing services and generating real benefits using these technologies, and on the other, building up the capacity of the local communities to actually develop, run and operate the 'hard' and 'soft' aspects of these. Community institution building takes time and sustained commitment, from the external professionals introducing the activities into the area, but especially from the communities themselves. The enthusiasm of the local people to date, and their willingness to embrace new ideas and learn new skills, is heartening.

7.0 Policy conclusions

Community-driven ICT enterprises, providing a range of telecoms and ICT services to rural communities, undoubtedly have a future, based on both past and current experience and on the latest pilots and trials. Of course, they cannot be the solution everywhere, and no doubt only a variety of solutions can eventually resolve the issue of affordable and accessible rural ICT.

While the intensive research approach of the iREACH project, as well as the highly challenging environment in which it has chosen to work, in some respects means progress is slow, this is justified by the wealth of research material developed. But it also gives the concept sufficient time to bed down among the local communities, and such local 'ownership' is a key to success.

In terms of tangible results, East African countries, and especially Rwanda, may make faster progress than Cambodia. Despite the limited infrastructure, the region is dynamic in the area of ICTs and many governments have woken up both to their potential and to the need to take new approaches in rural areas.

If community-driven ICT enterprises are indeed a viable option, then the question turns to the policy and regulatory instruments and actions that might support them, encouraging and enabling replication and growth.

Chief among these currently is probably a refocusing of universal access funds towards explicit development goals. The issue is not simply to support affordable access, but to do so in a manner that will maximize development goals and processes. This could be done for instance through an initial subsidy on the same principles as the lowest-subsidy auction, i.e., a once-off investment is sufficient to launch services that are sustainable thereafter.⁴

Ongoing policy measures, currently possible in Uganda, might allow such community-owned telephony networks to receive asymmetrical interconnection charges,⁵ whereby income to the rural network for each incoming call is greater than what it pays out to completed outgoing calls.

⁴ See the preliminary rethinking of universal funds evident in the draft report of Regulatel (2006) The report puts a strong emphasis on local and community-level initiatives including community telecom cooperatives, microtelcos, etc., and on using technologies creatively to make voice and broadband available in rural areas.

⁵ See ITU (2003).

Additional policy supports, such as tailored finance packages, would also help. And the creation of a technical support unit, based around skilled university departments or centers, for instance, would also offer a considerable boost to communities wishing to build their own networks.

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