

# 10

## Economic Sustainability

Achieving long-term sustainability is perhaps the most difficult goal when designing and operating wireless networks and telecenters in developing countries. The prohibitive cost of Internet connectivity in many developing countries imposes a substantial operating expense that makes these models sensitive to economic fluctuations and necessitates innovation to attain viability. Substantial progress in the use of wireless networks for rural communications has been accomplished over the past few years, due in large part to technological breakthroughs. Long-distance links have been constructed, high bandwidth designs are possible and secure means to access networks are available. In contrast, there have been fewer successes with the development of sustainable business models for wireless networks and telecenters, particularly for remote areas. Based on the authors' experiences and observations of existing networks, as well as knowledge from entrepreneurial development best practices, this chapter will focus on documenting methods for building sustainable wireless networks and telecenters.

In the past decade, there has been tremendous growth in Internet access across the developing world. Most developing world cities now have wireless or ADSL networks and fiber optic connections to the Internet, which is a substantial improvement. Nevertheless, outside urban areas, Internet access is still a formidable challenge. There is little wired infrastructure beyond the principal cities. Therefore, wireless remains one of the few choices for providing affordable Internet access. There are now proven models for rural access using wireless. In Macedonia, the Macedonia Connects project has now connected a majority of the country's schools to the Internet. This book was written for those wishing to connect their communities. The models described here are smaller in scale and use affordable designs. Our aim is to provide examples of how wireless networks can be designed to expand sustainable

access where large telecommunications operators have not yet installed their networks into areas that would otherwise not be economically feasible by traditional models.

Two common misconceptions must be dispelled. First, many people assume that there is one preferred business model that will work in every community of the developing world, and the key to success is to find that one “eureka” solution. In practice, this is not the case. Each community, town or village is different. There is no prescribed model that meets the needs of all areas in the developing world. Despite the fact that some places may be similar in economic terms, the characteristics of a sustainable business model vary from community to community. Although one model may work in one village, another village nearby may not possess the same necessary qualities for this model to be sustainable. In this circumstance, other innovative models must be customized to fit the context of this particular community.

Another misconception is that sustainability has the same definition for all people. Although this term generally means that a system is built to persist indefinitely, this chapter focuses more on the discussion of the economic conditions (financial and managerial) than other aspects of sustainability. Also, instead of the horizon being indeterminate, it centers on a time period of five years – the period in which these ICT infrastructure and wireless technologies are expected to be useful. Thus, the term sustainability will be used to encapsulate a system designed to persist for approximately five or more years.

When determining and implementing the best model for a wireless network or telecenter, several key factors help to ensure its success. This chapter is not meant to be a guide for managing sustainable wireless networks. Rather, this “how-to” guide seeks to present an approach that will enable you to find the model that best fits your situation. The tools and information contained within this chapter will help people starting wireless networks in the developing world to ask the right questions and gather the necessary data to define the most appropriate components of their model. Keep in mind that determining the best model is not a sequential process where each step is followed until completion. In fact, the process is ongoing and iterative. All of the steps are integrally connected to each other, and often you will revisit steps several times as you progress.

## ***Create a Mission Statement***

What do you want to accomplish by setting up your network? It seems like a simple question. However, many wireless networks are installed without a clear vision of what they are doing and what they hope to accomplish in the future. The first step involves documenting this vision with the input of your entire team or staff. What is the purpose of the wireless network? Who does the net-

work seek to serve? What does the network do to address the community's needs and to create value? What are the principles that guide the network? A good mission statement expresses the purpose of your network in a concise, meaningful way while articulating your values and services. Above all, your mission provides a vision of the aspirations for your wireless network.

It is important that every team member working to build the wireless network is included in the process of developing your mission, which helps create further buy-in. It will garner support and commitment not only from your staff, but also from customers, partners and donors, which will further your overall objectives. In the dynamic world of technology, the needs of customers and the best way to satisfy those needs change rapidly; therefore, the development of your mission is an ongoing process. After defining the initial mission with your team, you must conduct research to determine whether this first conception is aligned with the realities of your environment. Based on an analysis of the external environment and your internal competencies, you must constantly modify the mission throughout the life-cycle of the wireless network.

## *Evaluate the Demand for Potential Offerings*

The next step in deriving your business model involves assessing the community's demand for the network's products and services. First, identify the individuals, groups and organizations in the community that have a need for information and would benefit from the wireless network's offerings. Potential users could consist of a wide variety of individuals and organizations that include, but are not limited to:

- Farmers' associations and cooperatives
- Women's groups
- Schools and universities
- Businesses and local entrepreneurs
- Health clinics and hospitals
- Religious groups
- International and local non-governmental organizations (NGOs)
- Local and national government agencies
- Radio stations
- Organizations in the tourist industry

Once you establish a list of all the potential user groups of the network, you must determine their needs for access to information and communication. Often, people confuse services with needs. A farmer may need to gather in-

formation on market prices and climatic conditions to improve his crop yield and sales. Perhaps the way in which he gets this information is through the Internet; however, the farmer could also receive this information through SMS over a mobile phone or through **Voice over Internet Protocol (VOIP)**. It is important to differentiate between needs and services because there may be various ways to satisfy the farmer's needs. Your wireless network should look for the best way to fulfill the farmer's needs, thereby creating value at the lowest cost for the user.

When assessing the needs of the community, it is important to figure out where the network can bring the most value to its users. For instance, in the small town of Douentza, Mali, a telecenter manager evaluated the potential benefits of establishing a wireless network through discussions with several local organizations. He interviewed one local NGO that discussed its need to send monthly reports to its headquarters office in Bamako. At that time, there was no Internet access in Douentza. In order to email a copy of the report, the NGO sent one of its employees to Mopti once a month, resulting in transportation and lodging costs, as well as the opportunity cost of having the employee out of the office for several days each month. When the telecenter manager calculated the total monthly costs incurred by the NGO, he was able to demonstrate the value of an Internet connection through cost savings to the organization.

Assistance from key partners may also be necessary to secure sustainability for your wireless network. During this phase, you should connect with potential partners and explore mutually beneficial collaborations.

You can evaluate the demand in your community by contacting your potential customers and asking questions directly through surveys, focus groups, interviews or town hall meetings. Conducting research through a review of statistical documentation, industry reports, censuses, magazines, newspapers and other secondary data sources will also help to give you a better picture of your local environment. The goal of this data collection is to obtain a thorough understanding of the demand for information and communication in your community so that the network being created responds to those needs. Often, wireless networks that do not succeed in the developing world forget this key step. Your entire network should be based on the demand in the community. If you set up a wireless network in which the community does not find value or cannot afford its services, it will ultimately fail.

## ***Establish Appropriate Incentives***

Often, there is little economic incentive for such subsistence-based economic participants to access the Internet. In addition, the cost of acquiring a computer, learning to use it, and getting an Internet connection far outweighs the

economic returns that it can provide. There has recently been some development of applications that address this lack of incentive, such as market information systems, quality standards imposed by importing countries, and commodities exchanges. Internet access becomes an obvious advantage in situations where knowing the day-to-day prices of products can make a significant difference in income.

Establishing appropriate economic incentives is paramount to the success of the network. The network must provide economic value to its users in a way that outweighs its costs, or it must be cheap enough that its costs are marginal and affordable to its users. It is crucial to design a network with viable economic uses and with costs that are less than the economic value provided by it. Additionally, to create a proper incentive structure, you must involve the community in the creation of the network from the beginning of the project, making sure that this initiative is organic and not imposed from the outside. To begin, you should try to answer the following questions:

1. What economic value can this network generate for the local economy and for whom?
2. How much perceivable economic value can be generated?
3. Can present impediments be overcome to allow the achievement of these economic returns?

By answering these questions, the network will be able to clearly articulate its value proposition for its users. For example, “By using this network you can improve your margins on commodity sales by 2%,” or “Internet will allow you to save \$X in phone charges and transportation costs per month.” You must figure out how your network can improve efficiencies, reduce costs, or increase revenues for these customers.

For example, if providing market information for the local maize industry, the network should be located near to where farmers bring their crop for sale to merchants. Your network would then likely need to tie-into market information systems, providing daily price sheets (\$1 each), or terminals to sellers and merchants (\$2/hr). Your network might also provide the means for farmers to read about new techniques and to buy new products. You might also provide wireless connections to merchants and rent them thin-client terminals for Internet access. If the market was small, you might be able to reduce costs by limiting access to images and other bandwidth intensive services. Again, knowing how much value your network will create for these merchants will allow you to gauge how much they will be able to afford for your services.

## *Research the Regulatory Environment for Wireless*

The regulatory environment for wireless networks also affects the type of business model that can be implemented. First, research whether any organization has the right to use 2.4 GHz frequencies without a license. In most situations, 2.4 GHz is free to use worldwide; however, some countries restrict who can operate a network or require expensive licenses to do so. Although wireless networks are legal in the Ukraine, the government requires an expensive license to use 2.4 GHz frequencies, which renders this shared usage prohibitive. Typically only well established Internet Service Providers in this country have sufficient cash flow to pay the license fees. This restriction makes it difficult for a small community to share a wireless network with other potentially interested parties or organizations. Other countries, such as the Republic of Mali, are more permissive. Because there are no such restrictions on wireless networks, the possibility to share Internet connectivity in small communities is a viable solution. The lesson is to do your research at the onset, ensuring your network will comply with the laws of the country and local community. Some project managers have been forced to shut down their wireless networks simply because they were unknowingly breaking the law.

You should also check into the legality of Voice over Internet Protocol (VoIP) services. Most countries in the developing world have not yet defined whether VoIP is permitted; in such countries, nothing would prevent you from offering the VoIP service. However, in some countries there are complicated rules surrounding VoIP. In Syria, VoIP is prohibited for all networks, not just wireless. In Ukraine, VoIP is legal for international calls only.

## *Analyze the Competition*

The next phase in the evaluation of your community involves an analysis of the wireless network's competition. Competitors include organizations that provide similar products and services (e.g., another wireless Internet service provider or WISP), organizations viewed as substitutes or alternatives to the products and services your network provides (e.g., a cybercafé), and organizations defined as new entrants to the wireless market. Once you have identified your competitors, you should research them thoroughly. You can obtain information about your competitors through the Internet, telephone calls, their advertisements and marketing materials, surveys of their customers and visits to their site. Create a file for each competitor. The competitive information you gather can include a list of services (including price and quality information), their target clients, customer service techniques, reputation, marketing, etc. Be sure to collect anything that will help you determine how to position your network in the community.

It is important to evaluate your competition for many reasons. First, it helps you determine the level of market saturation. There have been several instances where a subsidized telecenter was established by a donor organization in a small village with limited demand, despite the fact that there was already a locally owned cybercafé there. In one circumstance, the subsidized center maintained low prices because it did not have to cover its costs. This scenario eventually caused the locally owned center to go out of business. After the funding stopped, the subsidized center went out of business as well, due to low revenues and high costs. Knowing what already exists will allow you to determine how your network can contribute value to the community. In addition, analyzing the competition can stimulate innovative ideas for your service offerings. Is there something that you can do better than the competitors to make your services more effectively fit the needs of the community? Finally, by analyzing your competitors from the customers' point of view and understanding their strengths and weaknesses, you can determine your competitive advantages in the community. Competitive advantages are those which cannot be easily replicated by the competition. For example, a wireless network that can exclusively offer a faster Internet connection than a competitor is a competitive advantage that facilitates client utilization.

## *Determine Initial and Recurring Costs and Pricing*

When you are planning to set up and operate your wireless network, you must determine the resources needed to start your project and the recurring operating costs. Start-up costs include everything you must purchase to start your wireless network. These expenses can range from the initial investment you make in hardware, installations, and equipment for access points, hubs, switches, cables, UPS, etc. to the costs to register your organization as a legal entity. Recurring costs are what you must pay to continue to operate your wireless network, including the cost of Internet access, telephone, loans, electricity, salaries, office rental fees, equipment maintenance and repairs, and regular investments to replace malfunctioning or obsolete equipment.

Every piece of equipment will eventually break down or become outdated at some point, and you should set aside extra money for this purpose. An advisable and very common method to deal with this is to take the price of the device and divide it by the period of time you estimate that it will last. This process is called **depreciation**. Here is an example. An average computer is supposed to last for two to five years. If the initial cost to purchase the computer was \$1,000 USD, and you will be able to use the computer for five years, your annual depreciation will be \$200 USD. In other words, you will lose \$16.67 USD every month so that you can eventually replace this computer. To make your project sustainable, it is of fundamental importance that

you save the money to compensate for the depreciation of equipment each month. Keep these savings until you finally have to spend them for equipment replacement. Some countries have tax laws that determine the period of depreciation for different types of devices. In any case, you should try to be very realistic about the life-cycle of all the implemented gear and plan for their depreciation carefully.

Try to find out all your costs in advance and make realistic estimations on your expenses. The following grid (continued on the next page) shows you a way to classify and list all of your costs. It is a good tool to structure the different costs, and it will help you to distinguish between initial costs and recurring costs.

It is important to research all your start-up costs in advance, and make realistic estimations on your recurring expenses. It is always better to over-budget for expenses than to under-budget. With every wireless project, there are always unforeseen costs, especially during the first year of operations as you learn how to better manage your network.

## Categories of Costs

	Initial / start-up costs	Recurring costs
Labor costs	<ul style="list-style-type: none"> <li>• Check ups (analyses) and consultancies</li> <li>• Development costs for programming, testing, integration etc.</li> <li>• Installation costs</li> <li>• Recruiting costs</li> <li>• Training costs (introduction)</li> </ul>	<ul style="list-style-type: none"> <li>• Handling costs / salaries for employees or freelancer, including yourself</li> <li>• Equipment maintenance and support costs for software, hardware and ancillary equipment</li> <li>• Security personnel</li> <li>• Training costs (refreshers)</li> </ul>



	Initial / start-up costs	Recurring costs
Material (non-labor) costs	<ul style="list-style-type: none"> <li>• Acquisition and production costs (for hardware like PCs, VSAT, radio link equipment and software)</li> <li>• Ancillary equipment (e.g., switches, cables and cabling, generator, UPS, etc.)</li> <li>• Data protection and security</li> <li>• Start-up inventory (chairs, tables, lighting, curtains, tiles and carpeting)</li> <li>• Premises costs (new building, modification, air conditioning, electrical wiring and boxes, security grills)</li> <li>• Legal costs, such as business registration</li> <li>• Initial license costs (VSAT)</li> <li>• Initial marketing costs (flyers, stickers, posters, opening party)</li> </ul>	<ul style="list-style-type: none"> <li>• Operating costs for hardware and operating systems (Internet access, telephone, etc.)</li> <li>• Rent or leasing rates</li> <li>• Depreciation of hardware and equipment</li> <li>• License fees</li> <li>• Consumables and office supplies (e.g., data media, paper, binds, clips)</li> <li>• Operational costs to maintain data protection and security</li> <li>• Insurance premiums</li> <li>• Costs for energy and to ensure power supply</li> <li>• Loan payments, capital costs for paying back your setup costs</li> <li>• Costs for advertising</li> <li>• Local fees</li> <li>• Legal and accounting services</li> </ul>

To improve your chances of sustainability, it is generally best to maintain the lowest cost structure for your network. In other words, keep your expenses as low as possible. Take time to thoroughly research all of your suppliers, particularly the ISPs, and shop around for the best deals on quality service. Once again, be certain that what you purchase from suppliers corresponds with the demand in the community. Before installing an expensive VSAT, ensure there is a sufficient number of individuals and organizations in your community willing and able to pay for using it. Depending upon demand for information access and ability to pay, an alternative method of connectivity may be more appropriate. Do not be afraid to think outside the box and be creative when determining the best solution.

Keeping your costs down should not be at the cost of quality. Because low-quality equipment is more likely to malfunction, you could be spending more on maintenance in the long run. The amount of money you will spend to maintain your ICT infrastructure is hard to guess. The larger and more complicated your infrastructure becomes, the more financial and labor resources you must allocate for its maintenance.

Many times this relation is not linear but exponential. If you have a quality problem with your equipment once it is rolled out, it can cost you an enormous amount of money to fix it. Concurrently, your sales will decrease because the equipment is not up and running. There is an interesting example of a major wireless internet service provider (WISP) who had more than 3,000 access points in operation for a while. However, the WISP never managed to break even because it had to spend too much money to maintain all the access points. In addition, the company underestimated the short life-cycle of such devices. ICT hardware tends to get cheaper and better as time goes on. As soon as the company had invested time and money to install the version of expensive first generation 802.11b access points, the new “g” standard was created. New competitors designed better and cheaper access points and offered faster Internet access for less money. Finally the first WISP was forced to close down the company, although it was initially the market leader. Look at the following table to get a better picture on the fast development of wireless standards and equipment:

Protocol	Release Date	Typical Data Rate
802.11	1997	< 1 Mbps
802.11b	1999	5 Mbps
802.11g	2003	20 Mbps
802.11a	1999, but rare until 2005	23 Mbps
802.11y	June 2008 (estimated)	23 Mbps
802.11n	June 2009 (estimated)	75 Mbps

Keep in mind the rapid advancement and changes in technology and think about how and when it may be time for you to reinvest in newer and cheaper (or better) devices to keep your infrastructure competitive and up-to-date. As mentioned before, it is highly important that you save enough to be able to do so, when necessary.

Once you have identified and mapped out your costs, you should also determine what and how to charge for your services. This is a complicated and time-consuming process to do correctly. These key tips will assist when making pricing decisions:

- Calculate the prices you charge so that you cover all costs to provide the service, including all recurring expenses
- Examine the prices of your competitors
- Evaluate what your customers are willing and able to pay for your services, and make sure your prices correspond with these

It is absolutely essential to make a financial plan before you start. You need to list all of your initial and recurring costs and make some calculations to find out if your project can be sustainable.

## *Secure the Financing*

Once you have determined your initial and recurring costs and created your financial plan, you know how much financing you will need to run a successful wireless network. The next step is to research and secure the appropriate amount of money to start up and run your wireless network.

The most traditional method of receiving funding for wireless networks in the developing world is through grants given by donors. A donor is an organization that contributes funding and other types of donations to an organization or consortium of organizations to help them manage projects or support causes. Because this funding is provided in the form of grants or other donations, it is not expected to be repaid by the organizations implementing the wireless projects or by the project's beneficiaries. Such donors include large international organizations like the United Nations (UN) and various specialized UN agencies like the United Nations Development Program (UNDP) and United Nations Educational, Scientific and Cultural Organization (UNESCO). Government agencies that specialize in international development, such as the United States Agency for International Development (USAID), the United Kingdom's Department for International Development (DFID), and the Canadian International Development Agency (CIDA), are also considered donors. Large foundations like the Gates Foundation and the Soros Foundation Network and private companies are other types of donors.

Typically, receiving funding involves a competitive or a non-competitive process. The non-competitive process is more infrequent, so this chapter will focus on the competitive process at a very high level. Most donors have complicated procedures surrounding the distribution of funding. The authors in this book are by no means trying to oversimplify this in depth system of rules

and regulations. The authors intend only to convey a general understanding of this process for communities attempting to establish wireless networks in the developing world. During the competitive bid process, the donor creates a **request for proposal (RFP)** or a **request for application (RFA)**, which solicits various non-governmental organizations, private companies and their partners to submit proposals outlining their plans for projects within the constraints of the donors' objectives and guidelines. In response to this RFP or RFA, NGOs and other organizations compete through the submittal of their proposals, which are then evaluated by the donors based on specific established criteria. Finally, the donor organization selects the most appropriate and highest ranking proposal to fund the project. Sometimes donors also supply funding to support an organization's operations, but this type of funding is more unusual than the competitive bid process.

Another way of accessing the necessary funds to start and maintain a wireless network is through **microfinance**, or the provision of loans, savings and other basic financial services to the world's poorest people. Pioneered in the 1970's by organizations like ACCION International and Grameen Bank, microcredit, a type of microfinance, enables poor individuals and entrepreneurs to receive loans in small amounts of money to start up small enterprises. Despite the fact that these individuals lack many of the traditional qualifications needed to obtain loans like verifiable credit, collateral or steady employment, microcredit programs have been highly successful in many developing countries. Typically, the process involves an individual or a group completing and submitting a loan application in the hopes of receiving a loan, and the lender, the individual or organization that provides the loan, giving money on condition that it is returned with interest.

The use of microcredit to fund wireless networks does pose one constraint. Usually, microcredit involves very small sums of money. Unfortunately, because a large amount of capital is needed to purchase the initial equipment for wireless network set up, sometimes a microcredit loan is not sufficient. However, there have been many other successful applications of microcredit that have brought technology and its value to the developing world. An example includes the story of village phone operators. These entrepreneurs use their microcredit loans to purchase mobile phones and phone credits. They then rent the use of their mobile phones to community members on a per-call basis and earn enough money to repay their debt and make a profit for themselves and their families.

Another mechanism for getting funding to start a wireless network is angel funding. Angel investors are normally wealthy individuals that provide capital for business start-up in exchange for a high rate of return on their investment. Because the ventures in which they invest are start ups and, therefore, often high risk, angel investors tend to expect different things in addition to their return. Many expect a board position and maybe a role in the organization.

Some angels want to have a stake in the company, while others prefer shares in the company that can be easily redeemable at face value, thus providing a clear exit for the investor. To protect their investments, angels frequently ask the businesses not to make certain key decisions without their approval. Because of the high risk involved in developing markets, it is often challenging to find angel investors to help setup a wireless network, but not impossible. The best way to find potential investors is through your social network and through research online.

## ***Evaluate the Strengths and Weaknesses of the Internal Situation***

A network is only as good as the people who work and operate it. The team you put in place can mean the difference between success and failure. That is why it is important to reflect about your team's qualifications and skills, including those of staff and volunteers, in comparison to the competencies needed for a wireless project. First, make a list of all the competencies needed to run a wireless project successfully. Capacity areas should include technology, human resources, accounting, marketing, sales, negotiation, legal, and operations, among others. Afterwards, identify local resources to fulfill these skills. Map your team's skills sets to the competencies needed, and identify key gaps.

One tool often used to assist with this self-evaluation is an analysis of strengths, weaknesses, opportunities and threats, called SWOT. To conduct this analysis, specify your internal strengths and weaknesses, and elaborate upon the external opportunities and threats in your community. It is important to be realistic and honest about what you do well and what you are lacking. Be sure to distinguish between where your organization is at the beginning of this endeavor from where it could be in the future. Your strengths and weaknesses allow you to evaluate your capacities internally and better understand what your organization can do, as well as its limits. By understanding your strengths and weaknesses and comparing them to those of your competitors, you can determine your competitive advantages in the market. You can also note the areas where you can improve. Opportunities and threats are external, which enable you to analyze real world conditions and how these conditions influence your network.

The diagram below will help you in creating your own SWOT analysis for your organization. Be sure to respond to the questions asked and list your strengths, weaknesses, opportunities and threats in the spaces designated.

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• What do you do well?</li> <li>• What unique resources can you draw on?</li> <li>• What do others see as your strengths?</li> <li>•</li> <li>•</li> <li>•</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• What could you improve?</li> <li>• Where do you have fewer resources than others?</li> <li>• What are others likely to see as weaknesses?</li> <li>•</li> <li>•</li> <li>•</li> <li>•</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• What good opportunities are open to you?</li> <li>• What trends could you take advantage of?</li> <li>• How can you turn your strengths into opportunities?</li> <li>•</li> <li>•</li> <li>•</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• What trends could harm you?</li> <li>• What is your competition doing?</li> <li>• What threats do your weaknesses expose you to?</li> <li>•</li> <li>•</li> <li>•</li> <li>•</li> </ul>

## Putting it All Together

Once you have gathered all of the information, you are ready to put everything together and decide upon the best model for the wireless network in your community. Based on the results of your external and internal analyses, you must refine your mission and service offerings. All of the factors that you researched in the preceding steps come into play when determining your overall strategy. It is essential to employ a model that capitalizes on opportunities and works within the constraints of the local environment. To do this, you must often find innovative solutions to attain sustainability. By exploring several examples and discussing the components of the models implemented in those instances, you will better understand how to arrive at an appropriate model.

In the distant jungles of the Democratic Republic of Congo, there is a rural hospital in a village called Vanga in the province of Bandundu. It is so remote that patients travel for weeks to get there often through a combination of travel by foot and by river. This village, founded by Baptist missionaries in 1904, has served as a hospital for many years. Although it is extremely remote, it is renowned for being an excellent facility and has had the support of German and American missionaries who have kept this facility in operation. In 2004, a project sponsored by USAID established a telecenter in this village to help improve education in this isolated community; this Internet facility was also heavily used by the educated class in the community – the hospital's staff. The center had been a great boon to the community, offering access to the world's knowledge and even providing consultation with distant colleagues in Switzerland, France and Canada. The center required near total subsidization to operate and cover its costs, and funding was to end by 2006. Although the center added great value to the community, it did have some shortcomings, primarily technical, economic, and political issues that limited its sustainability. A study was commissioned to consider options for its future. After reviewing the center's cost structure, it was determined that it needed to cut its costs and look for new ways to increase its revenues. The largest expenses were electricity and Internet access; therefore, creative models needed to be constructed to reduce the telecenter's costs and provide access in a way that was sustainable.

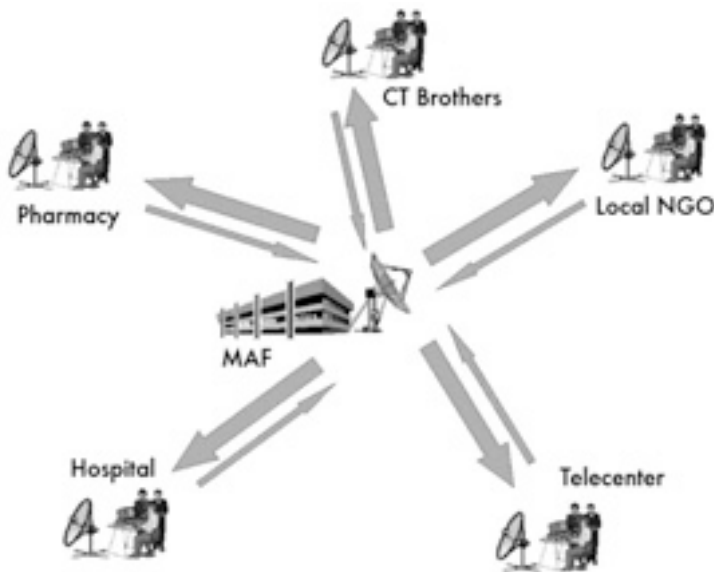


Figure 10.1: Shared Internet over wireless

In this instance, a traditional VSAT was used for connectivity. However, this model provided a unique way of accommodating local community groups' limited ability to pay for Internet services. Various organizations in the com-

community share Internet access through a wireless network; they also share the costs associated with that connection. This model functions well due to specific conditions – namely an awareness and understanding of the value of the Internet among key community members, the necessary resources to support Internet access, and a regulatory system that permits wireless sharing. In Vanga, several organizations, including a hospital, a pharmacy, several missionary groups, a community resource center, and some non-profit organizations, have a need for Internet access and the means to pay for it. This arrangement enables the network of organizations to have a higher quality connection at a lower cost. Additionally, one organization in the village has the capacity and willingness to manage several aspects of the network's operations, including the billing and payment collection, technical maintenance and general business operations of the entire network. Therefore, this model works well in Vanga because it has been tailored to meet community demand and leverage local economic resources.

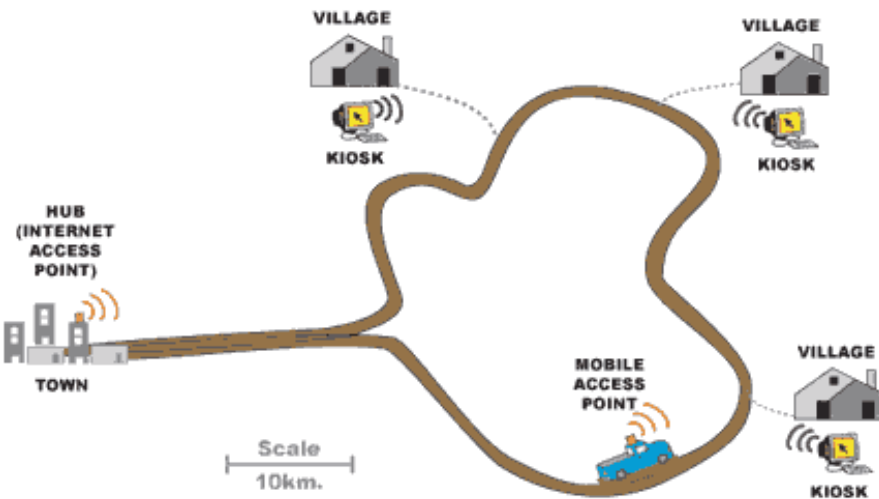


Figure 10.2: DakNet's roaming access point

Another example of a model adapted to fit the local context is that of First Mile Solutions' DakNet. This model has been deployed in villages in India, Cambodia, Rwanda, and Paraguay. By taking into account the limited buying power of villagers, this model addresses their communication needs in an innovative way. In the DakNet model, there is a franchise that exists in the country, and local entrepreneurs are recruited and trained to operate kiosks equipped with Wi-Fi antennas. Using pre-paid cards, villagers are able to asynchronously send and receive emails, texts, and voice mails, conduct web searches, and participate in e-commerce. Afterwards, these communications are stored in the local kiosk's server. When a bus or motorcycle with a mobile access point drives past a kiosk, the vehicle automatically receives



the kiosk's stored data and delivers any incoming data. Once the vehicle reaches a hub with Internet connectivity, it processes all requests, relaying emails, messages, and shared files.

DakNet integrates both mobile access and franchise models to bring value to people in remote villages. For such a model to be sustainable, several key conditions need to be present. First, a franchise organization must exist to provide financial and institutional support, including an initial investment, working capital for certain recurring costs, advice on start-up practices, management training, standardized processes, reporting mechanisms, and marketing tools. Additionally, this model requires a highly motivated and dynamic individual in the village, with the appropriate skills to manage a business and willingness to accept certain requirements of the franchise organization. Because these entrepreneurs are often asked to commit their own resources to the start-up costs, they need to have sufficient access to financial resources. Finally, to ensure this model will sustain itself, there should be sufficient demand for information and communication and few competitors in the community.

## *Conclusion*

No single business model will enable wireless networks to be sustainable in all environments of the developing world; different models must be used and adapted as the circumstances dictate. Every community has unique characteristics, and sufficient analysis must be conducted at the onset of a project to determine the most appropriate model. This analysis should consider several key factors in the local environment, including community demand, competition, costs, economic resources, etc. Although appropriate planning and execution will maximize the chances of making your network sustainable, there are no guarantees of success. However, by using the methods detailed in this chapter, you will help to ensure that your network brings value to the community in a way that corresponds with the users' needs.

