Making the Connection:

SCALING TELECENTERS FOR DEVELOPMENT

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Academy for Educational Development

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FOREWORD

We stand before the open door to the future, yet it is difficult to see inside and harder still to know how to take the first steps across the threshold.

It is somewhat counter intuitive. Advanced technology solutions are critical to alleviate poverty. One underlying cause of poverty is the asymmetry of information between the poor and the rich, including the middlemen. Commitment to building a framework for empowerment of the poor must therefore, start with access to information and connectivity. We know that the Internet has brought the potential for empowering even the most marginalized groups in our societies. We know that it will benefit all of us if we can unleash their entrepreneurial energy and creativity. Among the first steps is surely the challenge of how to achieve access to the Internet for the groups at the bottom of the pyramid, so they can participate fully in shaping their own future.

One of the answers to this challenge is the creation of ways for the poor to have shared access to information and communication technologies (ICT). A very committed informal community has been working on these issues for the better part of two decades, seeking ways to provide sustainable, affordable access to everyone. This "shared access computing and connectivity community" is an improbable collection of very different types of people, from social activists to telecommunications experts, rural farmers to nerdy computer professionals, national policy-makers to grassroots community development workers, and small entrepreneurs to software publishers. Shared access has been a moving target—personal computers have become exponentially more powerful and less expensive, the Internet has exploded into a worldwide phenomenon, and communication technology has made enormous strides forward, and the institutional context of shared access has made smaller steps forward.

However, the fundamental problem has not changed. Computers and connectivity are still too expensive for private ownership by the poor. Applications and information resources that are appropriate to this group have been slow to emerge, in part because the poor

themselves have not been involved in creating them. The dilemma is a classic chicken and egg proposition—in order to help create the applications and start the business dynamo that unleashes their potential, the people at the bottom of the pyramid need to have reliable, affordable access to technology and to learn computing skills.

The search for a solution to this problem has focused on different forms of shared access, in which public computers are made available in supportive environments, usually with the user paying only for the amount of time he or she uses it. The actual models under which this approach is organized are as diverse as the bottom of the pyramid itself, but for the sake of simplicity, its is called telecenters. The range of experimental activities undertaken is truly impressive. The implementers of these activities have demonstrated that when the approach is well matched to the need, telecenters can work in virtually any environment.

They have also learned that it is equally possible for any of these models to fail. There is no "correct" way to implement a telecenter, no single "best" business model, and no "perfect" combination of features. Each environment is different, and the local players need to know their audience, determine their objectives, and seize the opportunities that best match local conditions—this is "consumer-centric" design at its best. We can call this Co Creation of solutions where the consumers (the poor) have a significant say in developing the solution.

The shared access community has now reached the evolutionary stage where the focus of their efforts is moving to the "macro" level issues of how to scale up the coverage and the organizational structures to ensure that the goal of equitable access can be met on a national and global level. That is not to say that the organizations that deliver the service need to be large, but that the size of the population served is large. The leadership that will make possible this step forward must bring a very broad vision, so that the consumers can co-create the institutions that will enable them to flourish.

The challenges are formidable, but the prognosis is good. The demand for access is strong, and there is a wide consensus on the importance of succeeding. The technology continues to drop in price and increase in capability; electricity consumption is dropping and the efficiency of alternative power supplies is rising. The convergence of the complementary roles of cell phones, personal digital assistants, and full computing platforms offers the possibility of a broader range of possible services. Constraints on the connectivity side persist, but emerging wireless broadband technologies offer the promise of a major improvement in data connectivity and widespread access to services such as voice over Internet protocol.

The cumulative wisdom of the shared access computing community is the subject of this book. It is divided into three major parts: a review of past experience and lessons; a process for thinking about and planning for sustainability, impact, and scale; and an analysis of paths to scaling up from the pilot efforts that have predominated to date to a large scale of operations. The authors have assembled a rich collection of examples and experiences to help local efforts to build on the lessons learned to date. They offer a structured way of analyzing the local and national situation, as well as guidance on how to find a path to larger scales of activity.

The resulting book is not a cookbook; it is something more like a friendly letter from thousands of virtual mentors, offering insights gained from their years of experience. Combined with local understanding of each specific situation, it should make it possible to design and implement effective scale-up strategies. This step across the threshold into the future will be of profound importance. This book is a tribute to those pioneers who believed that the poor deserve the best the world can offer. They deserve our heartfelt thanks.

March 2007

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TELECENTER DEFINITIONS

1. **Telecenter:** A public place where people can access computers, the Internet, and other digital technologies that enable people to gather information, create, learn, and communicate with others while they develop essential 21st-century digital skills. While each telecenter is different, their common focus is on the use of digital technologies to support community, economic, educational, and social development—reducing isolation, bridging the digital divide, promoting health issues, creating economic opportunities, and reaching out to youth. Telecenters exist in almost every country, although they sometimes go by different names (e.g., village knowledge centers, infocenters, community technology centers, community multimedia centers, or school-based telecenters). Telecenters may be run as nonprofit ventures or as for-profit businesses. They may be established by businesses, social entrepreneurs, nongovernmental organizations, governments, or development donor organizations.

   Wikipedia definition of "telecentre"
   http://en.wikipedia.org/wiki/Telecentre
   February 17, 2007

2. **Telecenter:** A facility that offers community members the ability to use ICTs (information and communication technologies) in a publicly shared manner. Telecenters often provide the only connectivity available to many community members, and their services may be offered with or without a fee.

   "Readiness for the Networked World—Glossary"
   http://cyber.law.harvard.edu/readinessguide/glossary.html

Note on spelling: Throughout this book American spelling, such as telecenter, is used, except in cases of proper names and quotations.

INTRODUCTION

The telecenter movement's exceptional growth in the past decade has been driven by two key factors: recognition of the importance of information and communication technology (ICT) for development and poverty alleviation, and the fact that "shared-access facilities," such as telecenters, offer the most promise for extending the reach of ICT to the greatest number of people.

Telecenters exist in almost every country. They exist under a variety of names (including information kiosks, community technology centers, infocenters, community-multimedia centers, village knowledge centers, school-based telecenters, etc.) that reflect their diversity. People use them as **community centers** and **learning centers**, places where people can meet, talk, share stories, learn new skills, access information resources and online courses. People use them as **technology centers**, to make photocopies, to access the Internet, to contact family members in distant places. Finally, people use them as **business centers**, to transact business, to pay bills, to look up business opportunities, to advertise services, to develop marketing materials, etc.

Under most of these different names and the different models they represent, telecenters are tools for development across sectors. As such, they are of interest to a broad spectrum of individuals, firms, and organizations in developing countries.

This book identifies and discusses the most pressing issues facing the global telecenter movement, presents a condensed view of the current state of knowledge with regard to telecenters, and highlights possible paths forward. **Our goal with this book is to help you move forward, to inspire you, and, whenever possible, to guide you.**

Our primary audience for this book consists of those individuals, firms, and organizations that are most likely to be involved, either directly or indirectly, in the planning and deployment of telecenters around the world, with an emphasis on large-scale deployments. Our secondary audience for this book consists of all those who might benefit from

telecenters and therefore would be interested in better understanding their evolution and future potential. Whether you are a government official thinking through how best to support a national telecenter scale-up initiative, an entrepreneur hoping to start up your first telecenter, or the CEO of a private company seeking to expand the range of services offered through your existing network of telecenters, this book is for you.

In Chapter 1, we highlight the evolution of the telecenter movement and present a simplified timeline. If the 1990s were characterized by the piloting of telecenters, early struggles, and limited demonstrable impacts, the period 2000–2010 has been (until now) characterized by growth, diversification, and the emergence of a telecenter movement. Today's telecenters are benefiting from the experience gained since the 1990s and are proving their continued relevance to populations of developing countries as technology centers, business centers, and/or community centers, using a wide spectrum of technologies and providing an ever-increasing range of valued services under various business and organizational models. We predict that the period 2010–2020 will be characterized by even faster expansion of the movement through a combination of planned and unplanned scale-up as well as further transformation.

Our vision and hope is that during the period 2010–2020, we will reach a tipping point where further expansion will require less effort and yield substantial impacts on development. The investment by our professional community of time and energy in finding ways to take the vision to scale and sustainability will begin to pay dividends. This vision will only be realized as the aggregate of myriad individual, corporate, organizational, and national visions turned into action. This book will help you shape your own vision and take steps toward implementation.

What is *your* vision of the telecenter movement of the future? What are your targets? How would you go about achieving these targets? Whether you are working on establishing your first telecenter or planning your thousandth, what are your questions? What do you want to know?

Imagine a "Telecenter Help Desk" whose aim is to support local telecenter managers, entrepreneurs, government officials, civil society leaders, and others who share a vision of access to information and communication technologies for all through telecenters. What queries would such a help desk receive? And, more important, what responses could be provided? We pose hypothetical questions at the beginning of each chapter to introduce the issues presented.

We organized questions under three primary themes, which serve as the three main parts of this book:

Part I: Reviewing the Past and Previewing the Future

- What does the future hold for telecenters? What are the trends in telecenter deployment?
- What have we learned? What do we already know about how to establish, sustain, and replicate telecenters?
- What do we know about *scaling up*? What do we need to know about scaling up telecenters? Are there prerequisites to rapidly expand access to millions of new users?
- Are we ready to scale up? How would we know?
- What are some examples of scale-up initiatives? How successful are they? What challenges are they facing?

Part II: Planning for Sustainability, Impact, and Scale

- How do we increase the impact of telecenters, not only by increasing their geographic reach, but also by increasing the value and diversity of their services to rural and underserved populations?
- What is the relationship between sustainability and scale?
- How do we ensure that telecenters reach different geographic areas and all segments of society?
- What telecenter services provide the most value to rural and underserved communities as well as a stable source of revenue for telecenter operators?
- What business or organizational models have emerged over time? How successful has each of them been in ensuring both sustainability and impacts? Under what conditions is one business model more appropriate than others? How are these models transforming themselves over time to keep pace with changing markets?
- What technology solutions have been deployed to address power, hardware, software, and connectivity challenges? What is the impact of rapid technological advances on our ability to scale up telecenters cost effectively?
- What is the role of networks and capacity building in facilitating a scale-up and strengthening sustainability?

Part III: Paths to Scale-Up at the National Level

- What are the options for scaling up at the national level? What is the most appropriate role for governments, civil society, and the private sector?

- What are some of our knowledge gaps? What will we need to learn in the coming years? How will we share essential knowledge to strengthen the telecenter movement?
- What does it all mean for you? How can you use this book to help you move forward? How can you extract valuable knowledge from this book and apply it to your own vision?

Each chapter of this book begins with a series of more specific questions that you might ask yourself about telecenters, questions you might have posted as queries to a Telecenter Help Desk.

In addressing these questions and more, the book makes extensive use of **short case studies**. These case studies introduce you to specific examples of initiatives around the world that illustrate one or more key points about establishing and sustaining telecenters. Using your questions as a starting point and case studies as a primary means for discussing key issues, the book also guides you through a process of reflection and action. Each chapter ends with a **Take-Aways** section that synthesizes key points to keep in mind, as well as a separate **Make It Your Own** section that helps you to analyze the chapter's key points from your own perspective, with a view to encouraging you to develop and implement your own vision.

PART I:

REVIEWING THE PAST AND PREVIEWING THE FUTURE

This book is for the members of the international development community who are striving for equitable access to information and communication technology for all people. The efforts of this community over the last two decades have created a rich history of using shared access to computing through telecenters for development. The community now stands at the threshold of an exciting future, building on the experience of many small-scale projects and taking them to national and global scale so that the massive numbers of underserved people around the world can participate in the new information society.

Part I of this book is about taking stock. Chapter 1 looks at the recent history of telecenters and highlights emerging trends and visions of where we might want to be by 2020.

Chapter 2 presents an overview of our collective knowledge of telecenters, knowledge that will help us think through how to move forward with our visions.

Vision without action is a daydream. Action without vision is a nightmare.
—Japanese proverb

CHAPTER 1:
An Evolving Vision of Telecenters for Development

1.1. QUERIES TO THE TELECENTER HELP DESK

We are conducting an annual review of our portfolio of ICT-related projects, and we have been asking ourselves a number of questions about telecenters and similar kiosks and community technology centers:

- *Is there an accurate estimate of how many telecenters operate around the world? What fraction of these telecenters is "sustainable"?*
- *What are your expectations for the continued growth of the telecenter movement? Is the telecenter movement growing or declining?*

(Donor agency staff)

We are reviewing and updating our National ICT Strategy. We want to make sure that it is integrated into our national development goals and our broader strategies for achieving the Millennium Development Goals. We have identified telecenters as a key element of our revised ICT strategy, and we are looking for ways to ensure that telecenters become a development tool supporting a broad range of development goals, not just communication, games, and browsing. What are some best practices from other countries that we should study to help us develop a successful approach?

(National ICT policy advisor, Country A)

We launched 10 kiosks in one district a year ago. It's been a steep learning curve. One closed its doors, and three are barely covering their costs after a year of operation. We're working with all of the remaining kiosks to strengthen their operations and to develop a broader menu of services. However, we're debating whether we should scale up at this point or wait until we have a clearer understanding of critical success factors for kiosks to be sustainable. Are there significant economies of scale? How will we know when we're ready for a scale-up? Are there specific methods for going to scale?

(Private entrepreneur, Country B)

1.2. A VISION OF SHARED ACCESS—THE TELECENTER

The concept of *shared access* to information and communication technologies took shape in the "telecottage" movement of Europe and Canada as well as the U.S.-based Community Technology Center network in the 1980s. The second half of the 1990s saw the emergence of a more global *telecenter* movement, as a growing number of development agencies, nongovernmental organizations, and entrepreneurs started supporting and establishing telecenters in developing countries around the world.[1]

One of the major objectives behind telecenters is shared access to information and communication technologies. Telecenters are seen as essential tools for addressing the *digital divide* and providing underserved populations access to ICT resources that they could not afford privately. The idea behind these shared-access facilities is that while the goal of providing all households access to ICT, that is, universal service, is not possible for most people of the world, providing shared access is possible, particularly with the rapid evolution of technology.

The Geneva Plan of Action, which emerged out of the World Summit on the Information Society (WSIS) in 2003, recognized telecenters as a key element of strategies for bringing the information revolution to developing countries in a cost-effective way. The Plan of Action also pointed to the need for governments and other stakeholders to establish multipurpose community access points.[2] In 2005, The Tunis Agenda for the Information Society, which arose from the second phase of WSIS, stressed the role of ICT as a development enabler:

> ***We agree*** *that the financing of ICT for development needs to be placed in the context of the growing importance of the role of ICTs, not only as a medium of communication, but also as a development enabler, and as a tool for the achievement of the internationally agreed development goals and objectives, including the Millennium Development Goals.*[3]

Leapfrogging—bypassing whole generations of information technologies—is happening on a large scale. The past decade has seen major advances in technology and a rapid penetration of ICT into developing countries. Different sectors such as education, health, agriculture, governance, and trade have been remarkably quick to adopt the technology and develop applications to take advantage of it. The most visible sign of this transformation is the mobile phone, now ubiquitous in most urban areas around the world and increasingly visible even in rural areas. Computer-based technologies have also made breathtaking advances in capability and utilization.

Efforts to bring computing to underserved areas in developing countries have also blossomed. Most of these efforts focus on shared or public access facilities such as telecenters. In spite of the progress in recent years, however, most rural areas in developing countries still lack access to affordable information and communication technologies.

Box 1: telecentre.org

telecentre.org is a collaborative initiative that supports and strengthens the telecenter movement. It was founded by the International Development Research Center (IDRC), the Swiss Agency for Development and Cooperation (SDC), and Microsoft®. (Read more about this in Chapter 7.)

In the late 1990s, we witnessed early experiments with telecenters in developing countries. Telecenters at that time were few and easy to count. Today, **telecentre.org** (described in Box 1) suggests that there are at least 60,000 government-, community-, and entrepreneur-run telecenters worldwide. This includes approximately 35,000 telecenters said to exist in Latin America and the Caribbean and around 15,000 centers and kiosks in India.[4]

Those of us who work in this field are painfully aware that many of the telecenters established in the early years have not survived, and many of the survivors still have not achieved financial self-sufficiency. The high mortality rate among telecenters forces us to focus on *sustainability*—a complex issue with no simple solutions.

1.3. TODAY'S OPPORTUNITIES

The past decade has witnessed an explosion in the range of ICT sectoral applications and increased "specialization" of information and communication technology for development (ICT4D) into subfields such as e-Government, e-Commerce, e-Health, and e-Learning. Exciting opportunities are also emerging with e-Banking and the delivery of credit and transaction services through telecenters. It is essential to ensure that these tools are leveraged to deliver a variety of *relevant* services that enable people to learn, improve their economic capacity, become effective citizens, and participate in government.

As many countries tackle government reforms through e-Government, new opportunities open up for government agencies as well as civil society organizations to deliver services and connect citizens to their government representatives, and to achieve economies of scale in services and capacity building.

More and more people have the skills to take advantage of some of the more advanced services provided by telecenters. In many countries, the policy and regulatory environment for telecommunication services has improved,

resulting in lower costs and faster private sector deployments. New wireless broadband and satellite technologies have significantly opened up the range of possibilities in terms of rural Internet connectivity solutions.

Parallel to technology advances, we have witnessed a significant shift and evolution in the organizational and business models behind the deployment of ICT, including their deployment in the context of telecenters. All of these new opportunities have improved our chances of realizing our 2020 vision, but challenges remain.

1.4. TODAY'S CHALLENGES: SUSTAINABILITY, INCREASED IMPACT, AND SCALING UP

Today's key challenges with regard to sustainability, increased impact, and scale include the following:

- Flexible, responsive, and innovative social investment mechanisms to support the establishment of new telecenters.
- Well-packaged, easy-to-replicate community services for telecenters, such as computer literacy training, telemedicine, remote learning, financial remittances, and e-Government.
- Simple, proven social enterprise models that telecenters can use to generate community impact and financial revenue.
- Flexible, ongoing training and support to users and service providers.
- Low-cost, easy-to-implement telecenter technology platforms, including affordable and stable Internet connections for rural areas.
- Networks and partnerships that can help the telecenter movement reach a global scale.
- An enduring commitment to the notion of telecenters and other grassroots technology as an important contributor to development.[5]

Focus on Sustainability

Discussions of "sustainability" are often cast in terms of financial sustainability (i.e., the telecenter's ability to generate enough revenue to cover its expenses). Other dimensions of sustainability may be equally important. Klaus Stoll argues that in addition to financial sustainability, social, cultural, political, and technical sustainability must be taken into account.[6]

To address this issue of sustainability, a broader range of organizational models has emerged. There has been a shift toward fee-for-service structures and entrepreneurial approaches as well as greater involvement on the part of the local private sector and global corporations, as evidenced in the Millennium Development Goals (see Box 2). Without extensive private sector

involvement, a significant scale-up of telecenter deployment is unlikely.

Box 2: Millennium Development Goal #8

In cooperation with the private sector, make available the benefits of new technologies—especially information and communication technologies.

Finding the appropriate mix of contributions and roles for the private sector, public sector, civil society groups, and donors is critical (Chapter 4 addresses this issue in more depth). In this book we posit that the diversity and quality of services provided by telecenters are at the core of sustainability strategies—irrespective of the organizational model.

In addition to efforts toward sustainability,[7] there is increased interest in understanding the types of impact that telecenters are having as well as the process through which those impacts happen. The lack of rigorous evaluation of most pilot initiatives means that evidence of impact depends primarily on anecdotal accounts. That notwithstanding, a vast literature has emerged identifying some of the critical lessons about sustainability and impact.

As pilot initiatives have proliferated, so have calls for moving beyond the "forever pilot syndrome."[8] Some of the focus has been on identifying financing mechanisms for scaling up. We argue throughout this book that scaling up is more than simply replicating pilots and providing investment financing to support scale-up efforts. Going to scale with telecenters is more than simply multiplying investments by 10 or 100 times.[9] Indeed, moving from pilots to large-scale implementation will require significant adaptations to business models and operations to function effectively at scale and be cost effective.[10]

1.5. SCALING UP IS MULTIDIMENSIONAL

Within telecenter initiatives that focus on supporting socioeconomic development, *scaling up* seeks "to bring more quality benefits to more people over a wider geographical area more quickly, more equitably, and more lastingly."[11] In this document, we distinguish four types of scaling up: quantitative, functional, organizational, and political.[12]

Discussions about scaling up most often focus on moving away from a few experimental pilots and increasing the number of telecenters—**quantitative scale-up**. In such cases, scaling up can be expressed in terms of number of telecenters or number of people reached through telecenters. While this quantitative scale-up captures most of the attention in the current discussions, it is only one aspect of the emerging story of the telecenter movement.

Functional scaling up refers to organizations increasing their scope of activity. This type of scaling up may occur when local NGOs start establishing or using telecenters to support their work in health, agriculture, or education, for example. **Organizational scaling up** refers to an initiative to improve the effectiveness and efficiency of an organization's core activities. This may take place in the context of the emergence of a *national* telecenter ecosystem, whereby various stakeholders forge partnerships to build on their respective strengths and work together toward their common goals. It may happen on a smaller scale as two organizations join in implementing a specific initiative, as in a public-private partnership.

Finally, **political scaling up** refers to efforts to engage in the political process and build relations with government. A political scaling up may result in increased engagement of the government in a national telecenter network or in an improved policy and regulatory environment.

To scale up the impact of telecenters on development, all four dimensions of scaling up need to be addressed.

1.6. AN EMERGING TELECENTER ECOSYSTEM

Early pilot telecenter projects are now being replaced by telecenter ecosystems. A telecenter ecosystem consists of local telecenters, the networks that provide support to these local telecenters, the social enterprises that develop services, and the investors who fund the centers. An "organizational scale-up" is really a transformation of the broader environment within which individual telecenters operate.

Pilot telecenters of the late 1990s typically involved donors working with local institutions to address all of the telecenters' support needs, including start-up capital, training, defining the mix of services, and meeting electrical power and connectivity needs. We are now witnessing the emergence of more self-reliant networks of telecenters. These take the shape of formal and informal associations that enable individual operators to pool their expertise and resources, collaborate on training and procurement, and build partnerships to address common challenges. This evolution from single independent operators to associations and networks is essential for successfully scaling up telecenter initiatives. As the telecenter ecosystem evolves, so does our knowledge of what works and what doesn't. This telecenter ecosystem and its emerging body of knowledge are very dynamic.

Many of you are already engaged in shaping this future within your own countries. For the greatest possible effect, don't try to do this alone! Join a network or association if you haven't already; if one does not exist, work with your peers to establish one.

Table 1 illustrates the evolution of the telecenter movement and our "vision" of the telecenter ecosystem(s) in 2020. It presents the evolution of the telecenter movement as a global movement in aggregate; it is important to note that individual countries are at different stages in this evolutionary process.

Table 1: Evolution of the Telecenter Movement—Quantitative, Functional, Organizational, and Political Scaling Up

1990s	
	• Isolated pilots, primarily donor funded, often lacking long-term sustainability, each trying to deal with all aspects of telecenters on its own • Led by NGOs and development agencies • Limited services, content, and applications • Challenging policy and regulatory environment
2000–2010	
	• Emergence of networks and telecenter ecosystems • Larger-scale pilots in some countries—increased geographical reach • New connectivity and hardware technologies and new business and organizational models • Increased involvement of government, the academic community, and the private sector • Broader range of services and applications across sectors • Improved policy and regulatory environment (in many countries)
2010–2020	
	• Fully developed and dynamic telecenter ecosystem at national, regional, and international levels • Large-scale capacity building • Documented socioeconomic impacts (increased economic opportunities, access to health, education, government services, etc.) • Self-priming pump • Top-down delivery of connectivity and bottom-up approach to the supply and demand of relevant services • Extensive partnerships and the unbundling of services • An enabling policy and regulatory environment in all but a handful of countries

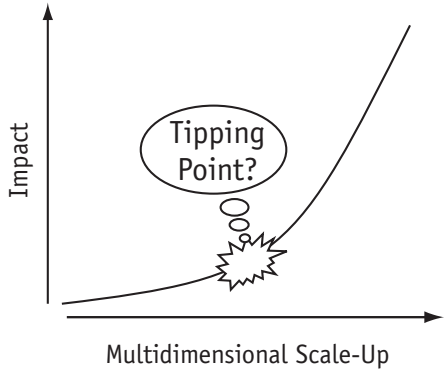
1.7. A VISION OF THE FUTURE—SCALING UP IMPACTS

This is an opportune time to focus on the future of telecenters with an emphasis on different models and increased scale to achieve our vision of increased impacts. We emphasize this point because we believe that the telecenter movement is very near a tipping point, a turning point in its evolution whereby increased scale dramatically increases socioeconomic impacts.

Pushing Toward the Tipping Point

This is the principle of "network externalities," which asserts that the more people who have access to information technologies and are connected to the network, the greater the network's value and effect. The more users and the more applications that are on the network, the more benefit each user will derive. The same principle is true for telecenters as well. The greater the number of individual telecenter members in a national network, the greater the value of the network to each individual telecenter. Figure 1 demonstrates the acceleration of benefits that can occur.

Figure 1: Network Effects and Tipping Points[13]



Given the nature of information technologies and *network effects*, a vision of nonlinear growth of impacts with increasing scale is possible and raises some interesting questions about where the *tipping point* might be.

Admittedly, this vision of network effects and tipping points applied to the telecenter movement dramatizes a process that is more ongoing than sudden. One has only to look back at the last decade to see that we are on a fast track up an exponential curve. What we see as a tipping point from the perspective of the present is that the growth curve is climbing even more steeply. The challenge for our professional community is to do whatever we can to ensure that the rapid growth and benefits reach all members of the society, rather than just the privileged few. For that, a vision of what is achievable in the short and medium term is a critical first step.

Comparing the late 1990s and today, another significant difference is the number of developing countries that have established a National ICT Policy or an equivalent e-Strategy. Many national ICT strategies and plans have specifically included telecenters as a means to achieve universal access

goals and other plan objectives. In some cases, civil society coalitions are actively pushing forward the telecenter agenda and trying to shape national policies—as in a political scaling up. In large countries such as India and Brazil, state governments also play a critical role.

Some National Examples

India has been a test bed for many telecenter initiatives. A sample of these initiatives, including n-Logue, Drishtee, Bhoomi, MS Swaminathan's Village Information Centers, TARAhaat, Akshaya, Gyandoot, and one of the most recent—the Nemmadi initiative in Karnataka—is discussed in various chapters of this book. Some states have also been proactive in implementing e-Government initiatives and in decentralizing government services through rural access points, telecenters, and kiosks.

In July 2004, Mission 2007 was launched as a nationwide initiative to facilitate setting up 600,000 knowledge centers (a type of telecenter) throughout India, one in each of India's 600,000 villages. Each of these centers would be a center for knowledge-based livelihoods and income-generation opportunities for poor women and men, farming communities, and all disadvantaged people.[14] Mission 2007 is now both a policy and advocacy group, hoping to propel the vision from a holistic and collaborative perspective and working with government to increase awareness about telecenters.

The vision of the Indian Government's National e-Governance Plan (NeGP) is to provide all government services in an integrated manner at the doorstep of the citizen, at an affordable cost. The NeGP envisions a three-pillar model for delivery of "web-enabled anytime, anywhere access" to information and services in rural India. The three pillars are:

- Connectivity: State Wide Area Network (SWANs)/National Informatics Center Network (NICNET)
- National Data Bank/State Data Centers (SDCs)
- Common Services Centers (CSCs)

The CSC scheme envisions CSCs as the front-end delivery points for integrated government private and social sector services to rural citizens of India. The goal is to establish 100,000 such centers, one for each cluster of six villages.[15]

At the opposite end of the spectrum in terms of country size, yet in the same region, is Sri Lanka. Sri Lanka's vision is captured in a simple slogan, *Smart People, Smart Island*. The e-Sri Lanka initiative seeks to use information and communication technologies (ICT) to develop the country's

economy, reduce poverty, and improve the quality of life of the people. Operationalizing this vision involves five core programs, including:

- building implementation capacity;
- building information infrastructure and an enabling environment;
- developing ICT human resources;
- modernizing government and delivering citizen services; and
- leveraging ICT for economic and social development through public-private partnerships.[16]

In other regions of the world, many governments have developed or are developing their visions of how ICT can contribute to social and economic development. Uganda's universal access policy (UAP) initially sought to provide basic access to communications (voice telephony and a postal outlet) within each subcounty across the country. Basic access to telephony was defined as consisting of at least one public access telephone per 2,500 people by 2006. The program also added a telecenter at the district level.[17] Throughout Africa, donor-funded telecenters remain the norm, but some governments are integrating telecenters as part of their national ICT strategies.

In many countries in Latin America, national governments have played a key role in the deployment of telecenters, often in conjunction with local governments and municipalities. Government programs to support telecenters in the region can be traced back to the late 1990s and Argentina's argentin@internet.todos program, which contemplated the creation of 1,350 telecenters in its first version in 1999. Similarly, the e-Mexico project announced plans in 2000 to open close to 2,500 telecenters in all municipalities of the country. In many cases, funding for these programs was provided through universal service funds set up as part of the deregulation of the telecommunication sector. This early wave of investments in the late 1990s led to some disappointments—primarily because investments lacked adequate attention to community ownership, capacity building, and maintenance and renewal of equipment.[18] Based on lessons from these early experiences, a second wave of investment is now taking place in Latin America.[19]

In Chile, three different public programs have been implemented in the past 10 years. Biblioredes, supported by the Bill and Melinda Gates Foundation, is perhaps the most successful of the three, having established more than 370 Internet access points in municipal libraries and having provided computer literacy training to more than 200,000 people. In addition, a network of 70–80 youth telecenters was established. Finally, Infocentros run by microentrepreneurs were established throughout the country. Those that are still running often belong to civil society networks such as the *Asociacíon de Telecentros Activos de Chile* (ATACH), demonstrating the importance of

networking among telecenter operators.[20] The latest government project, "200 Barrios," is also going to be implemented through ATACH.

Visions do not have to be developed by governments and handed down to stakeholders and implementing partners; they can and should be your individual visions as well. We expect the telecenter movement of 2020 to be an aggregation of carefully planned and coordinated initiatives, driven by government policies and multisectoral stakeholder engagement on the one hand, and the result of organic growth on the other.

If you are looking to find a scaling-up "how to" manual or a scale-up "recipe," you will not find it in this book. What you will find in this book, however, are essential ingredients and critical insights into the processes leading to a successful scale-up. It remains up to you to create your own recipe.

1.8. TAKE-AWAYS

From the early telecenters of Europe, Canada, and the United States of the 1980s, to the initial telecenter pilots of Africa, Latin America, and Asia, a movement has emerged. This book will inspire you to shape the future of the telecenter movement, whether in your community, in your country, or at the global level.

- Today's telecenters are being deployed in more auspicious circumstances than were the telecenters of the 1990s. The regulatory and policy environments, support systems, technologies, and human resources needed for successful telecenter operations have improved enormously.
- Connecting more people to the information society, especially the most impoverished, women, youth, and others who might otherwise be excluded, remains a challenge. Greater attention to the development of value-added services is vital. Increased investments are necessary to ensure that all communities have access to telecenters, and all citizens are able to take advantage of such services.
- Issues of sustainability are paramount. One of the critical factors for sustainability is achieving sufficient scale. Pilot telecenters may be excellent learning vehicles but they are seldom sustainable as isolated telecenters. They may increase their sustainability as members of a larger network, however.
- This is not a "how-to" book with step-by-step instructions. It is meant to help you extract important insights from these experiences around the world, and to provide some guidance to help you move forward so that you can shape the future of the telecenter movement.

1.9. MAKE IT YOUR OWN

Throughout this book, we encourage you to think through what is presented in light of your own experience and your individual country context. Given the global scope of this book, we are not attempting to provide a comprehensive review of any single country's experience with telecenters. The case studies present snapshots of experiences in specific countries related to a particular issue, rather than country overviews. It is up to you therefore to make the connections, find out more about the telecenter movement in your own country, and determine how what is presented in the pages of this book applies—or does not apply—to your own situation.

- Develop your own vision and read this book with the specific intent of extracting valuable insights that will help you take action.
- What are the elements of your vision? Is there a national vision already spelled out to which you can contribute? If you were to develop your own vision, what would it be? It could be a personal vision, an organizational vision, or a national vision.
- Whatever your country of interest, your vision should start with an understanding of where that country stands in terms of the evolution of the telecenter movement. Who has implemented pilot telecenter initiatives successfully? What is the scale of the initiatives currently being implemented?
- Are there any scale-up plans? To what extent are these scale-up plans multidimensional, encompassing not only quantitative scaling up, but also functional, organizational, and political scaling up? How can you contribute to your country's broader vision?
- How can you strengthen the existing networks you may be a part of, build new partnerships, and identify synergies?
- [*Add your own questions and reflections*]

1.10. SELECTED RESOURCES

Overview

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ENDNOTES

1 Development agencies that spearheaded the telecenter movement in developing countries included the International Telecommunications Union (ITU), UNESCO, International Development Research Center (IDRC), United Nations Development Program (UNDP), and United States Agency for International Development (USAID).

2 World Summit on the Information Society (WSIS), 2003.

3 WSIS, 2005.

4 telecentre.org, 2006a. This count does not include cybercafés, which are defined as privately owned, primarily urban establishments providing limited services, such as e-mailing and browsing.

5 Ibid.

6 Stoll, 2003.

7 Proenza, 2001.

8 Global Knowledge Partnership, 2003.

9 Kusakabe, 2003.

10 We must also recognize that not all countries are ready for scaling up and that some emphasis on achieving sustainability before scaling up may be advisable.

11 Uvin and Miller, 1996.

12 Hooper, Jafry, Marolla, and Phan, 2004.

13 Gladwell, 2002.

14 Mission 2007 web site: http://209.31.179.166/mission_secretariat

15 Government of India, Department of Information Technology, 2006.

16 Information and Communication Technology Agency of Sri Lanka, ICTA web site: http://www.icta.lk/insidepages/e-srilanka/e-srilanka.asp

17 Uganda Communications Commission, 2005.

18 Menou, Poepsel, and Stoll, 2004.

19 Phone conversation with Florencio Ceballos, IDRC, January 8, 2007.

20 ATACH (Chile)—Asociación Nacional de Telecentros Activos de Chile.

Start by doing some homework.
Look at what has worked and what has not worked,
study good practices in the area, and build on what you have learned.
—Bridges.org, 2005

CHAPTER 2:
Learning from Experience

2.1. QUERIES TO THE TELECENTER HELP DESK

We're developing a set of best practices tip sheets for the members of our national telecenter network. Is there a list of best practices or at least good practices that have been identified across countries? We're also trying to organize our best practices around themes for training purposes. What are the core themes within which we should identify best practices?

(National Telecenter Network coordinator, Country C)

We're a large NGO providing health, education, agriculture, and microfinance services to hundreds of small rural communities and the urban poor. I am part of a small group of younger staff members who are more tech savvy, and we are trying to convince our management to set up a small network of telecenters to support our work at the village level. We've established an internal working group to start a feasibility study. Where can we find information about telecenter best practices?

(Junior staff, local NGO, Country D)

Most of the literature on telecenters focuses on donor-funded initiatives. To what extent do the best practices emerging from donor-funded initiatives apply to private sector-led scale-ups?

(CEO, rural technology applications company, Country E)

2.2. BACKGROUND, PERSPECTIVE, AND GENERAL LESSONS

Objectives of This Chapter

The objectives of Chapter 2 are to:

- summarize the most widely accepted lessons of the experience of the professional community that has worked in developing telecenters—those lessons will be described here in general terms with an occasional example, but the much richer context of multiple examples and case studies will be reserved for the subsequent chapters where the specific topics are taken up;

- introduce a common framework for the readers to help them put the detailed discussion in the subsequent chapters into perspective;
- offer a "full disclosure" of the perspective we bring to the issues;
- provide the readers with a way of structuring their analysis and some tools that will be useful in collecting and considering data from their situations; and
- provide the readers with a base of information that will enable them to make their own analysis and decisions about their situation, so that they can build their plans on the foundation of the experience of the pioneers.

It is worth clarifying that there are a few things that Chapter 2 is specifically not trying to do. Chapter 2 is *not* attempting to present the evidence underlying the lessons described here; that is done in the later chapters. The book as a whole is *not* attempting to spell out a single pathway toward the goal of sustainable scaling up of telecenters. It is also *not* arguing that any particular model is preferable in all cases. In large part, a message of the book is that the best path to sustainability and social development is: to have a clear vision of the objectives and local needs of the community; to think systematically about the obstacles and opportunities that exist in the local situation; to design thoughtfully (hopefully with considerable attention to the lessons of others' experience that we present in this volume); and to pay careful attention to and be quickly responsive to the empirical indicators of success or lack of it as the local plan is implemented and evolves. We would be especially pleased if the readers came to think of themselves as members of this broader professional community that is concerned with shared access, and came to feel that they also should share their lessons and insights with their peers.

Continuous Learning

Our understanding of telecenters is evolving rapidly. There are important knowledge gaps that have yet to be filled, and what we can present as lessons learned today reflects our current understanding. We are fortunate that ours is a field in which the community shares its knowledge openly, for the improvement of all. The lessons we discuss in this book are not the final word; we will continue learning. Scaling up is a learning process. Given the pace of technology advances, it is crucial to keep an eye on the horizon for new tools that might help us scale up more quickly, more effectively, and more cheaply. Each new pilot and each scale-up effort will yield lessons that we will need to integrate into our planning and share with the wider community.

In Chapter 1, we pointed to the evolution of the telecenter movement. A first lesson that is clearly visible from experience is that the telecenter movement is dynamic, and learning about telecenters is a dynamic process

as well, as is shown in Table 2. As the telecenter movement evolves, so do our "knowledge needs." Small ICT initiatives are often designed as pilot projects with the specific intent to test a new approach or technology, or simply because the project's designers had access to only limited resources. Such small projects can act as a "proof of concept" that demonstrates a valuable lesson. Nevertheless, one of the first questions we must ask ourselves in these cases is how the approach might have to be adapted for use on a larger scale.

Table 2: No End to Learning

1990s Pilot Scale	2000–2010 Initial Scale-Ups	2010–2020 Toward Global Access
Our knowledge of what works and what doesn't is limited—this is a period of intensive experimentation	Increasing knowledge of how to make it sustainable, but knowledge of "how to scale" is still limited	Extensive knowledge of "how to scale" and a continuing need to learn and adapt to changing technologies and local conditions

Scaling up telecenter initiatives is likely to require significant investment. As with most investments, there are risks, and we need to make the most of the available information to reduce those risks. Before making a significant financial investment in scaling up a telecenter model, you will need to consider the viability of the business model, the range of products, the potential downside, and the competitive environment before committing the funds. You will want to have a good grasp of what has already been tried, what has been proven to work, and what has failed before charging forward. Fortunately, there are rich sources of experience to guide you.

The Importance of Thoughtful Evaluation

Monitoring progress and evaluating past performance of telecenters provides the data to guide program implementation and inform scaling-up plans. The same data gathering that assists you to understand how well your efforts are succeeding serves others as well when you share lessons from telecenter-related experience. The specific lessons may or may not be applicable across countries and regions, but the broader principles and lessons are likely to apply in the majority of circumstances.

Many lessons presented in this chapter and in similar documents on ICT for development are lessons that are not specific to the subfield of ICT for development (ICT4D), or even specific to "development" work. *Bridges.org* starts its list of "The 12 Habits of Highly Effective ICT-Enabled Development Initiatives" with a reminder to do your homework.[1] That is precisely what we

try to do in this chapter. Core lessons are presented briefly in this chapter, and each is addressed in more depth in subsequent chapters.

Lesson #1: Build from the Ground Up

Understanding the local ICT environment is the first step in planning and implementing successful telecenter initiatives. A thorough assessment of community needs—and wants—with regard to ICT services should be a first step in planning and designing scale-up initiatives. Many failures of ICT projects in rural and underserved urban areas can be traced directly to the project designers' and promoters' failure to understand the local socioeconomic and political environments. They then design projects based on misguided assumptions and face disappointment as a result.

Box 3: Where should the telecenter be located? Ask the community!

"It is clear that if the telecenter is away from the usual community meeting points, it might hinder participation. In South Africa, the telecenter in the township of Mamelodi, in Pretoria, was originally located in the local library. Shortly after, they decided to move to an independent location. Esme Modisane, the telecenter manager, explains the reason why: 'the library location was not appropriate because it appeared to the community as an official or government site. People were intimidated by the library and what it means; they think it is for "intellectual people." They do not feel it as *their own* community center if it is located within the library.' In Hungary, the very rural nature of the movement usually means that there are few locations in a community where a telecottage can be placed, so it's the community that decides where it should be placed, in fact, *participating* in an important decision related to the telecenter's operation." (Roman and Colle, 2002, p. 4)

The best way for designers of telecenter initiatives to be sure they are addressing the needs of the target communities is to engage the active participation of community members in articulating their information and communication needs. This principle is elaborated in Box 3. This process is complicated by the fact that many members of these communities have so little experience with the new technologies that they will have a hard time understanding the potential of ICT. There is often a role for an informed outsider to present a vision of needs that are yet unknown by local residents.

In many countries, there is a significant difference between the rural demand for basic phone services on the one hand, which tends to be high, and the rural demand for computer-based services on the other. Relatively low demand for computer-based services can be traced to a number of factors, including: lack of awareness and understanding of computer-based technologies; low levels of literacy and computer literacy skills; and lack of relevant applications and content that bring value to local communities. Even when all of these

factors are addressed, actual use may also depend on the affordability of computer-based services and approaches taken to create demand for these new services.

Lesson #2: People Are Key

Telecenter operators, local ICT champions, and infomediaries play key roles in facilitating access and effective use of telecenters. In many instances, the success or failure of a telecenter or kiosk is rooted in characteristics and skills of the manager or operator. The challenge is that only a small percentage of people in any given country are truly natural entrepreneurs with the drive and capacity to build businesses that will provide employment for others, and they won't necessarily be the ones with technical computing skills. Kirk Magleby suggests that *microfranchises* provide a solution to this challenge. A microfranchise is a small business that can be replicated easily by following proven mentoring, marketing, and operational concepts found in formal franchises.[2]

Box 4: The Role of Local Champions

"Working with a local champion can help make a project that originates from outside become more locally-driven. A local champion is someone who understands and embraces the objectives and sees the big picture, supports technology-based solutions, is trusted by the community served, and shares a vision for the future. By working with a local ICT champion who embraces the potential benefits of technology, the initiative can engage an ally to support and promote ICT use among local groups. The champion should play a key role in communication with the community, be an advisor to the initiative, and act as a catalyst to help the initiative introduce innovation." (Bridges.org)

Beyond the individuals managing the telecenter, a small group of "super users" within the community often also plays a key role in advocacy, peer learning, and creating vital demand for telecenter services. They can be encouraged to offer training and individual assistance to new users, either as paid trainers or by being compensated in "access time." Box 4 describes the role played by a special category of "champions."

A special kind of "super users," *infomediaries*, often prove invaluable in extending the reach of a telecenter or kiosk to those within the community who might not otherwise have accessed the services on their own. The role of *infomediaries* is discussed further in Chapter 3 in the context of a case study on D.Net in Bangladesh.

Lesson #3: Services Drive Sustainability

The provision of locally relevant services is the basis for sustainability. Based on an assessment of a community's needs, specific services,

content, business models, and applications should be developed. Much locally appropriate content exists in the files of the various government ministries, NGOs, and donor organizations; it is worth starting an initiative to encourage them to make it available, perhaps even by mentoring them through the process of establishing their own web sites and posting their information resources. In other cases it can be created—for example, teachers can share their best classroom exercises, or curriculum materials can be translated into minority languages by students at teacher colleges. A significant number of e-Government services can be delivered or facilitated through telecenters, such as obtaining forms or paying utility bills online. In many underserved communities, access to agricultural market and weather information is a very relevant and valued service. It can be provided efficiently and cost effectively by telecenters or kiosks, especially when they are part of a regional or national network. Access to health information and education services can also be facilitated by telecenters and kiosks.

Box 5: Training as a Key Service for Telecenters

Computer-assisted training (including computer literacy training) has been a significant source of revenues in many telecenter initiatives—thereby contributing to telecenter sustainability. A number of cases are discussed in more depth in this book, including 1) the Community Learning and Information Centers of Mali; 2) the kiosks of the Akshaya initiative in Kerala, India; and 3) the eCenters of Kyrgyzstan.

Of course, basic communication services such as phone and e-mail are also critical to an increasingly large number of people. In addition, computer skills have become essential for economic success, especially for youth. Telecenters are a good place for people to acquire these skills without having to spend the money to buy their own equipment and software. In turn, a computer-literate population ensures a market for computer-based services, and telecenters can foster high levels of computer literacy. Box 5 summarizes the important role of training. Once again the principle of network externalities is evident—more telecenters create more computer literacy and get more customers, who support more learning and applications and communication—in an endless virtuous circle.

Given the dynamic nature of telecenters, the range of services to be offered in the future is likely to increase, and those services most relevant in the early days of the telecenter movement—such as basic phone, Internet communication, and computer literacy—may not remain the most relevant. Close attention to matching demand for services and the services provided will remain the key to sustainability.

Lesson #4: The Model Must Follow the Purpose

Different models have different strengths and weaknesses. The complementarities of different models are as important as their individual strengths and weaknesses. No single model has emerged as *the* best model to be replicated, and there probably will never be such a model because of the diversity of local conditions under which telecenters can emerge and thrive.

Telecenters and information kiosks exist under a wide range of organizational models, ranging from 100 percent government-sponsored and -run, to 100 percent privately run and for-profit, or 100 percent supported by external funders and run by NGOs, with an infinite number of hybrid alternatives. Given this diversity, which organizational model is likely to be most effective in your context? The answer depends on the purpose to be achieved and the maturity of the market in any given location.

Donor-supported telecenters generally have lacked sustainability, and entrepreneur-led, private sector approaches are perceived as more likely to be sustainable. Yet a purely commercial approach may not accomplish the social objectives that motivated the interest in telecenters in the first place. A commercial entrepreneur won't invest in the social programs, although he or she will welcome people pursuing those objectives as a customer. The incentive structure behind commercial operations runs the risk of increasing inequities in underserved areas, by catering to the wealthier elites—setting up services where the market is most profitable and neglecting populations and services that offer less immediate potential for financial returns.

Many initiatives take a balanced approach, following a *social entrepreneurship* model, whereby the goal is to make a profit, or at least recover all costs and provide a surplus to grow and diversify services, while at the same time serving the needs of the local population.

Whatever the approach selected, realistic financial models and timelines are essential. In many initiatives, whether intended as for-profit or not-for-profit, there is no explicit financial or business model based on the goals of the initiative as well as on local market reality. Initial deployment tends to be costly, and in the early stages revenues collected through user fees often are not enough to cover costs. Organizations should have a plan for transitioning from donor funding, and both entrepreneur-led and NGO-led models need creative revenue and marketing plans. Individual entrepreneurs often lack the capacity to undertake reliable market research to determine the best location or the most appropriate mix of services, or even to manage the telecenter effectively as a viable business. Even under a franchise model, the usage assumptions for reaching a break-even point are often unrealistic and do not include strategies to create and grow demand for services.

Throughout the book, a wide range of models are presented, from the nonprofit Village Knowledge Centers established by the MS Swaminathan Foundation in India, to the entrepreneur-led Community Information Centers of Rwanda, the community-based micro-telcos of Peru, the nationwide network of nonprofit telecottages of Hungary, the public-private sector partnership model behind the Akshaya kiosk franchises, and India's private sector-led e-Choupal, among others.

Lesson #5: Appropriate Technologies Are More Easily "Appropriated"

A telecenter's technology package consists of four interlocking systems: 1) power supply system; 2) durable computing and other end-user devices; 3) software and applications; and 4) connectivity supply.

The three most common technical challenges facing telecenters are a lack of reliable electrical power, a lack of affordable and reliable connectivity, and difficulties associated with maintaining equipment in working order.

The technologies to be deployed through telecenters must be robust, affordable, and appropriate for the local context. The lack of a reliable power source often turns into lost opportunities for revenue for telecenters and a resulting loss of profitability. This issue is explored in depth later in the book by looking at the case of the Community Information Centers (CICs) of Rwanda. Reliability is a two-faceted issue: it includes the likelihood that the grid-supplied power will go off, and the quality (stability) of the current provided may not be adequate. Battery backup solutions and—when necessary—alternative energy sources can help remedy the situation, but they add costs and complexity. A combination of low-power-consumption equipment and a low-cost, low-maintenance power supply is often the best solution. Many centers find it advantageous to have battery banks charged from the electricity grid when the power is on; they can then continue to operate (and earn revenues) even when the grid goes off for short periods. The solution doesn't help if the grid stays off for a long time, but it does cover the most frequent short outages and avoids having customers give up and leave. The issue of reliable power is also critical to the long-term sustainability of physical infrastructure. Poor-quality power can often result in the early failure of computer equipment and a loss of connectivity.

Connectivity solutions must provide a balance of quality and speed of service with affordability. While the range of connectivity options for rural and underserved areas has increased over the years, the challenge remains to find cost-effective solutions that are appropriate for different geographies and socioeconomic environments and uses. Generally, dial-up services prove to be too slow for multicomputer telecenters—as demonstrated in the case of the Community Learning and Information Centers of Mali (read more in Chapter 6), and they are often quite expensive. The digital subscriber

line (DSL) service that is available in some countries is much faster, but is only available to customers within a few miles of the telephone company's switching centers. The most promising new technologies are such wireless broadband approaches as WiFi and WiMax, which offer high bandwidth and the potential for low prices.

Equipment will be subjected to harsh and challenging physical environments and individual telecenter use patterns. Nearly all computer technologies are designed by engineers and companies in developed countries for use in business environments by individual users, and the physical conditions in telecenters in rural and underserved communities are radically different from these first-world office environments. As a result, telecenter designers need to gather information from other users in their countries about the specific equipment they might want to purchase and factor in the trade-offs between longevity and cost in the local environment. Equipment that is particularly vulnerable to power surges is a typical example of the source of equipment problems; your colleagues in environments similar to yours are your best source of information on this issue. If the equipment often fails early on, repair costs are usually very high.

A carefully chosen mix of technologies and software is often the most appropriate option for addressing local needs. Software with user-friendly interfaces, local language versions, and wide distribution is often the easiest for users to master or find appropriate training and assistance when needed. Most technologies developed in industrialized countries are based on assumptions regarding the literacy levels and skills of end users and the availability of technical support and technicians to handle maintenance and repairs. These assumptions are often not valid in developing countries. This is not a new phenomenon; in fact, computers could be the new "rusted tractors" of the green revolution if we fail to apply some key lessons from the past.

This is not to say that new technologies are inappropriate for developing countries, and that rural areas should focus their attention on older and more widely available technologies, such as radio. Quite the contrary; many of the newest technologies are also the easiest to use. Some of the latest advances in wireless technologies offer exceptional opportunities for bringing connectivity and services, such as voice over Internet protocol (VoIP) to rural and underserved areas, and, more important, for doing so in a manner that makes the services affordable to local communities. When cell phones are the most appropriate technology, the supply of power may still need to be addressed. Often, a hybrid approach, mixing new and old technologies, has provided the most benefit to rural communities. The Community Multimedia Centers (CMCs) established with support from UNESCO, for example, continue to utilize a combination of radio and

Internet technologies to reach their target audiences. Podcasting may also bring new opportunities for mixing media, as in the case of the SIRU project in Peru (read more in Chapter 5).

Lesson #6: Networks, Associations. and Partnerships are Key to Capacity Building and Sustainability

Individual telecenter managers or kiosk operators face many common challenges, but they are often geographically dispersed and isolated from their peers. National networks or associations of telecenters provide an opportunity for these individuals to act as a peer support group and to gain access to support, expertise, and economies of scale. Networks can be primarily virtual, but some support can also be provided through regional or national telecenter support centers supporting a cluster of villages and their telecenters or kiosks. Networks such as the Community Technologies Centers' Network (CTCnet) in the United States, and the Hungarian Telecottage Association have paved the way for many more networks and associations of telecenters that have emerged on all continents. These networks have also found support in initiatives such as telecentre.org, acting as a network for networks.

Partnerships can bring complementarities and scale, but they must be put together and nurtured carefully. Partnerships need to be based on real complementarities and an honest assessment of the strengths and weaknesses of each of the partners. This also implies an understanding of each other's business. This is particularly true of public-private partnerships; many NGOs and governments enter into discussions with private sector firms and are disappointed to find that the private sector entity wants to be a real partner, not just a benefactor. In this context, real partnership means that there need to be positive outcomes for both sides. This has proven to be a difficult learning curve for the public sector, but the situation is improving as each side gains experience with the other, and both come to understand how they can benefit. Expectations need to be specified (in writing) to avoid misunderstandings, and ongoing communication is essential to build trust and address challenges as they emerge. Partnerships will only survive over time if the benefits of being partners exceed the costs of sustaining the partnership.

Networks also offer great opportunities for learning from one another and sharing experiences. Monitoring and evaluating ongoing initiatives with effective tools is the best approach to learn from mistakes and successes and to share experiences with others through telecenter networks. The networks, in turn, can help synthesize and document lessons across initiatives.

Lesson #7: The Broader Environment Matters

External factors and the macro environment affect telecenter initiatives in many ways. National government policies and regulations can have a

considerable limiting impact on telecenters, for example, through policies restricting the licensing of community radio broadcasting, regulations limiting the type of content that can be broadcast, spectrum allocation for connectivity solutions, and VoIP regulations. Government is in a position to help or hinder through policies or the lack of them. Telecommunications entities often set prices for connectivity that are vastly in excess of their costs and prohibitive for all but a small commercial elite. This operates to the detriment of the country by limiting national participation in the new information society and by further disadvantaging less fortunate citizens. One of the ways the broader environment can be improved most easily is for potential communications users to exert friendly but persistent pressure on the government to establish policies that support fairly priced connectivity.

Inconsistencies and unexpected changes in policies and regulations can also have a devastating effect on telecenters or projects that are already struggling to break even. In Burkina Faso, a key factor in the destabilization of the community multimedia center (CMC) established with support from UNESCO was the sudden and unexpected doubling of the telecommunications tariff by the national government.[3] The overall macroeconomic environment, economic disparities between urban and rural areas, and economic opportunities in rural areas, as well as the overall environment for private business, are likely to have a significant impact on the level of risk local entrepreneurs are willing to shoulder to start new ICT-related activities, the purchasing power of local residents for new services, and the community's need and demand for ICT-related services.

2.3. IMPLICATIONS OF LESSONS FOR SCALING UP

Planning Issues

Scaling up is qualitatively and quantitatively different from most of the experiences on which our lessons are based. Scaling up a telecenter initiative will involve more than applying lessons learned from ongoing, mostly small-scale initiatives. The first core lesson highlighted earlier is the need to base one's planning on the best available data. Ideally this will be from a thorough community-level needs assessment/market analysis, though the financial resources and technical skills to do this well may be hard to come by. It can be relatively easy on a small scale, but on a large scale, it is a complex and costly undertaking.

There may already be many relevant data available, especially if other rural development initiatives are being undertaken. Even if the only data available are anecdotal and fragmentary, they can offer a good basis for thinking systematically about the path to your objectives. In fact, sometimes the combination of informal inputs and existing data will provide

a reasonable picture of the environment for some major decisions, which can help sharpen the focus of whatever systematic research might be necessary.

When data need to be collected from many locations, cost-effective sampling methods need to be identified. In addition, local capacity to interpret the resulting information and devise a response based on the data collected may not always be available or sufficient. Techniques used in large-scale rural development initiatives may be useful here.

Technology Issues

Technology solutions that have been proven (at least from a technology perspective) on a small scale may not be cost effective or appropriate on a larger scale. In many countries, connectivity solutions will need to be based on extension of the Internet backbone to rural areas and an enabling policy and regulatory environment to ensure affordable connectivity at the national level. For example, isolated locations that are off the communications grid will often turn to satellite communication for connectivity, but the ongoing cost of satellite connections is often too high to justify on a larger scale; the aggregated demand would make it much more reasonable to install a more comprehensive network that had lower connectivity costs.

When it comes to electricity, technology solutions developed over the years to bring power to rural areas have proven to be very valuable in powering telecenter projects established off the grid and in areas where the grid does not provide a constant, reliable supply of electricity. In the context of scaling up, however, it may be appropriate to set minimum standards, such as the availability of a reliable power source as a prerequisite for deployment of public access facilities. In many off-grid areas, a combination of cost-effective alternative power solutions (solar, micro-hydro, wind, biofuel, etc.) and using energy-efficient equipment is a likely option, when combined with inexpensive power backup solutions.

The computing hardware platforms that are optimal for a given set of applications will be very situation-specific. We have already noted that less power consumption is better than more, but the local variability of sites will likely dictate what makes most sense in any particular location. To date, the largest power savings are achieved by moving to LCD displays from CRT monitors. There has been a great deal of interest in developing more power-efficient computers, and the current status is that laptops bring considerably higher efficiency but with the trade-offs that the initial cost is higher and the machines may be more vulnerable to theft. There is a continuing interest in productizing a "rural" machine that is both power-efficient and ruggedized for the environmental stresses, but this will probably not materialize until the demonstrated market is much larger. Interest continues in the possible value of moving to thin-client systems, which

can offer minor power savings but could potentially offer major capital cost savings and possibly operating cost and software licensing savings as well. Where it is appropriate to the objective of the centers, personal digital assistants (PDAs) and cellular phones can offer certain kinds of computing and connectivity services with lower capital and operating costs, but with commensurately more limited capability.

Training and Capacity-Building Issues

Scaling up capacity building brings with it a number of additional challenges and opportunities. Identifying a half-dozen appropriately qualified telecenter managers for a small project may be relatively easy, but identifying, training, and retaining 5,000 such managers may require a special training program and enlisting existing training institutions at the national level. A coordinated approach might be most appropriate, or at least sharing training materials across initiatives to avoid duplication of efforts and conserve scarce resources. On the other hand, deployment of telecenters, coupled with connectivity, may provide expanded opportunities for providing distance support and e-Learning for telecenter operators.

Of all the issues mentioned above, the most significant in terms of impact on the potential scale of the initiatives is the existence of an enabling policy and regulatory environment. While the presence of an enabling policy and regulatory environment in itself does not guarantee that scaling up will happen, it is a precondition for successful and affordable scaling up.

The success of a pilot initiative in a specific location does not in any way guarantee success by replication in other locations. Equally true—yet often neglected—is the fact that the failure of a project in a specific location does not necessarily mean that the model or approach was inherently faulty and should be rejected. The mechanisms behind each success or failure need to be identified and understood before decisions about replication and scaling up are made.

2.4. TAKE-AWAYS

This chapter provided a condensed overview of lessons based on the collective experience of the field. The lessons are not intended to be rules to follow, but to provide a common perspective for the subsequent chapters; if your circumstances call for something different, you will at least have had the opportunity to arrive at that conclusion with a good familiarity with the conclusions that others have reached concerning their circumstances. The guidance of this chapter can be summarized as:

- Understanding local ICT ecosystems is a critical first step in designing successful ICT initiatives in rural and underserved areas.

- A mix of services optimized for the local market and context are needed to provide value to different local stakeholders and sufficient revenues for the telecenter to be financially sustainable.
- No single organizational model can provide the ideal outcome for all circumstances. Different organizational models have different strengths and weaknesses. The challenge is to make them work together and ensure complementarities among them to maximize beneficial impacts for all.
- Robust and affordable technology solutions—encompassing power, hardware, software, and connectivity options—are essential to the success and sustainability of telecenter initiatives.
- Networks, associations, and partnerships play a key role in building capacity, sharing experiences and providing support to telecenter operators, developing robust and appropriate technology solutions, and developing locally relevant services and content.
- External factors, outside the direct area of influence of telecenter initiatives, can have a significant positive or negative impact on the success or failure of telecenter initiatives. These include, in particular, the policy and regulatory environment.

2.5. MAKE IT YOUR OWN

How do these lessons translate in your setting—your country, your community?

- What lessons have emerged from your own experience or that of your country?
- Where could you find the informal or anecdotal inputs in your context? What agencies or NGOs might already have relevant data? What potential private sector partners might be appropriate to contact?
- What do these lessons mean in practical terms for you? For example, how might you become involved in influencing telecommunications service availability and pricing in your country?
- What local experiences can your country build on in terms of information technology use in rural and underserved areas in general and in terms of shared public access facilities more specifically?
- Have you ever thought about attending a national-level telecenter stakeholder consultation to bring together the leaders of the telecenter movement to collect "lessons" specific to your country? If no such meeting or consultation has ever taken place in your country, would you be in a position to organize one?
- Do you see opportunities for collaborative action with others with similar interests to contract a local firm to conduct a national telecenter study or a needs assessment?

- What processes would you (or have you) put in place to capture lessons from ongoing telecenter activities? How would you share such lessons with others in the telecenter movement in your country and globally?
- [*Add your own questions and reflections*]

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ENDNOTES

1 bridges.org, 2005.

2 Magleby, 2005.

3 In Burkina Faso, a key factor in the destabilization of the community multimedia center (CMC) established with support from UNESCO was the sudden and unexpected doubling of the telecommunications tariff by the national government (Creech, 2006, p. 40).

PART II:

PLANNING FOR SUSTAINABILITY, IMPACT, AND SCALE

In Part I, we introduced the concept of the telecenter ecosystem. In Part II, we look at some of the critical elements of this ecosystem, how each element is connected to the others, and how the entire puzzle fits together. As the individual pieces of this puzzle take shape, the connections and the ways in which they might fit together also emerge.

The combination of community characteristics and the local ICT environment (Chapter 3) determine the mix of social and enterprise-driven models (Chapter 4) that may be most effective and sustainable and the types of services and content that will ensure development impacts (Chapter 5). Different types of services and content depend on the availability and cost effectiveness of a range of appropriate technologies (Chapter 6). For all of the pieces of the puzzle to work together at the level of individual telecenters and at the national level, building networks and capacity (Chapter 7) become essential.

CHAPTER 3:
Analyzing the Local ICT Environment in Rural and Underserved Areas

3.1. QUERIES TO THE TELECENTER HELP DESK

We've been going through a nationwide consultative process focusing on the national ICT strategy in the past couple of weeks. As part of this, yesterday I facilitated a small brainstorming session with colleagues representing a broad range of stakeholders in this process. Our goal was to articulate key questions to be addressed in the design stage. The next step is to start looking for answers to these questions. We hope you can give us some direction.

- *We know that the local context is important, but what is it exactly within the local context that we need to pay most attention to? What are the key elements of a community profile for a telecenter initiative?*
- *Should we be concerned about **how** the information is collected and analyzed? Is it as important as **what** is collected and analyzed? What are the most appropriate methods for engaging the community and collecting data at the community level?*
- *Local communities don't exist in a vacuum. What other information do we need to collect to understand the broader context within which telecenters operate? What macro-level factors influence local realities—in terms of both how they have shaped local realities and how they may constrain or enable future opportunities?*
- *How could we handle not just the analysis of one community, but the analysis of thousands of communities? How can we develop data collection/community engagement methodologies that are scalable?*

(Facilitator, national ICT strategy planning workshop)

3.2. TELECENTER ECOSYSTEMS AND LOCAL ICT ENVIRONMENTS

In Chapter 2, we pointed out that a key lesson of past projects has been the need to design initiatives based on a good understanding of the local realities and to engage the community in designing the initiative.

Development of a healthy telecenter ecosystem depends not only on designing initiatives that are grounded in local needs and resources, but

also on initiatives that reach beyond the local community to partner with outside organizations. Partners such as NGOs, agricultural extension service providers, corporations, and educational institutions need to be part of the broader telecenter ecosystem.

Telecenters serve as a connecting node, linking local communities with other communities and other organizations both within and outside the country. In the context of a scale-up, a comprehensive scan of the environment will require engaging with both local communities and national-level institutions that may become part of the telecenter ecosystem.

3.3. UNDERSTANDING LOCAL COMMUNITIES

Ideally, a pilot project would spend a significant amount of time and energy at the design stage to understand the community's needs. Surveys might be conducted to find out what was already available in terms of technology and infrastructure, how the community uses existing technologies, and what the community's needs and aspirations are in terms of information technology. Demonstrations, community consultations, and other awareness-raising activities might be organized, as much to stir interest as to learn about the community.

Scanning and mapping of individual communities has yielded useful methodologies that should now be adapted to the needs of telecenter scale-ups. A thorough analysis and mapping of the local ICT environment can be very labor intensive and time consuming, whereas scale-up initiatives will need to use cost-effective and quick methods without sacrificing community engagement.

Scaling up is not just a matter of replicating a pilot in thousands of different locations, but it also cannot design individual solutions for thousands of locations. A scan covering entire regions of a country or a whole country should not result in a collection of disconnected community maps and profiles but rather a national map highlighting regional characteristics, geographies, local economic realities, etc. It is about identifying community types and geographic zones that are similar enough to be accommodated with similar telecenter solutions. It is about developing a typology of zones that can serve as the basis for developing different telecenter models to be deployed throughout the country. It is about finding a cost-effective compromise between developing a tailor-made telecenter for each individual community and applying a one-size-fits-all model across the country.

3.4. METHODOLOGIES

A range of information-gathering methodologies can be used to collect data to understand the local ICT environment. The methodologies, extent of community participation, and range of data collected may vary according to the level of resources available and the magnitude of any commitment that would be based on the results of the data analysis. The level of sophistication of the data collection methods may also vary. A local entrepreneur is likely to have significant knowledge of the local business environment already. He or she may supplement that with a few conversations with potential clients to identify key services for which there seems to be a market. At the other end of the spectrum in terms of complexity, a company planning to deploy a large number of kiosks may develop a sophisticated methodology for identifying appropriate locations for its kiosks. The private entrepreneur can tailor his or her individual telecenter to the local community. The large company is looking for sites that will accommodate a model meant to fit communities that match specific characteristics. The two approaches are different, so they require different data collection approaches.

More generally, we can distinguish among three broad types of data collection methods: participatory rural appraisal (PRA), rapid rural appraisal (RRA), and market analysis, each of which is described briefly in Table 3.

Table 3: A Range of Methodologies for Data Collection

Participatory Rural Appraisal	Rapid Rural Appraisal	Market Analysis
A family of approaches, methods, and behaviors that enables people to express and analyze the realities of their lives and conditions, to plan by themselves what action to take, and to monitor and evaluate the results. PRA involves extensive community participation.	Systematic, semistructured activity led in the field by a multidisciplinary team to obtain new information and to formulate new hypotheses about rural life. RRA does not involve community participation.	Market analysis focuses on identifying the demand for specific products and services as well as customers' ability and willingness to pay for such products and services.

The selection of a methodology is important because it shapes the extent of participation and community ownership and leads to development of specific data collection tools that can be adapted to specific communities to replicate processes.

The manner in which information is collected, who owns the information, and who is able to use it are all important questions. As indicated by one of the core lessons spelled out in Chapter 2, local ownership is important

to long-term sustainability and is enhanced significantly by the use of participatory processes.

Within the methodologies described above, the following techniques can be used:

- Interview individuals, households, and key informants
- Household surveys
- Cross-checking information from different sources
- Sampling techniques
- Methods for obtaining qualitative data in a short time frame
- Group interview techniques, including focus group interviewing
- Direct observation at site level
- Use of secondary data sources
- Training and orientation sessions and demonstrations
- Facilitated community conferences

From a needs analysis perspective, social mobilization, using PRA methodologies, can be very useful. For a more market-oriented approach, the specific techniques used and key areas of concern may be different. More specific examples are highlighted below.

Participatory Approaches and Needs Assessments

A number of organizations involved that support community-based telecenters have developed participatory methodologies designed to ensure community participation in design and implementation. For example, UNESCO has articulated practical participatory methodologies based on its experience with community multimedia centers (CMCs).[1] Box 6 gives an example from the World Bank's experience.

Other useful participatory methodologies have been developed to facilitate technology appropriation by marginalized communities. One example is the *Reflect*[2] approach to adult learning and social change, under which groups of people meet regularly to discuss and analyze local issues and devise action plans using participatory techniques. *Reflect* projects are split into two phases: during the first year, participating groups analyze, discuss, and debate communications issues and come up with a plan; the plan is then implemented in the following two years.

Simple tools (resource sheets) were developed to operationalize the *Reflect* methodology. The resource sheets for the planning phase cover the following topics:[3]

- The value of information
- What makes information useful
- Documenting local knowledge
- Accessing information
- Identifying information gaps

Using these tools and working with communities using participatory techniques, teams in various countries were able to design communication systems that build on people's existing communication preferences, practices, and prejudices. In contexts where there is sufficient time and resources, these methods have been judged to be very helpful.

Box 6: Other Experiences with Scaling Up Rural Development Initiatives

Large-scale, community-driven development projects funded by the World Bank have also accumulated significant experience about scaling up community-driven processes and rural infrastructure deployment. The feasibility of adapting such methodologies to deploy rural ICT infrastructure should be explored. These projects have had to address trade-offs between scale and participatory processes

Drishtee's Market Segmentation Approach

Drishtee, an ICT enterprise based in India, has evolved an entrepreneurial network of ICT centers or kiosks that facilitate information and services related to education, health, employment, government services, insurance, e-Commerce, and other sectors in the rural areas. The 1,020-member network of Drishtee kiosks connects *panchayats* (local governments) to one another and to the service and information delivery channels developed through Drishtee.

Drishtee, working both through a for-profit organization and a foundation, has developed an innovative complex of services offered through a franchisee relationship. Their efforts have the explicit intent of fostering equity and accelerating growth in the communities where the rural kiosks are established, while keeping service provision on a firm commercial basis to ensure sustainability. A detailed description of the Drishtee model is presented in Chapter 4, where the Gyandoot rural kiosk initiative is discussed.

Drishtee has developed a sophisticated methodology for measuring the viability and profitability of potential rural sites, ranking them on a scale of 1 to 10, 10 being the most profitable. Three key components are used: rural

dynamics (worth 7 points on the scale), rural economics (worth 1.5 points), and rural infrastructure (worth 1.5 points). Additional details are provided in Table 4, below.[4]

Table 4: Drishtee's Rural Service Delivery Segmentation Methodology

Rural Dynamics	Population	5.0	7 points
	Literacy	0.8	
	Role of government	0.6	
	Response of entrepreneur	0.4	
	Role of NGO	0.2	
Rural Economics	Population above poverty line	1.5	1.5 points
Rural Infrastructure	Road link	0.4	1.5 points
	Distance from town	0.4	
	Electricity	0.3	
	Constraints (i.e., floods)	0.2	
	Telephone	0.2	
TOTAL			**10 POINTS**

3.5. CASE STUDY: MS SWAMINATHAN RESEARCH FOUNDATION (MSSRF) AND THE VILLAGE KNOWLEDGE CENTERS

MSSRF, a nonprofit organization based in Chennai, India, has close to 20 years of experience undertaking activities to support socially equitable and sustainable development. Throughout its activities, MSSRF has emphasized strong principles of participatory development. MSSRF started supporting village knowledge centers (VKCs) in Pondicherry in 1998.

Detailed surveys were conducted in the region to determine incidence of poverty, status of literacy and education, and the state of telecom infrastructure—its gaps and local availability of skills to bridge them. A separate survey was carried out to identify existing communication habits and channels of information flows. Overall, 13 villages were surveyed, involving 20,000 people representing 5,000 households.

The following community profile emerged: Most places had no reading rooms or library, and many had no post office. Some villages had telephones, but the public ones were often broken, and the private telephones were usually used only by the families that owned them. Approximately 20 percent of the rural families in the area are officially classified as living below the poverty line, and half the population has a total family income equivalent to less than US$25 per month. Before the project began, the villagers shared 12 public telephones and 27 private telephones—less than one phone per 500 people. The survey revealed that villagers requested information on

market prices, pesticides, buying and selling services, health, child care, and government schemes, including relevant forms.

Using PRA methodologies also helped in assessing the community's willingness to collaborate and cooperate in the venture. The access points set up in each village are owned and run by villagers for the benefit of the whole community, which agreed to provide volunteers from the village to run the center from nine to five, five days a week, and adhere to principles of open access to all who wish to use the village centers.

There is a strong focus on locally relevant content development, which has resulted in a strong sense of community ownership and ongoing use of the services. All information and communication is in Tamil, the local language and script.

The model adopted was a hub-and-spoke model with one village (Villianur) acting as the hub information center and all other knowledge centers connected to each other through this hub, thereby creating a local network. The hub is connected to the Internet, but the other centers are not.

Scaling Up and Remaining Issues for MSSRF

This experience has underlined the advantages of careful initial attention to local knowledge and participation issues. The knowledge base and community support were already in place when the opportunities to scale up emerged. Some remaining issues include:

- A participatory approach, community ownership, and locally relevant content have been the keys to the VKCs' approach. The success of the knowledge centers has resulted in the Government of Pondicherry replicating the project in all villages in the Union Territory.[5] In addition, MSSRF's own activities have expanded from the original 12 villages to a new emphasis on creating and disseminating content and services at the state level through the Jamsetji Tata National Virtual Academy for Rural Prosperity.[6]
- While communities have contributed a great deal in terms of space, volunteers, and other local resources, most of the services to date have been provided free of charge. As a result, the financial sustainability of the centers is in question, and various revenue-generating options are being considered.
- A more market-oriented approach would have required an additional set of questions about how much community members were currently spending or would be willing to spend for improved access or information services.

3.6. CASE STUDY: BASELINE MARKET ANALYSIS IN PERU

Understanding the market is an essential step in pricing, marketing, and long-term profitability and sustainability.

In the context of an impact assessment of a project funded by USAID, the Instituto de Estudios Peruanos and the Annenberg School of Communication conducted a baseline analysis for the Jauja province of Peru, where the project was expected to establish a *micro-telco*.

This baseline data collection is very similar to a market analysis. The data, collected from households, included information about the following variables.[7]

- Demographics (age, family situation, occupation, education, language)
- Household income
- Cell phone expenditure
- Public phone expenditure
- Internet use patterns
- Willingness to pay for fixed phone, Internet, computer/Internet classes

Because the planned project focused on providing improved access to telecommunications at the household level rather than shared/community access, the focus of questions about demand and affordability was based on household access. When community access is considered, the location of such public access points becomes very important.

This study[8] showed that many households were willing to almost double their current telephone spending. Responses from businesses and major education, health, government, and civil society institutions showed an even stronger interest in improved access to telecommunications, given their coordination needs. The analysis also showed that the demand was somewhat weakened by the availability of substitutes. Public phones were readily available in the area and widely used by all segments of the population. In addition, while only a minority of households owned a cell phone, use of the phones was shared extensively at the household level.

The study concluded that such availability of substitutes represented a challenge to the sustainability of the proposed micro-telco, and that pricing and marketing would need to be crafted carefully to attract subscribers to the new services. With regard to Internet access and related services, the demand for household-based services was significantly lower, as a result of low computer literacy, which suggested that public shared-access facilities seemed better poised to attract significant use than was residential access. Finally, the study also revealed that the majority of the population relies heavily on existing media to obtain high-value information, so collaborating

with local radio and newspapers could be a promising strategy. All of this information is valuable for a micro-telco or telecenter business planning.

3.7. TAKE-AWAYS

As the two case studies above illustrate, collecting data regarding a community's needs and readiness for a telecenter can also help shape decisions regarding the types of services to be provided and a possible pricing structure for services. It is not always easy, however, to estimate the demand for services when the local population is relatively unaware of their utility.

- *What information is needed to design telecenters based on local community realities?*

  The same questions are relevant whether a single community is being considered as a potential site for a new telecenter or an entire region is being targeted for the deployment of a network of telecenters: What is the reality of local ICT environments? What are the key elements of a community profile?

- *How do we go from individual community scans to a national mapping exercise?*

  In the context of a scale-up, what is needed is a typology of zones for which different telecenter models can be designed. A scale-up needs to look at relevant clusters of communities. For example, geographically central or larger communities can serve as hubs for the rest of their clusters, hosting a larger telecenter with support services for small telecenters in other communities within the cluster. These connections beyond individual communities cannot happen unless the mapping exercise goes beyond scanning individual communities and looks at broader geographic units for potential synergies.

- *Beyond local community realities, what is the status or level of maturity of the telecenter ecosystem?*

  Pilot initiatives often fail to connect with other local and national-level institutions, but a successful scale-up is likely to require the involvement of multiple institutions. In the planning phase of a scale-up, it is critical to identify the key public and private sector institutions that may become partners, as clients, service providers, or support agencies. This scan for potential partners and initial partnership-building activities is essential to a healthy telecenter ecosystem.

- *How do the approaches and methodologies discussed in this chapter scale? Can they be replicated?*

  The *Reflect* ICT project has developed user-friendly sheets that can be adapted to specific contexts, translated, and used to replicate the process in rural communities around the world. Market analysis and large-scale surveys can be conducted using sophisticated sampling techniques as a cost-effective way of gathering data from a limited number of individuals and communities without sacrificing the generalizability of the findings.

Designing initiatives grounded in local realities is a necessity, whether designing for a single telecenter or a network of 5,000 telecenters. The challenge of a 5,000-telecenter network covering a large geographic area is that the local realities are likely to be quite varied. A single model will not be able to respond equally well to all of these local variations. That is where local entrepreneurship and community ownership can become important in tailoring telecenters to the local realities.

3.8. MAKE IT YOUR OWN

Assessing the local circumstances in order to generate a well-targeted plan delivers value regardless of what approach or model is ultimately chosen. The specific data chosen to support the decision-making, and the methodologies chosen to collect them, will be influenced by the objectives in a given case:

- What do you need to know about local realities and the broader national environment to plan a telecenter scale-up? What would you need to know if you were planning a single telecenter versus 1,000 telecenters?
- How does the planning and design phase relate to community ownership in your context? To what extent is community ownership an important goal for you? How is it related to your vision? How can you ensure community ownership?
- What methodologies would be most appropriate for your purposes? If you were to scale up an ongoing initiative from three rural communities to 30 such communities in different regions of the countries, what cost-effective methodology would you use to collect local data and identify local needs and market demand? What different methodologies would you use if you were dealing with a single site?
- Do you know of organizations within your country that specialize in either socioeconomic or market surveys? What community-level data relevant to a telecenter initiative may already exist?

- In the context of a scale-up, how would you go about developing a typology of zones for the deployment of different telecenter models? (Section 9.2, in Chapter 9, provides additional guidance.)
- [*Add your own questions and reflections.*]

3.9. ANALYZING YOUR SITUATION

In chapters 3 through 6, we will include a section to help the readers bring the content of the chapter to bear on their own situations. These steps are given in summary at the end of each chapter to give an example of a typical action that the planner of a telecenter project might undertake. They are NOT a workbook for you to complete, or a full planning exercise—they are only single examples of a planning tool. One of the main messages of this book is that the planning exercise is very situation-specific, and the goals and local conditions must guide all the decisions. Our objective here is to identify the concepts that must be considered, to share lessons that have been learned from the experience of others, and to suggest some useful tools and resources for you to use in your own exercise. Each of these example actions is found in more detail in Chapter 9, where the overall activity of planning is considered in integrated form.

The focus of this chapter is to form an understanding of the ecosystem within which the centers you are planning will exist. Part of that consists of understanding the characteristics of the locations and communities that will be served, in particular in regards to how ready they are to adopt and integrate ICT use into their lives. Not all communities will have the same level of e-Readiness, so it may be useful to identify the parameters along which they differ, and use that information to categorize communities. Separate strategies can than be worked out for dealing with the different levels of e-Readiness.

The main idea is to assist in identifying potential sites for telecenters under different organizational models. Richard Heeks[9] suggests that a simple schematic identifies three different categories of locations: high, medium, and low telecenter readiness:

- **High telecenter e-Readiness locations:** The private sector will cater to this market, largely unaided.
- **Medium telecenter e-Readiness locations:** These are locations where the market does not yet deliver services, yet there are potentially sustainable development benefits from investment in telecenters.
- **Low telecenter e-Readiness locations:** Locations that simply cannot sustain a telecenter because of impossible economics (lack of a viable market) or low volume of demand.

A way of identifying communities that might fall into these categories can be built around the characteristics of the community, such as population demographics, institutional maturity, and infrastructure and economic situation. Thus, one might gather available data on communities, organize it into a table like the following one (see Table 5), and use this categorization, or "typology," to organize the selection of sites and plan the types of services that would be appropriate.

The characteristics of a community in each category will be different in every country. The factors of infrastructure availability must be weighed against size, and against the education level of the population, etc. The important point is for you to develop a categorization scheme that is useful for your purposes. A more detailed example is presented in Chapter 9.

Table 5: Example of Analysis of Typology of ICT Ecosystem

	Telecenter e-Readiness		
Community ICT Ecosystem	**Low**	**Medium**	**High**
Population Demographics			
a. Size of communities			
b. Literacy rate/languages			
c. Income levels			
d. Occupations			
e. Age distribution			
f. *[Add your own]*			
Institutional Readiness			
a. Government institutions			
b. Businesses, SMEs			
c. Health posts and hospitals			
d. *[Add your own]*			
Infrastructure			
a. Roads			
b. Electricity			
c. Basic telephony			
d. Connectivity			
e. *[Add your own]*			

3.10. SELECTED RESOURCES

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ENDNOTES

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3 *Reflect* ICT resources page: http://www.reflect-action.org/Initiatives/ict/resources/pages/intro.htm

4 For additional information, see Drishtee, 2006.

5 MSSRF has developed a *Toolkit for Setting Up Rural Knowledge Centres* to help other communities and organizations replicate the model" (MS Swaminathan Research Foundation [MSSRF], 2005).

6 See more details on the web site, http://www.mssrf.org/iec/601/index.htm

7 Instituto de Estudios Peruanos and Annenberg School of Communications, 2006.

8 Ibid.

9 Heeks, 2005.

Opportunities for financial viability and sustainability of village computing initiatives are highly context-specific. Although some village computing initiatives are identified as "models," there is not yet a clear set of business models nor a clear understanding of the conditions under which these models are feasible and adequate.
—Bell, 2006, p. 13

CHAPTER 4: Identifying Appropriate Organizational Models

4.1. QUERIES TO THE TELECENTER HELP DESK

I am a policy advisor on ICT for development, helping to shape my country's path toward universal access. It seems that in my country, the early wave of telecenters was funded by donors and implemented by a local NGO. These telecenters had a strong social orientation, differentiating themselves clearly from purely profit-making enterprises such as cybercafés, and most of them were operating in more rural and disadvantaged areas. Most of these telecenters are now expected to be (or to become) financially sustainable and to operate more as private enterprises. I have seen that in other countries the private sector is becoming much more involved, with plans for large-scale deployments through a for-profit franchise model. Is it possible to speculate about which model or hybrid approach has the greater potential to help us achieve global access?

(ICT for development policy advisor, Country F)

We are a small nonprofit organization working in health, agriculture, and literacy. We're not ICT experts, but we do know that our efforts would benefit from information technology. Also, we're a small player, and while we have plans for scaling up our activities, at this time we work in only 10 districts. We were planning on establishing three small telecenters to support our work. The plan was to work with the communities to identify the types of services and information they need, identify local champions and volunteers, and bring in equipment that we've collected through corporate donations. We consulted with a rural connectivity expert who told us that the state is going to be working with the private sector to deploy kiosks in all districts, and that these kiosks will provide all kinds of ICT services to the population. Are we going to be competing with these private sector kiosks in the communities where we were planning our telecenters?

(Managing director, community-based organization, Country G)

What is the sustainability record of telecenters funded through universal access funds? Overall, do private sector-operated telecenters function better than those operated by the public sector or nonprofit organizations? Where have donor agencies been able to make a difference in supporting specific telecenter models? If private sector models work best, should donors support such models, or should they stay out of the way and support civil society efforts to ensure equity in access?

(Donor agency staff)

4.2. KEY CHARACTERISTICS OF ORGANIZATIONAL MODELS

Our discussion of organizational models is premised on the assumption that there is value in all of the approaches, and that the key factor for success is to understand your context and objectives well enough to pick an approach that is a good match for your situation. Our purpose here is to provide a detailed discussion of the strengths and weaknesses of different approaches to help you think through the trade-offs for your own situation.

Organizational models can be divided into broad categories based on who initiated them and their goal orientation. There are government-, private sector-, and civil society-led telecenter models. In practice, many projects use mixed models that transcend boundaries among the public sector, private sector, and civil society. A *social entrepreneurship* perspective combines social objectives with a market or business approach. The general categorization is described in the accompanying table (Table 6).[1]

Most initiatives discussed in this book fall somewhere along this continuum, with MS Swaminathan Research Foundation's (MSSRF) VKCs (discussed in the previous chapter) on the social end of the continuum, and large franchises such as Drishtee, on the enterprise end of the continuum. Despite this, MSSRF is concerned with financial sustainability, and Drishtee has a social purpose.

It is important to recognize that this classification is in fact a *continuum*, not a categorization. Activities that have any social component to their goals fall somewhere along the span of the continuum, not into two or three distinct types. The point of the continuum is to identify a dimension along which meaningful difference exists. As the technology and connectivity become more and more pervasive, the provision of social services through ICT will eventually become a given, because the cost efficiency and reach is vastly higher than nonmediated service delivery. Whenever the infrastructure is available, the long term tendency will be that providers of social service will tend to adopt it. A logical analysis of the secular trend is that in most parts of the world, the natural forces of demand-driven growth will produce an expansion of the supply of access, and the social service groups will use that as a tool in support of their traditional objectives. In some geographic

areas, and among some economic levels, the secular trend will be delayed or halted; it is in these areas or subgroups that the need and challenge of shared access will persist, and will need to be met by a combination of government and NGO action.

Table 6: The Social-Enterprise Continuum

Social ⟷ Enterprise		
Universal Access/ Public Service	**Social Enterprise**	**Business Case/ Economic Demand**
Social objectives achieved through public sector investments and donor funding	Social objectives achieved through business approaches	Private sector investments responding to market demand
"Needs analysis" Gap between reality and desired state Public good approach to ICT access	A social enterprise is a business with primarily social objectives whose surpluses are reinvested for that purpose in the business or in the community, rather than being driven by the need to maximize profit for share holders	"Demand analysis" Ability and willingness to pay Profit maximization motivation

At present, groups with social development agendas find that, for lack of any other way to access computers and the Internet, they often must become the provider of shared access (by establishing and managing a telecenter) in order to deliver social benefits through ICT. Over the next few decades, the subset of geographic areas or populations that cannot get access to connected computers will shrink, but it will never disappear. The challenge for the shared-access community is to ameliorate the "digital divide" effects of the current imbalance, and make sure that the needs of the subgroups that will never be served by routine availability are accommodated. That entails aggressive action now to redress the immediate imbalance, and careful planning for public policy and social development to ensure that the most disadvantaged are included now and in the future.

What is unique about the current moment in time is that the groups with social and economic development agendas are finding it necessary to provide the initial opportunities for shared access, as well as do their development work. In doing so, they face a certain implicit competition between their development goals and their need to create and manage an infrastructure of access points and connectivity. In a testament to the commitment and cleverness of these groups, the competition between these two objectives has led to some very creative combinations of institutional development with social benefits as an outcome, thus turning the implicit competition

for energy and resources into a "win-win" situation. We cite many such cases in our examples in this book. In the long run, however, in most contexts development agencies will be users of public ICT infrastructure to accomplish their access goals, rather than providers of ICT infrastructure to enable access to development activities.

This evolution will play out at different rates in different contexts, and there will always be a need for development organizations to take action to ensure that shared access is available to the most marginalized areas and groups. Ultimately, and in lots of places it will be a very long time, the main focus of the shared-access community will shift from being *providers* of the access so their beneficiary groups can be served, to *users* of ICT resources in order to serve their beneficiaries. The sustainability focus needs to remain, so that in those cases where national solutions never emerge, the social goals can continue to be met.

This book is focused on the middle ground, where development-oriented groups in both the public and private sectors are still finding it necessary to make access available. Sustainable models need to be created that will permit the development agency-initiated efforts to stay alive until the evolution of the national solutions for access and connectivity arrive (perhaps as outgrowths of the social organizations' efforts). Sustainable solutions must be created for those contexts where the market-driven evolution of supply will never serve the neediest.

In relation to the "Social ↔ Enterprise" continuum, many of the projects are currently in the middle ground of "Social Enterprise" models, where they are using business models to achieve sustainability of shared access while they deliver their development services. Over the next several decades, the social enterprise model will evolve; they will still need to be concerned for the sustainability of their service delivery, but they will not necessarily need to function as providers of access to accomplish that. Thus, there may be a paradoxical growth of "Public Service" models to assure service to those groups that will never be reached by commercially provided access, and a reversion to relying on publicly available infrastructure for the cases where that is reasonable. For the purposes of this book, we will not pay much attention to the "pure" cases of commercial provision of access. In the near term, they generally have only an incidental impact on shared access in rural areas, because they are currently focused on the higher margin markets in urban areas. In the very long run, many of the social development agencies will use them as important tools to achieve their objectives; access to computing and connectivity will then have become a simple

utility for most of the population. However, in the near term for most people, and in the very long run for the most disadvantaged, the issues we are discussing in this book will be very salient.

As an aid to the reader, the projects described in various places in this book have been categorized in a general way in Table 7, below and are detailed further elsewhere in this book. The table is not meant as a comprehensive list of models, and few of the projects represent a "pure type"; most projects are hybrids along some parameter. The table simply lists the models, gives a very basic description, and indicates where in the book you can find the discussion.

In Chapter 3, we mentioned the VKCs in India, which initially offered free services and operated on a nonprofit basis and are now seeking a way to become financially sustainable. Does this mean that a purely for-profit model is the only way to ensure financial sustainability? Entrepreneurs are not immune to failure; they often misjudge their market, overestimate demand, or provide the wrong set of services, with disappointing results for their enterprise. Initial challenges faced by both for-profit and not-for-profit initiatives can lead to useful lessons learned, greater attention to market potential, and, eventually, greater success.

Analysis of the rural environment and the macro environment during the planning research phase would have helped to determine any potential constraints on the deployment of various organizational models. The suitability of different models depends heavily on the financial viability of each model in different rural ecosystems.

Within the context of a social enterprise model, it is possible to think about the types of services that can be provided on a for-profit basis versus those that require public investment of some kind, and to ask that question based on the specifics of the rural ecosystem. In any given rural environment, what does the market say? What services can be provided on a for-profit basis? What services are needed but cannot be provided on a for-profit basis? Can economic models help us understand the broader context of rural ICT markets?

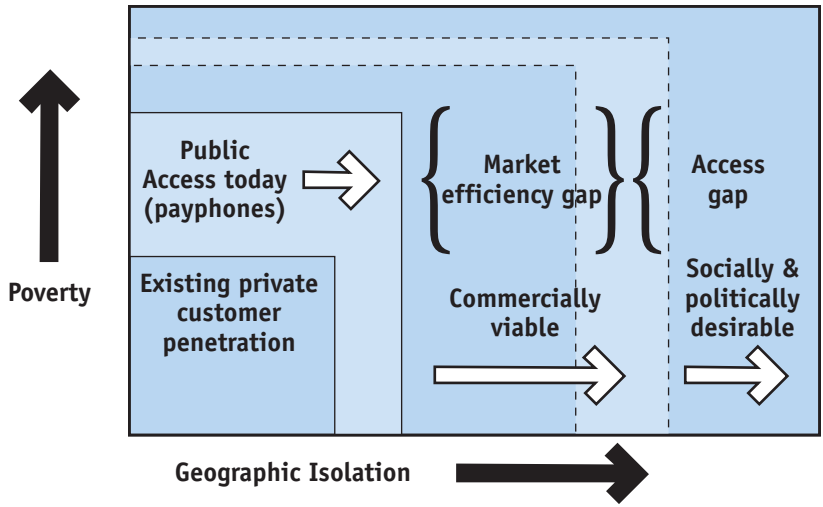
Table 7: Examples of Organizational Models and Key Characteristics

Name/Country	Position along the Continuum	Key Characteristics
MSSRF's Village Knowledge Ctrs., India (Ch. 3)	Not-for-profit/CSO	• Community-driven • Emphasis on locally relevant information • Sustainability challenge
CDI, Brazil (Ch. 4)	Not-for-profit/NGO	• Ability to combine revenue-generation strategies • Replicable methodology • Strong training focus
IT clubs, Egypt (Ch. 4)	Government-initiated	• Emphasis on poor communities • Managed by local institutions
Micro-telcos, Peru (Ch. 4)	Community-based enterprise	• Community-driven
Gyandoot Project, India (Ch. 4)	Government-led	• Focus on government services (land records, grievances, welfare benefits) • Individual kiosks run by entrepreneurs
CICs, Rwanda (Ch. 6)	Individual private entrepreneurs	• Launched with donor funding through competitive tender process • Individual characteristics of private entrepreneur/manager are key[34]
CMCs, UNESCO (Ch. 2)	Not-for-profit, managed by local institutions	• Community-driven • Sustainability challenge • Radio focus
Telecottages of Hungary (Ch. 7)	Not-for-profit	• Community-driven • Scalable, emphasis on capacity building
Chiraag Kiosks, India (Ch. 5 and Ch. 6)	Private sector product support to kiosk operators	• n-Logue's provision of products and linkages to enhance survival of kiosks • Private sector development and marketing of technology (corDECT) that is appropriate for rural areas
Akshaya, India (Ch. 5)	Public-private partnership/franchise	• Social entrepreneurship • Subsidized e-Literacy component
e-Choupal, India (Ch. 4)	Private sector	• Agricultural market information • Supply Chain Efficiencies
e-Sri Lanka (Ch. 8)	Government-led, multiple institutional models	• Multipronged strategy • Nationwide effort
D.Net, Bangladesh (Ch. 5)	Not-for-profit	• Extensive use of intermediaries
Nemmadi Initiative (Ch. 5)	Public-private partnership	• BOT model, extensive array of G2C and B2C services • Parties include the state of Karnataka, India, and three private companies—Comat, 3i Infotech, and n-Logue

4.3. THE TWO-GAP "ECONOMIC" MODEL

Rural telecommunication economists look at the urban-rural access divide in developing countries as a series of gaps. More specifically, the literature refers to a two-gap model, as illustrated in Figure 2.

Figure 2: Two-Gap Model



Source: Uganda Communications Commission, 2005.[2]

These two gaps are the *market efficiency gap* and the *access gap*. The *market efficiency gap* is the difference between what markets actually achieve under existing conditions and what they can achieve if market barriers are removed. Establishing an enabling policy and regulatory environment (including effective competition, private sector provision of services, and market-oriented policies and regulations that create a level playing field, particularly for new entrants) is the best way to close this *market efficiency gap*.

The *access gap* refers to people and places that remain beyond the limits of the market due to inadequate income levels or skewed income distribution. Public investment is likely to be required to close the access gap and make it possible for rural operators to become active in these areas.[3]

What the two-gap model suggests is that there are areas, characterized by a combination of poverty and geographic isolation, that will require government and/or donor intervention to ensure provision of telecommunication services—until the market evolves. In areas where the private sector can provide services, the government should ensure that the policy and regulatory environment encourages rather than inhibits private sector investments. The government might also want to use policy tools to assure that some equity goals are met within the context of

commercial viability. In many cases, as was mentioned before, we are using telecommunications both as a tool, and as a case in point for the way that capacity development requirements can be met in ways that support the development objectives at the same time. The provision of connectivity can be simultaneously a driver for development, a source of employment, and a catalyst for community development.

Less extreme instances of poverty or isolation would seem to provide a niche for social entrepreneurs to operate, extending the limits of the market and reaching out to populations that otherwise would not be served easily under a pure market-driven model. *Social franchising* would seem to be a good fit in these areas. Figure 3 summarizes the relationship between the different market situations and the kinds of organizational models that make a good match.

It is important to note that with markets for information and telecommunication services evolving rapidly, the elements of this analysis will change as well. Identifying specific geographic areas or target populations for which some form of assistance is required (the access gap) will be a dynamic process in which the boundaries are likely to change over time. The solutions and organizational models applied to different zones and populations will also need to change over time.

Figure 3: Markets and Organizational Models (Simplified)

Established Market	**➔**	**Cybercafés**
Emerging Market	**➔**	**Social Enterprises**
Latent Market	**➔**	**Social Telecenters**

4.4. A MODIFIED TWO-GAP MODEL—ADDING A SERVICE DIMENSION

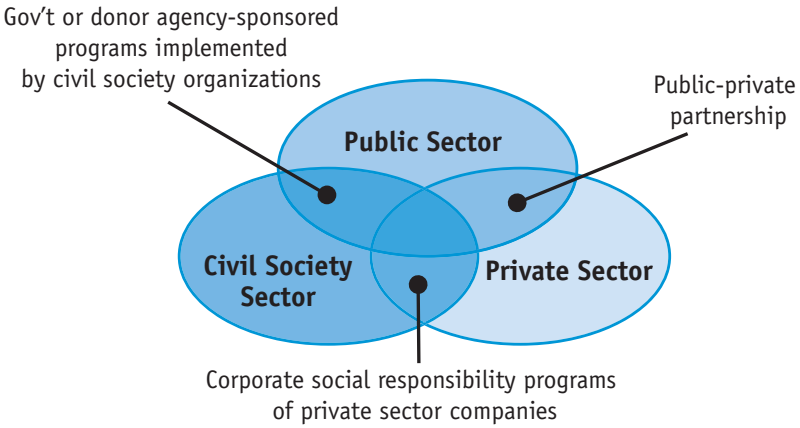
A key challenge of the two-gap model presented above is that it presents the rural ICT market as if it were a single market instead of multiple markets for different services. The situation, and the appropriate response, will be different for different services, or even within classes of service for a specific product. It is important to differentiate among basic service, such as telephone; services that may be provided on a for-profit basis even in some of the most remote and poor areas; and more advanced, PC-based services, which may be successful on a for-profit basis only in a more limited number of areas.

In short, the two-gap model is two-dimensional. A third dimension—a "service" dimension—needs to be added. Al Hammond and John Paul of the World Resource Institute (WRI) describe a model for rural connectivity that makes the most of new technologies to establish local wireless

Internet networks (via WiFi) linking voice-only telephones rather than computers.[4] The model leverages currently existing local demand for voice services and voice-based applications, with an infrastructure investment that can be ready for computer-based networks when the market matures. Different levels of service can gradually evolve along with the resources and sophistication of the market. Internet connectivity is only one type of service or economic activity that can be utilized in this way to leverage the meeting of a local need into a force for social development. For example, community development work around the organization of a local crafts marketing effort, or the use of agricultural cooperatives to encourage positive collaboration among locals, or the meeting of demand for telephone services are all examples of the synergy among objectives of creating community, expanding employment, and developing human capacity.

New wireless technologies offer the potential for developing new organizational models. For example, a telecenter may offer VoIP services from its central location. However, it can also become a micro-telco and implement a local WiFi network to reach out and provide voice services to individual community members, local institutions, and businesses in their homes and offices. This can provide a steady source of revenue while the demand for computer-based/pure data services increases.[5] New wireless technologies offer the potential to transform rural ICT landscapes by allowing the infrastructure to be "built from the bottom-up by a variety of local actors, from municipalities to user cooperatives."[6]

Figure 4: Mapping the Organizational Models—Hybrids and Partnerships Emerge at Different Points Along the Continuum



4.5. SNAPSHOTS OF CASE STUDIES

The case studies presented in this chapter illustrate a range of organizational models. Figure 4 gives a graphical representation of the "conceptual space" created by the combination of the dimensions of the "Social ↔ Enterprise" continuum with the general types of participating organizations. The real-life cases are located somewhere in the overlap between the types of organizations that are involved and the kinds of objectives that those organizations seek to fulfill. The cases themselves do not represent "pure" types; they have multiple features, some of which conflict with the others. For example, a public-private sector partnership can reflect, in different parts of the organizations' collaboration, elements of social responsibility, of profit seeking in nontraditional markets, and of government-paid service delivery. Such a project would not appear as a single point in the conceptual map of Figure 4, but as an amorphous blot, with tentacles that reach out in different directions. The concepts are useful for describing a particular intersection, but not necessarily for locating a complex, real-world activity.

Rather than comparing the models and attempting to identify the most successful approach, we present them as alternative, complementary models that have evolved in response to different local and national realities. Our intent is to provide a broad base of real models from different circumstances, so that you have access to the rich experience of this professional community in designing a local implementation. The examples in this chapter have been chosen to represent different organizational models in action.

The typical NGO or community-sponsored organization (CSO)-led telecenter has been established with either donor funding or a funding from a universal access program. One of its main challenges is the eventual need to secure financial sustainability for its services. In the case of the Committee for the Democratization of Information (CDI) in Brazil, sustainability has been achieved through extensive international and national fund raising. Other case studies presented in this chapter include the IT clubs of Egypt, which are government-initiated and -sponsored by various external donors as well. The Chancay-Huaral project in Peru provides an example of a community-based model, and Gyandoot, in India, illustrates a government-led, multilayered model involving local governments and local entrepreneurs.

4.6. CASE STUDY: COMMITTEE FOR DEMOCRATIZATION OF INFORMATION TECHNOLOGY, BRAZIL[7]—A SOCIAL FRANCHISE APPROACH FOR URBAN AREAS

The Comitê para Democratização da Informática (Committee for Democratization of Information Technology, or CDI) is a nongovernmental, nonprofit organization that has pioneered bringing information technology to underprivileged groups in Brazil. Through its Information Technology and Citizenship (*Escola de Informatica e Cidadania*, or EIC) schools, CDI develops educational and vocational programs in Brazil and throughout the world to integrate marginalized groups, especially children and youth, into their communities. The EICs (described in more detail in Box 7) also promote civic participation, formal education, literacy, ecology, health, human rights, and nonviolence. Specific CDI objectives are to:

- provide access to new information and technologies;
- develop marketable technical skills, especially in youth, to increase their employability;
- foster community involvement and civic awareness; and
- develop community leaders.

Local ICT Environment

CDI works with disadvantaged youth in *favelas* (urban slums) to address issues of equity of access in urban areas rather than access per se. It targets specific groups within a geographic area where access already exists but may be too expensive.

Organizational Model

Each EIC is a result of a partnership between CDI and the community, typically via a community center or some other social organization active in the community. Communities prepare a project proposal detailing why they want the EIC and how they will use the computers. Once a community is selected as a site for an EIC school, CDI helps with the initial organization of the school (hardware, software, wiring, training, etc.) and provides technical, pedagogical, and administrative assistance. The community is responsible for EIC management and maintenance.

Box 7: Attributes of CDI and EIC Schools

- Created through partnership and collaboration
- Initiated by community organizations
- Built in the community and managed by community members
- Computer training focused on themes important to the community
- Information and experiences shared among communities
- Community assumes responsibility for school maintenance
- No political affiliation

CDI obtains financial resources for its projects through partnerships with government and the private sector and through funding from national and international organizations such as Brazilian Development Bank (BNDES), Microsoft®, Xerox, Exxon, Starmedia Foundation, IBM, AVINA Foundation, Global Partnerships, and others.

Each school has a coordinator who maintains contact with CDI and makes sure that the EIC is well integrated into other community activities. Each school also has two or three teachers who receive training in basic computer skills and pedagogy and attend periodic staff development workshops to learn about new tools and discuss common challenges.

Services

CDI provides schools with everything necessary for start-up. Beyond this initial investment, the EICs must generate resources to sustain their activities. To do this, schools charge US$5–US$15/month for a three-hour-per-week course. Each school is equipped with five computers and can train 10 students per session, yielding revenues of about US$500–US$800/month. This amount typically covers EIC expenses. Students who cannot afford to pay can help with EIC activities (cleaning, maintenance, etc.).

EICs offer classes in basic computer skills as well as some more advanced skills, such as Internet (browsing, e-mail, and web page development), database development, computer graphics, and hardware maintenance. Training, consisting of introductory classes and word processing, is also offered to community members outside of normal school hours. All materials used by CDI integrate computer literacy with other themes relevant to the community with a focus on democracy and citizenship.

Replicability, Sustainability, and Scalability

The first EIC school was created in 1995 in the Santa Marta community, Rio de Janeiro. Today, CDI has more than 150 EICs operating through regional offices in 14 Brazilian states. Internationally, CDI is also active in Japan, Colombia, Uruguay, and Mexico.

The model has proven to be replicable—at least under similar circumstances. It tends to target underprivileged youths in urban areas, so it may not be applicable in more rural areas facing a different range of challenges. Setting up a new CDI requires a community to demonstrate a certain level of organizational readiness, including links to private sector and other institutions within the community as well as its own resources. It is in essence a *social franchise* targeting disadvantaged urban youth.

Public-private sector partnerships are on the rise and may involve very different forms of private sector participation. For example, in the case of CDI and the IT clubs of Egypt described below, it is often the philanthropic side of the private sector that makes a contribution in the form of donated equipment. This is very different from the private sector's involvement in setting up telecenter services operating on a for-profit basis.

4.7. CASE STUDY: IT CLUBS IN EGYPT[8]— A SOCIAL/GOVERNMENT-LED MODEL

Part of the Egyptian Ministry of Communication and Information Technology's (MCIT's) vision is to provide citizens with access to information technology (IT) and high-tech tools. The MCIT has launched the Technology Clubs initiative to achieve this objective. The clubs seek to provide IT access to Egyptian citizens and communities, leverage IT to improve standards of living, and empower citizens with the knowledge they need to compete in a global economy.

Public-private partnerships are vital to the existence of IT clubs (see Box 8). The Ministry provides hardware and software for these clubs, including computers, printers, software, and peripherals, and it provides training for IT club managers and trainers. Local partners and hosting organizations[9] provide space, infrastructure, and utilities.

Organizational Model

While IT clubs seek to provide access to all Egyptians, they are especially interested in reaching those who otherwise might not have access to technology, including poor youth, those in rural areas, and women. That is why locating clubs in schools, youth centers, universities, and religiously affiliated organizations is important. Small local businesses are also able to use the clubs at designated times for a nominal fee. In this way, the centers generate income that can help to sustain their operations.

Box 8: Microsoft® and MCIT— Partners in Development

In 2003, MCIT—with its partners, Microsoft® and UNDP—started a pilot program to train 100 trainers from IT clubs and 500 community members. By 2004–05, the program was in governorates across Egypt. To date, more than 300 trainers have received IT training on desktop productivity tools, project management, and maintenance, in addition to communication tools each instructor needs so the IT clubs have qualified trainers and standardized curricula. Through training-the-trainer capacity building, the project will ensure that thousands of Egyptians have access to the most up-to-date Microsoft® technology and receive high-quality accredited training.

Currently, MCIT manages the IT clubs and provides trained managers. Prospective club managers must have some English-language skills and basic computer knowledge. The Ministry's long-term goal is to enlist private enterprises and entrepreneurs to replicate the IT club model and open clubs in areas currently not served.

Services

IT clubs offer a wide range of training, from basic keyboarding to designing web pages, as well as self-paced learning opportunities. Clubs have access to training on DVDs and the Internet in such areas as math, science, and history. They also have business and professional software applications such as PowerPoint, Word, and Excel.

Other examples of shared-access facilities with a strong learning component include the Digital Villages of South Africa, with a strong focus on IT training for employability, and the digital libraries of Chile—the BiblioRedes program.[10] Basic IT literacy is often just a starting point for vocational training and other training opportunities that lead to increased employability.

4.8. CASE STUDY: MICRO-TELCOS IN PERU—A COMMUNITY-BASED SOCIAL ENTERPRISE[11]

Local ICT Environment

More than 60 percent of Peru's population, which is concentrated in the country's urban centers, lives in Lima, and 71 percent of the total population lives in urban areas.[12] The concentration of people living in urban areas makes communication difficult for those living in rural areas because the small market size and the difficult terrain make running telephone and cable lines to remote areas expensive and unprofitable for private businesses.

To address this challenge, the government has promoted deployment of *cabinas* (public telephones) through a universal access fund. Beyond these *cabinas*, a number of micro-telcos—small-scale telecom operators that combine local entrepreneurship, municipal efforts, and community action—play an important role in expanding information and communication technology services to rural, underserved areas of Peru.

The Chancay-Huaral River irrigates large areas of heavy farming in Peru, in areas that are relatively close to markets in Lima. The area is also home to a number of food processing companies and specialized agricultural educational and experimentation centers. The villages spread along this valley have precarious access to communication facilities.

Organizational Model

A group of institutions collaborated to plan and execute a project to address these villages' specific needs, which included not only agricultural information but also VoIP telephony. The area's primary economic activity is agriculture, and river water for irrigation is essential to sustain it.

In many rural areas of Peru, the Board of Irrigation Users is the most important social organization. Boards of irrigation users are local organizations that help regulate the use of river water for irrigation. In the Chancay-Huaral valley, the board of users felt an obligation to provide telecommunication services to the farmers in the valley. It was important for the project to be financially viable, but profiting from the network was not the primary aim.

Services

A network of 14 telecenters using only free open-source software and affordable computer equipment was established. The Peruvian Centre for Social Studies (CEPES), an NGO, established the project, which received support from local institutions, the Ministry of Education, the Ministry of Agriculture, and European development organizations. The project provides training in computer and Internet skills for operators and users of the system. Farmers are also learning how to use the new information to make the most of their land and resources. The board of irrigation users, which runs the computer centers, charges a small fee for services to aid in center sustainability. The adoption of IP telephony and scaling of the network are evidence of its ability to adapt rapidly to community needs. Cooperation among local participants has also been critical, for each village is responsible for local network maintenance, with training provided by CEPES. In addition, new wireless local area network (WLAN) technologies have allowed flexibility in service provision and scaling of the network with a modest initial investment.

Even after the network was online, it faced challenges when trying to connect to other networks. Many micro-telco experiments have faced a similar challenge. They operate well as isolated networks, but connection to other networks is often difficult. In practical terms, this means that while members of the networks can communicate with each other, they are unable to connect with others outside the local network. The primary challenges stem from the licensing and interconnection agreements necessary for linking local networks to national telecommunication providers.

Replicability and Scalability

As noted above, policy and regulatory issues are making it difficult for micro-telcos to establish themselves in Peru. While the potential for such

locally based service providers to emerge and serve the needs of specific communities has been recognized, that potential has not yet been realized on a significant scale.[13] Current enabling environment requirements need to be in place, including a requirement for telecommunication providers to offer interconnection as well as the institutional infrastructure that could support the local micro-telcos in the complex technical and regulatory details of operating a telecommunications franchise. Replication of such a community-based approach may need to take place one community at a time, but each community will need to have the institutional infrastructure and the policy and regulatory environment that encourages rather than inhibits such an approach.

4.9. CASE STUDY: GYANDOOT—MULTIPLE MODELS TO ADDRESS DIFFERENT SITUATIONS[14]

Gyandoot[15] is an interesting illustration of a hybrid model that combines significant government leadership (at the state and national level), direct involvement at the local government level, and participation of the private sector through local entrepreneurs.

Gyandoot is an intranet government-to-citizen (G2C) service delivery portal established in Madhya Pradesh in 2000 to pilot a cost-effective, replicable, and sustainable model of telekiosks that bring ICT into poor, rural areas of India. It seeks to provide the poor with access to information that will facilitate citizens' participation in community and government affairs; reduce the time and money spent trying to communicate with government officials; and provide quick, transparent access to government data and documentation. Kiosks are placed in village community buildings, in local markets, and along busy thoroughfares to facilitate access for those in nearby villages.

The three entities involved in funding, organizing, and running Gyandoot are:

- Gyandoot Samiti, a nonprofit that was established to manage the project;
- the National Informatics Centre,[16] which provides technical support and guidance in system maintenance and software development; and
- individual kiosk managers (*soochaks*), who oversee day-to-day operations.

The investment required for this project was US$50,000, which was invested by local government units. State and central governments paid nothing, but they did contribute system design/development by the National Informatics Centre, a central government body. The kiosks were funded by bank loans,

which facilitated financing and helped to ensure initial ownership and commitment of key stakeholders.

Organizational Model

There are two management models in use: the *panchayat* and the entrepreneurial (see below). In both models, the *soochaks* offer services outside the normal scope of Gyandoot, such as photocopying and computer training to enhance sustainability.

- *Panchayat* Model: In this model, the village committee (Gram Panchayat) invests about US$1,500 to establish a kiosk and provides the physical space, invests in hardware and other infrastructure, and trains a kiosk operator. The kiosk operator—or *soochak*—is selected from three nominees proposed by the local community. The district council, through the Gyandoot Samiti, trains the nominees. At the end of the training, the best nominee is chosen as *soochak*. *Soochaks* are generally young and must have at least 10 years of education. Regular maintenance costs of electricity are borne by the *panchayat*, and the *soochak* pays for the telephone and office supplies and gives 10 percent of his or her earnings to the *panchayat*. The *panchayat* does not pay a salary or stipend to the *soochak*.
- Entrepreneur Model: In this model, a local entrepreneur registers as a kiosk owner and assumes all expenses. Entrepreneur *soochaks* are required to pay an annual licensing fee of Rs.5000 (approximately US$100) to Gyandoot Samiti to own and operate a kiosk.[17] The average Gyandoot-generated income for the kiosk operators is around US$35 per year. Their calculated break-even point is nearer to US$100 per year. As a result, the *soochaks* have had to find other income-generating ideas, which, in some cases, have involved closing their kiosks as they seek their fortunes in other ways.

Replicability and Scalability

Unlike some other initiatives in India, such as MSSRF's VKCs, Gyandoot was designed and implemented in a top-down approach resulting in less relevance in the types of services offered and the manner in which they are delivered. Awareness of Gyandoot among the poor could have been improved by increasing the involvement of NGOs and community-based organizations.

Drishtee—a private sector-led initiative—is attempting to take Gyandoot to scale throughout the country, adding services and transforming it in the process.

4.10. PUTTING IT TOGETHER—LOCAL MARKETS AND THE ROLES OF DIFFERENT SECTORS

When deciding how to move from the present toward the desired future, it helps to know where the beginning and end points are. Is the current context one in which the market is still latent and must be developed before a commercial model could be sustained? Is there a base of strong NGOs that could take on leadership roles to develop social enterprises? Do private sector partners exist with relevant skills and with an interest in the population to be served? Are the ultimate objectives that social enterprise activities would survive as self-sustaining entities, or would it be more appropriate in this situation to consider them an evolutionary phase toward pure commercial shared access? Are the social development objectives in this case amenable to being performed in private sector access facilities when that phase of the market evolution arrives?

Part of the answer will be determined by geographic considerations, population and income characteristics, and available infrastructure. In urban areas, the private sector often provides the bulk of shared-access facilities through cybercafés, reflecting existing market demand and purchasing power. However, the services provided by cybercafés are typically very limited and serve the needs of educated elites whose members are already computer literate and can afford market prices. Government and civil society organizations can complement the private sector's role in urban and semiurban areas by providing low-cost access through post offices or other government entities, particularly to facilitate e-Government services. Civil society's role may be important in supporting access for the urban poor, providing a mix of capacity-building services, relevant content, and low-cost access (as in the case of CDI in Brazil's urban centers).

In some geographic areas, the economic status and the social characteristics will be more important as a guide. In more rural areas and in underserved urban areas, the demand for telecenter-like services may not have developed sufficiently for the private sector to operate on a for-profit basis—the *access gap*. In such cases, the public sector and civil society should assist with demand creation. They can implement interventions that lead to the emergence of a market for such services, for example, by providing computer literacy training, demonstration projects to increase awareness of ICT, and low-cost (subsidized) access to encourage market development. As the demand develops, public funding should become more targeted to the needs of the poorest and most disadvantaged, and social enterprise models can evolve to serve that market segment.

Rural and underserved urban areas with less-developed markets for telecenter-related services may require specific interventions—beyond what the market will provide on its own. These may take the form of government

investment to ensure that services are affordable or training to ensure enough local capacity to use the services provided.

In all cases, the background of what institutional resources are available and/or could be developed will have to be considered carefully. If one is considering a transitional strategy of community based initiatives that gradually either convert to a more commercial model or are transferred to commercial facilities as they come into existence, then the questions of institutional readiness are important. What are the strengths and weaknesses of the available candidates, and what kind of plan would take the best advantage of the situation?

Such "interventions" need to evolve over time and adapt to the evolution of the market. A purely externally funded model providing a set of free services may evolve into a mix of fee-based and free services under a social enterprise model. Eventually, service providers operating entirely on a for-profit basis may emerge to serve the market, but their focus on profitable services may mean that gaps in services needed but not delivered by private enterprises will still need to be addressed via a social enterprise model.

The concepts introduced in this chapter of the continuum along which projects may be located are intended to give a mental framework for thinking about how to organize the work ahead. In some cases, one might decide that a static version of a model is the objective. In those cases, one would design a program that tries to create a permanent social enterprise model. If the local community were not yet ready to move directly to that objective, one might design a program that started out at the "social" end of the continuum and gradually moved toward being a social enterprise. In a different situation, one might conclude that the challenge was to design an intervention in which the shared access evolved naturally toward a commercial model, but had a social component that could become institutionally embedded in the concerns of the private sector. There is no "correct" model and no obvious path; the participants in each situation will have to assess their own circumstances and craft a plan that fits their conditions. In Chapter 9, the ideas and tools presented in these chapters will be presented as an integrated sequence, including techniques for business and financial planning that can help you decide what the community can afford.

4.11. TAKE-AWAYS

In Chapter 3 we talked about the need to understand local realities. Part of the local reality is level of maturity of the market for various telecommunications and related services. This chapter has taken a more detailed look at "markets" through an analysis of the two-gap model, and

helped to make connections between "market zones" and organizational models. In developing a typology of zones, it is important to think in terms of markets for different services and the capacity of specific geographic areas and communities to generate sufficient demand for telecenter services.

- Organizational models exist on a continuum from purely subsidized models to purely commercial ones. Most real-world examples are hybrids that tend to fall somewhere in the middle rather than at either of the two extremes. They differ as well along other dimensions, such as the sector in which they are rooted, and the degree of social and economic development that prevails in their geographic or target population segment. In addition, there are significant variations in the extent to which telecenter initiatives view the provision of telecommunication and related services as a public good, worthy of government and donor funding, rather than as private goods to be provided through market mechanisms. These dimensions of description can be used to approximate where in a conceptual map any given organization or activity might be categorized.
- Different points in that conceptual space have different strengths (and different probabilities of success). From a sustainability perspective, market-based mechanisms are most likely to provide long-term solutions. From an equity perspective, a social enterprise model may help extend the reach of markets and ensure broader access for disadvantaged communities, and a purely social model may alleviate increases in inequalities resulting from the digital divide.
- Some of the existing models that started as private sector, for-profit models or purely not-for-profit models—at the two opposite ends of the continuum—are now moving toward a middle ground. In the context of a scale-up and the need to cover a broad range of geographic areas with varying levels of market maturity, a flexible model, or multiple models (similar to Gyandoot's multiple models), may be needed. It is also important to recognize the dynamic nature of markets and the need for models that can adjust over time to changing conditions.
- In emerging markets, purely commercial enterprises may not yet believe that what they gain from serving the needs of the poor will provide the return on investment they seek, though there is growing evidence that an appropriate business model will succeed in purely return on investment (ROI) terms (see Prahalad, 2005). In the absence of commercial providers, social enterprises may find their niche.[18] The social enterprise model tries to balance social needs and economic realities. Even within a social enterprise model, there may be need for additional interventions so that areas of greatest need (least accessible rural areas, disadvantaged groups such as women, or areas with low literacy levels) get the attention they deserve to ensure equity in access.

4.12. MAKE IT YOUR OWN

The cases and characteristics discussed in this chapter are intended to give a realistic notion of the degree to which projects vary in meaningful ways. They differ along multiple dimensions; the most important for these purposes is the model or approach taken to solving local problems. The real world is full of hybrid cases, but there are clear conceptual differences among the public service, social enterprise, and market-driven categories that can be used to describe general areas along the continuum. These questions will help you apply the concepts and analysis to your own situation:

- What organizational models have emerged in your country? What has their record been in terms of sustainability, impact, and *replicability*? Is one specific model emerging as the leader and most likely candidate for replication?
- What is the level of private sector involvement in rural access? How is the private sector looking at rural markets? To what extent are telecommunication services viewed as a public good, to be provided through government funding, or as a private good, to be provided through market mechanisms?
- What is the level of private entrepreneurship in your country? How does it compare to levels of private entrepreneurship in countries where private sector-led models seem to be emerging? Be sure to differentiate among the private sector's philanthropic activities (donations of equipment and services), its corporate social responsibility activities, and its purely for-profit engagement in the ICT sector.
- If you are a private sector operator, do policy and regulatory issues hamper private sector expansion in rural areas? Has the government put in place special incentives for the private sector to invest in rural areas?
- Have you thought about how your nonprofit approach needs to complement rather than compete with what the private sector may be providing?
- Would you be able to draw a map of your country identifying broad geographic zones and target populations and corresponding organizational models? (See Section 9. 5 in Chapter 9 for additional guidance.)

4.13. ANALYZING YOUR SITUATION

This chapter's focus has been on organizational models that are appropriate for different situations. As an example of a planning tool in this context, we present here a brief example having to do with matching the possible models to contexts in which they would work. These questions are discussed in more detail in Chapter 9.

A continuum of organizational characteristics was described, and three basic models of organization were named, corresponding to a for-profit commercial model, a "social enterprise" model that seeks profit or sustainability while pursuing social goals, and a public service model for areas or groups that are too marginalized to hope for unassisted sustainability. Each of these models could be structured in many different ways; we focused on two forms of organization: as an independent, single telecenter, or as a network or franchise of telecenters.

How then might one think about what kinds of organizational models and forms would make sense in different contexts? By way of example, one might set up a table showing the models and then match the models with the kind of community characteristics discussed in Chapter 3. A simple version of that might look like Table 8.

This is just a tool for helping structure the thinking process. The example is discussed at length in Chapter 9.

Table 8: Example of Planning for Organizational Models

	Telecenter e-Readiness		
Organizational Models	**Low**	**Medium**	**High**
M1. Commercial Model			
a. Individual			✔
b. Franchise			✔
c. *[Add your own]*			
M2. Social Enterprise Model			
a. Individual		✔	
b. Franchise		✔	
c. *[Add your own]*			
M3. Public Service Model			
a. NGO-operated	✔		✔
b. Government-operated	✔		
c. *[Add your own]*			

4.14. SELECTED RESOURCES

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1 Davis and Surman, 2006.

2 For more on the critical nature of the individual entrepreneur, in a different context, see Rangaswamy, 2006.

3 Uganda Communications Commission. (2005). Funding and implementing universal access: Innovation and experience from Uganda. Fountain Publishers/International Development Research Center. Retrieved from http://www.idrc.ca/en/ev-88219-201-1-DO_TOPIC.html

4 de Silva and Tuladhar, 2006, p. 3.

5 Hammond and Paul, 2006.

6 Ibid.

7 Galperin, 2004, p. 4.

8 The CDI case study draws heavily from *Case study: Committee for Democratization of Information Technology-Brazil*, prepared by the World Bank. Retrieved November 7, 2006, from http://info.worldbank.org/etools/docs/library/91628/telecentres/telecentres/workshop/sbt-pdf/case-studies/CDICaseStudy.pdf; and The Communication Initiative. *CDI Americas—Latin America and the Caribbean*. Retrieved from http://www.comminit.com/experiences/pdskdv52202/experiences-1381.html; Smith, 2006.

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10 Hosting organizations include NGOs, youth centers, schools, universities, public libraries, community centers, and religiously affiliated associations.

11 Gates Foundation, BiblioRedes project web site: http://www.gatesfoundation.org/GlobalDevelopment/GlobalLibraries/LibraryProjectChile/Chile_Case_Study.htm

12 Galperin and Bar, 2005; Bello, 2004.

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15 The Gyandoot case study draws from Sanjay and Gupta, 2003. Retrieved October 2006 from http://www.gyandoot.nic.in/; Department of Information Technology, 2006. 39 summary assessment projects details: Gyandoot: Ministry of Information and Technology, Government of India. Retrieved October 2006 from http://www.mit.gov.in/SA/7.asp

16 Various Hindi translations have been seen, most notably *Purveyor of Knowledge* and *Messenger of Information*.

17 The National Informatics Center (NIC) is a department of the federal government with units at the state and district levels. NIC develops and implements IT solutions for government departments.

18 User fees are expected to cover any maintenance and administrative costs associated with running the kiosk and to provide the *soochak* with an annual income of Rs.36,000.

19 Some development experts have suggested that the potential for commercially based solutions may be greater than previously anticipated; see Prahalad, 2005.

CHAPTER 5:
Ensuring Sustainability and Impact through Appropriate Services and Content

5.1. QUERIES TO THE TELECENTER HELP DESK

I heard that telecenters need to diversify their services in order to survive. Our network of telecenters is based on a social entrepreneurship model. We expect each telecenter to be financially sustainable, and we have strong social objectives. We are not trying to maximize profits. The telecenters initially offered a standard set of services, and, over time, they have all made some adjustments, adding some services where there was a demand and abandoning others where there was none. Now we are working on a plan to double the number of telecenters that are part of the network. We are hoping that half of the new members will be existing telecenters that will see the benefit of joining the network, and the other half will be new telecenters. With regard to services and content, we are trying to address the following questions:

- *How can we know the right mix of services for our telecenters?*
- *If the telecenters within the network are operating within a social entrepreneurship model, does that imply a specific mix of services?*
- *What can we do, as a network of telecenters, to support our member telecenters in terms of services and content*?

(Telecenter network coordinator, Country H)

I set up a computer in my shop about a year ago when my son came back from his studies in the capital. His head was buzzing with ideas about computers, and he wanted to start his own cybercafé in our town. There was already a cybercafé, but it was struggling because most people don't know how to use computers yet. I told my son I would give him the money to start with one computer in our shop so he could start teaching people one at a time. It turned out that a lot of people want to learn, but now a computer training institute is being set up in town. My son is worried that people won't come to him anymore. We want to add a couple of computers and get connectivity, but if there is stiff competition from the cybercafé for connectivity and from the training institute for training, what services can we provide—if any?

(Shop owner)

5.2. SERVICES AND SUSTAINABILITY—A STRONG RELATIONSHIP

The sustainability of telecenters is highly dependent on their ability to offer the right mix of services. What that right mix is will depend on the organizational model and local ecosystem, among other factors, which is in turn affected by the goals and target market of the center. In this chapter, we present a typology of services, illustrating the broad range that telecenters can provide. We then follow up with case studies to illustrate different mixes of services addressing specific needs of different local realities. The interplay among the services, the community, and the participating organizations can demonstrate many of the principles of sustainability.

A key differentiating factor between typical cybercafés established in urban and semiurban areas on the one hand and telecenters on the other hand, is the range of services they provide. Cybercafés typically limit themselves to providing access to the Internet and rely on a ready supply of computer-literate clients. The information and communication needs of rural areas are more complex, and telecenters must provide a broader range of locally relevant services to be sustainable and contribute to socioeconomic development. Ultimately, however, "services" consist not only of the activities and content offered at the center's initiative, but also those things available from the broader web and other institutions.

There are different approaches to service delivery, but within the shared-access model, it is important to differentiate between the "kiosk" approach, favored in India, where a single computer is used by a kiosk operator to provide services, and the multi-PC telecenter approach, which provides shared access to the computers themselves, not just a limited set of services.

5.3. TYPOLOGY OF SERVICES

One way to look at services is to think of telecenters as composite centers, part learning center, part business center, part community center, and part technology center. In different contexts, the appropriate centers will comprise different mixes.

Another useful typology of services and content differentiates among **informational** services, **transactional** services, and **e-Government** services. We use this typology, explained in Box 9, in the rest of this chapter. Education in its various forms fits into this typology as an information service, but it is so broad and so complex that it might qualify as an entirely separate kind of service. The same is true of most kinds of training. This typology is not necessarily the most appropriate one in all circumstances, however, and not all telecenters or public access facilities will provide all of these types of services. Illustrative examples of services in each category are given in Table 9.

At first sight, informational services might be provided best through a not-for-profit, NGO-driven telecenter model; transactional services might be provided best through a for-profit, business-driven telecenter model; and e-Governance services might be provided best through a public sector-driven model. However, an early part of the planning activity should take into account the objectives of the centers and the local situation to decide to what degree the centers will offer a broad mix of services versus provide a narrower mix specific to a specific set of needs. This issue is easy to resolve if one is planning a series of centers for facilitating interaction with government services: a narrow, vertical mix of services makes excellent sense. In general, though, the rural contexts are very "thin" markets, and the strategy of a series of vertically organized providers of shared access does not make sense. In most rural areas, the cost efficiencies of a single, general purpose center, with government services as a part of its service mix, are very compelling.

Box 9: Three Types of Services Offered in Rural India

- **Informational services** disseminate generic (non-customized) information, such as agricultural practices, weather forecasts, and contact information.
- **Transactional services** involve an exchange of specific (customized) informational services or funds between two or more parties using the ICT infrastructure.
- **e-Governance services** refer to transactional services that involve local, state, or national government; providing land records, submitting complaints to local officials, and confirming a user's presence on electoral rolls are examples.

The mix of services to be provided should be based on the following set of factors:

- Analysis of needs and demand (see Chapter 3)
- Capacity of the telecenter operator
- Organizational model—what makes sense, depending on the extent to which each service must be profitable, whether cross-subsidization of services is an option, or whether the services are meant to be delivered free of charge to users and supported by some external funding
- Technology requirements—what is technologically and economically feasible

As you read through the case studies in this chapter, you may want to keep in mind the following issues:

- Some services can be used to build demand for basic communication services, including phone, fax, phone cards, e-mail, web browsing, and VoIP. In Chapter 4, we mention the role of basic communication services that can be provided on a for-profit basis even in remote locations, and how telecenters can start building demand for more advanced services.

Table 9: A Typology of Services: Informational, Transactional, and e-Governance

Informational	Transactional	e-Governance
Agriculture	Communication	Downloading and submission of forms
Education (general)	Desktop publishing, printing	Status of pending work
Computer training	Photocopying	Land records
Job listings	Obtaining loans and insurance	Ration cards
Health (general)	Entertainment	Government certificates
Government schemes and procedures	e-Banking/remittances	Licenses/permits
News	e-Commerce transactions	Grievance redress
Market prices	Matrimonial services	Below-poverty-line lists
Weather	Photography	Vehicle registration

- Some services may need to be supported—at least initially—to build demand for other computer-based services—for example, e-Literacy. On the other hand, there may be significant demand for a broad range of training services for which citizens are willing to pay.
- Some services may be developed to serve the specific needs of a geographic region—for example, supply chain management support for an agricultural product common to a specific geographic area.

- Some services cannot be developed or delivered without higher-level network support. This is the case for many e-Government, e-Learning, employment generation, and market pricing services. In such cases, a franchise or network may be essential to expand services.
- One of the prime motivators for many telecenter clients is to improve their employment prospects by acquiring skills or information. This is reflected in an impressive level of demand for e-Literacy skills, direct job training, and education services that increase their qualifications. Sometimes the center's services themselves can be employment generators—direct employment can easily result with telecommunication services, such as phone ladies, and the desktop publishing or keyboarding assistance that many clients will need is also a source of employment. While we treat education as a subset of information services, it is a very large and important subset.
- To reach some of the more disadvantaged population groups, some services may require that telecenter staff become mobile and extend their activities outside the telecenter's premises. For example, in Bangladesh, D.Net's "Pallitathya Help-Line" has developed a sophisticated information help line that combines infomediaries equipped with cell phones with desk researchers and content partners (see Box 10).[1]

Box 10: An Example from Bangladesh—D.Net's Phone Ladies

To reach some of the world's most disadvantaged populations, sometimes it is not enough to provide shared access to services. Access to information and resources needs to be facilitated so that illiteracy and lack of e-Literacy do not become barriers. *Infomediaries* play a critical role in facilitating access to essential information for the most disadvantaged.

In Bangladesh, D.Net established *pallitathya kendra* (rural information centers), which are staffed by local residents who assist users to locate market information, assist victims of abuse by connecting them with existing institutions that provide legal support, etc. Providing a common access point represents a cost-effective method of bring technology to poor rural areas. The centers sustain themselves by charging user fees, and the range of services they offer is quite impressive.

Infomediaries

One of the more innovative aspects of D.Net's Pallitathya Help-Line Center is its use of *infomediaries*—women who were selected and trained to work as mobile and help desk operators. This was an important means to ensure that beneficiaries could access and actually use the services provided. With women's economic empowerment as its centerpiece, the Help-Line Center directly addressed the community's information needs in health, education, livelihood, employment, and agriculture. As mobile operators, women traveled door-to-door in their communities to assist information seekers, especially women and the disabled, to call the help desk. Women who served as infomediaries reported feeling a sense of increased self-worth as well as higher incomes and more knowledge about various issues.

The value of mobile phones

Mobile phones were used in help-line centers and by infomediaries as they worked with the communities. Cell phone technology is:

- easily available throughout Bangladesh;
- interactive—information provider and receiver talk to each other;
- quick—problems can be relayed to experts and feedback can be received quickly; and
- simple to use.

Infomediaries were an important part of making rural information centers successful. It was found that housewives were the biggest users of the help line. This group is perhaps the most isolated in terms of access to information. Often telecenter-based information services are not able to address their needs due to their lack of mobility and other social constraints. Mobile phone-based services such as those provided via the mobile operators can be of immense benefit to this group of users.

The Planner's Dilemma: Make it Yourself?

The "location-independence" that comes with Internet access means that services from anywhere in the world are available in the most remote place, once it becomes connected. The implication of this particular characteristic of connected telecenters is that those operators or organizers who wish to create services and content must consider very carefully what the

added value is that will distinguish their service or content from "the competition." Often, the answer to this question is that the language issues or the cultural specificity of the service are paramount, and *de facto* there will be little competition.

This issue should be carefully analyzed if the planned effort contemplates a significant commitment to content development. Many telecenter activities have underestimated the challenges of content production and have made the initial assumption that they needed to create any content that would be useful in their context. This assumption is undoubtedly correct for things like information on local government services or community news. However, it is often the case that the real issue is lack of availability of content in the local language. This situation is dynamic, and is likely to shift in the near future as the worldwide content base appropriate for rural areas increases and as decent connectivity becomes more prevalent.

Telecenter movements may find that the best utilization of their efforts on content development is to ally with other information producers and/or domain experts, and to adapt those content sources' existing resources in terms of language and localization of the content. For example, as the field of online instruction grows, telecenter programs will find it difficult to compete with efforts from existing educational institutions that can provide credible (and sometimes accredited) course offerings. The telecenter program may best serve its target population by cooperating, rather than competing, with such content suppliers. They can work with the educational institution to adapt the content and make language-specific versions available, rather than invest their limited resources to develop separate courses from scratch. Similarly, the telecenter organization can add considerable value organizing pointers to relevant content on the web in a compact portal that helps their users find useful sites, rather than trying to create and offer completely unique content. Their most efficient utilization of the resources they can commit to providing a critical mass of relevant content may involve translation of others' offerings, perhaps with locally specific addenda, rather than creation of separate content.

There is no simple answer to the question of how much resource to devote to content development and provision, and the situation is only becoming more fluid. Our point here is that planners of telecenter scale-up activities need to focus specifically on analyzing what, in their situation, is the most effective way for them to assure that there is local language, locally specific information available.

5.4. SNAPSHOTS OF CASE STUDIES

The case studies presented in this chapter have been selected to highlight a range of organizational models, different mixes of services, and different approaches to service delivery and cost recovery.

- The community learning and information centers (CLICs) of Mali represent a mix of informational and transactional services provided through a networked social entrepreneurship model.
- Akshaya is a public-private partnership to provide rural access to telecommunications in the State of Kerala, India. A unique aspect of this initiative has been the public sector-funded e-Literacy campaign.
- In Kyrgyzstan, high-value services have been added to the typical menu of infotainment/cybercafé services in the e-Centers, leveraging an existing infrastructure and strengthening effects through new services targeting economic growth.
- The recently launched Nemmadi Initiative in Karnataka, India, provides an interesting case of functional and quantitative scale-up in the context of a public-private partnership and plans for a broad range of government-to-citizen (G2C) and business-to-citizen (B2C) services.
- e-Choupal represents a strong case of transactional services with a focus on agriculture and the specific needs of farmers in rural India.
- In Peru, Project SIRU provides informational services to rural communities, using telecenters as a delivery mechanism and mixing old and new technologies for maximum impact.
- The Grameen Village Computing Project in Tamil Nadu, India, provides lessons about the linkages between service provision and successful business models.

There are new models emerging that offer some insights into things that will achieve significant impact over time. The initial focus by most telecenters on employment development was restricted primarily to education and to training in computer skills. As the global infrastructure has developed, it is now possible to think about how to use the availability of such technology as the basis for local employment. One interesting example is the emergence of Business Process Outsourcing (BPO) as a way of providing employment in the communities. Jobs such as customer support, back office paperwork, data entry, and telemarketing can be performed by well-trained individuals from the local community, at pay scales that are attractive to business clients. This has already become an active business area in India, where it provides an interesting comparison to the macro-level phenomenon of international outsourcing. Two telecenter-oriented activities that are interesting in that regard are the Gram IT project of the Byrraju Foundation[2] and the Rural Information Technology Enabled Services (Rural ITES) project of the Telecommunications and Computer Networking Group (TeNet) at

the Indian Institute of Technology—Madras (IIT-M).[3] These projects are discussed in somewhat more detail in the section of this chapter entitled, "Growth in Microfinance, Employment, and Business Services." As the underlying infrastructure develops, one can expect to see a rapid growth in interest in projects focused on employment that is facilitated by information technology, as opposed to employment in the information technology sector.

5.5. CASE STUDY: COMMUNITY LEARNING AND INFORMATION CENTERS (CLICS) OF MALI[4]

Rural Environment

Mali, with its predominantly rural 13.5 million inhabitants, remains one of the poorest countries in the world, and 72 percent of its population is estimated to live below the poverty line. The literacy rate is about 46 percent (and likely much lower for women), and while the official language is French, not everyone speaks it. Eighty percent of the population speaks Bambara.

Organizational Model

The Mali CLICs are part of a network of 13 telecenters (or CLICs) established within existing local institutions, otherwise known as "host institutions." The host institutions included community radio stations, teachers' colleges, parastatal institutions, local NGOs, and mayors' offices. Spread throughout Mali, some CLICs were established in urban and semi urban areas, while others were in rural locations.

The CLICs were established between 2003 and 2005 with initial funding from USAID and technical assistance from the Academy for Educational Development's dot-ORG program. Additional support came in the form of a Microsoft® Unlimited Partner grant, and, since September 2005, continuing support has come from USAID AfrikLinks, a newly formed local NGO now aiding CLICs and other telecenter structures in Mali.

Services and Content

The CLICs have the capacity to provide a wide range of services, which can be categorized as:

- informational services (content organized around development themes such as agriculture, health, education), which are provided free of charge;
- informational services such as computer training, which are either funded with vouchers or provided for a fee; and

- transactional services, such as Internet access (e-mail and web browsing), photocopying, word processing, and printing, which are offered for a fee.

The actual range of services provided in each of the CLICs varies, as do their revenues. For most CLICs, however, Internet connection, photocopying, and training are their three primary services.

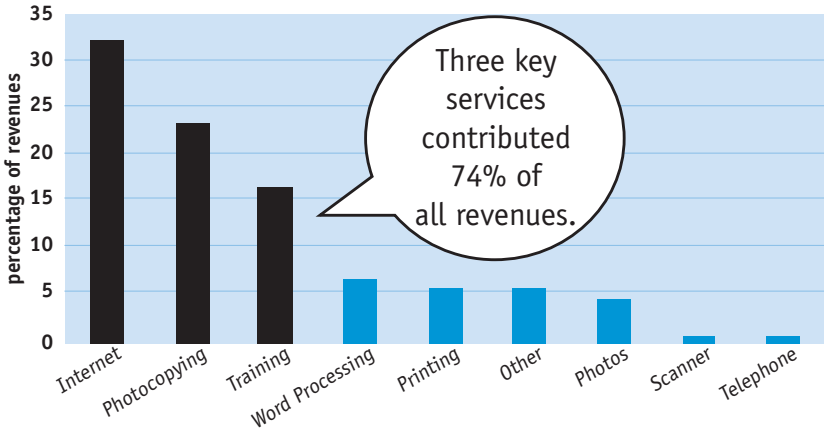
The graph in Figure 5 shows that, on average, 74 percent of revenues come from three key services: Internet, photocopying services, and training.[5]

Content Collection and Use

Locally relevant content was collected and disseminated through the CLICs. The materials collected fell into five broad categories of issues of relevance to the USAID Mission:

- Economic growth
- Education
- Health
- Governance
- Agriculture

Figure 5: Mali CLICs—Share of Different Services as a Percentage of Revenues



While the content was impressive in terms of the number of materials in the primary local language (Bambara) and their relevance to rural Mali, mechanisms for effective use of these materials were lacking.

- The CLIC managers, under pressure to "sell" services that bring in revenue, have limited incentives to focus on content dissemination, since in most cases content dissemination is not a revenue-generating service.

- Content dissemination requires a proactive outreach strategy, which may involve costs and needs to be budgeted for. Transportation costs associated with this outreach are also problematic.
- CLIC staff have limited capacity to identify local information needs to which they can respond. Most of the content that had been collected was produced at the national or international level with local needs in mind and reflects the international community's perception of the types of information local communities need (or should have access to). Matching perceived needs with local demand is the key challenge.
- Language barriers (limited availability of content in Northern languages, e.g., Tamacheq) are a problem as well.

Appropriate Technologies for the CLICs in Mali

Power issues have had an impact on the operations of three of the CLICs. In two cases, the CLICs were located in areas suffering from chronic power shortages, making it difficult to maintain regular hours and forcing them to interrupt training sessions, which affected their ability to provide key services. In the case of the third CLIC (Bougoula), it was located in a very rural area that was not connected to the grid. The initial generator solution proved too expensive and was replaced by a low-cost, multipurpose platform that consumed less fuel, provided power for the CLIC, and supplied supplementary battery power for the community and as a source of revenue for the CLIC.

Connectivity was provided initially through the national provider (Sotelma). When this solution proved ineffective, VSAT (very small aperture terminal) connectivity was provided to 10 CLICs,[6] and an alternative local provider (Megasat) provided connectivity (64Kb) for the three remaining CLICs. The Megasat solution proved unreliable, and the VSAT solution is expensive for most CLICs to maintain beyond the period of project funding. Other providers, such as Ikatel, are quickly expanding their reach throughout the country and may be able to provide cheaper alternatives. Other options that are already being implemented in some CLICs involve sharing bandwidth with local partners.

Two of the CLICs were established within radio stations, enabling synergies between more traditional information technologies, such as radio, and the new technologies, such as the Internet (Chapter 7 provides information about the initiative's bandwidth sharing solution and radio/Internet connections).

Replicability and Scalability

AED's local partner in Mali for the implementation of the project involving the 13 CLICs has now established itself as AfrikLinks, a local NGO.[7] Rather than trying to replicate or scale up the experience of the CLICs, AfrikLinks is focusing on strengthening the existing CLICs and other telecenters through

a national telecenter network in Mali. The emerging network includes the 13 CLICs, existing community multimedia centers (CMCs) supported by UNESCO, and other telecenters supported by USAID and other donors.

Mali was one of the countries covered by UNESCO's CMC scale-up initiative, which involves establishing 20 CMCs in Mali. Three were established as a result of the initial pilot, six additional CMCs were established recently, and 14 are in the process of being established.[8]

5.6. CASE STUDY: AKSHAYA'S E-LITERACY CAMPAIGN AND SERVICE NETWORKS[9]

Akshaya, a project of the government of the state of Kerala, India, was piloted initially in the district of Malappuram and involved an extensive publicly funded e-Literacy campaign intended to teach computer skills to at least one person in every family. In less than a year, more than half a million people, about 65 percent of whom were women, were provided with basic computer skills.

Local Environment

The program emerged as a result of local demand for computer training. However, instead of outsourcing the e-Literacy campaign to existing private sector institutions or setting up government-run education centers, the state government decided to use this local demand as an opportunity to establish a network of telecenters providing a range of technology services in rural areas.

Organizational Model

The organizational model deployed is a private franchisee model. It was felt that the level of "enterprise" and individual initiative required to make it work demanded a private enterprise model. This was based at least partially on an earlier unsuccessful experience with government-owned village libraries equipped with Internet-enabled computers.

The government's funding of the e-Literacy campaign guaranteed initial sustainability of the centers. Each center took on approximately 1,000 learners and collected the equivalent of US$3.26 per learner for providing a basic computer course developed by the state's IT mission. The local government (*panchayat*) covered part of the cost (US$2.79), as did the learners (US$.47). In about a year, the private entrepreneurs had recovered their initial investment.

When the e-Literacy campaign was over, the Akshaya team had to help the operators find new revenue streams. An existing project in urban areas

(FRIENDS) already provided such e-Government services as collecting utility bills. The service was extended to rural areas through the Akshaya centers and is now a major source of revenue. The Akshaya team has also developed linkages for the centers to sell financial services—banking and insurance—to the communities. The centers work as pickup points for a courier agency, and a few government-certified computer courses have been offered in partnership with outside agencies. Content related to the school curriculum has been put online and can be accessed at the centers by students. A more complete list of services is included in Box 11.

Additional content and services in agriculture, health, fisheries, and tribal welfare are being developed, in close consultation with relevant government departments. The primary goal of these services is to enhance the delivery of government services by using the Akshaya centers to reduce the cost of extension services. The relevant government departments will pay the Akshaya centers to deliver certain services to community members.

In light of the oversight functions of the district government and local *panchayat*, the Akshaya centers are viewed as "community spaces," clearly more welcoming to women and children than were purely commercial access facilities. For example, viewing pornography is not tolerated in the Akshaya centers. The effect of the government's patronage is very evident in the Akshaya centers.

Box 11: Services at the Akshaya Centers

A typical Akshaya center employs three or four people and has between five and nine computers. A center offers the following menu of services:

- Computer education
- Computer-aided education (e-Content related to school curriculum)
- Content (education, health, career development, livelihoods, agriculture, law)
- Internet browsing
- Utility bill payment
- Computer-based services (digital photography, desktop publishing, data entry)
- Financial services (banking and insurance)
- Courier services
- Facilities for children's clubs, women's clubs, farmers' clubs
- Community health mapping
- Community resource mapping, biodiversity mapping

Monitoring the centers' performance is a key function of the Akshaya team, which is able to identify centers that are not doing well and provide them with outsourcing work, such as data entry from government and other offices. This has been particularly important in supporting women-run centers.

Replicability and Scalability

Even though the Akshaya centers are run by private franchisees, the role of government (state, district, and local *panchayats*) has been very important and provides an interesting model.

Local government bodies such as the *panchayats* are highly developed in Malappuram, as they are in many areas of India. This model may not be easily replicable, however, in a country where local government entities are undeveloped and have limited financial resources and autonomy.[10]

The district government has also played a key role. For example, connectivity for the centers is now provided through a government-owned, district-wide WiFi intranet. The technology infrastructure and network of content and services are owned by the district government, which has important implications for replication in other districts.

With 600 Akshaya centers deployed in the district of Malappuram, the district-level pilot can already be considered a large-scale initiative. The next step was a statewide rollout, aimed at 6,000 centers, covering the whole state of Kerala.

5.7. CASE STUDY: E-CENTERS OF KYRGYZSTAN—ENHANCING CYBERCAFÉS' TRADITIONAL MENU OF SERVICE

Local Environment

Without the advantage of oil revenue or other marketable natural resources, Kyrgyzstan's development has been modest in comparison to resource-rich countries such as neighboring Kazakhstan. Recent political turmoil underscores the need to create better communication linkages between rural areas and larger cities. More than 60 percent of Kyrgyzstan's population lives in rural areas where many subsistence farmers struggle to find potable water.

Organizational Model

Kyrgyzstan's e-Centers are unique in several ways. While they were developed as a donor-supported pilot initiative with USAID funding, they were planned from the start within a for-profit framework. Rather than being established within local NGOs or local institutions, they were set up within existing cybercafés, based on a competitive tender process. e-Centers reversed the traditional path of not-for-profit telecenters charging for services to become financially sustainable by starting with profitable cybercafés and increasing their capacity to provide high-value services such as videoconferencing, e-Learning, and others geared to serving the needs of economically depressed rural areas with high unemployment rates.

Services

The e-Centers leverage the high demand for "infotainment" services such as computer games and other forms of online entertainment, which are highly profitable and allow the operator to pay staff and overhead costs. e-Center services, offered separately (in a different room), were funded initially by USAID. Microstipends or vouchers, used for training purposes, were distributed in the community to stimulate demand for the new services. Most training starts with basic computer literacy and guided access to training courses in Internet- and multimedia-related services such as macromedia web design and other digital media skills now in demand. e-Centers also offer web-based certification for accounting courses and other business capacity-building skills. This training is unique in Kyrgyzstan because it seeks to create 21st-century skills and potential and offers a nontraditional source of revenue into which rural communities can tap.

Replicability, Expansion of Services, and Scalability

The initial success of the project has attracted additional support from the International Telecommunications Union (ITU), which has allocated resources to open 16 additional e-Centers. The ITU-funded e-Centers follow the USAID-funded pilots' structure and will add an e-Government pilot component. The e-Government component is intended to increase government transparency in rural areas and establish online resources and applications to improve delivery of government services in rural areas, including permits, tax filings, government information, and distribution of social benefits.

The UPS Store developed a franchise business model based on the original e-Centers that will help the e-Centers transition to fully self-funded private enterprises. The core mission of the e-Centers is to deliver computer literacy training, public information services, and other learning programs, in addition to providing communities with high-speed Internet access, Internet protocol (IP) telephony, and other computer-based services. Using the e-Center locations as "spokes" in a wheel, franchising can provide the centralized "hub" control and systems necessary to successfully develop and deliver these types of services.[11]

Typically, under a franchise model, each location provides a "required" menu of services and can add others based on demand. There may also be a list of services that should *not* be provided through the e-Centers.

AED's dot-ORG program, which implemented the USAID-funded pilot, also helped to develop an e-Learning resource for local economic development. The e-Learning modules are meant to educate local government and business leaders on best practices in improving the conditions for economic growth

in rural communities. The e-Center's facilities and equipment for web-based e-Learning will be used for the training.

5.8. CASE STUDY: NEMMADI INITIATIVE—A CASE OF FUNCTIONAL AND QUANTITATIVE SCALE-UP[12]

The Nemmadi initiative is a public-private partnership among the state of Karnataka, India, and a consortium of three private sector companies—Comat, 3i Infotech, and n-Logue. The initiative involves the deployment of 800 telecenters to supplement the 177 existing land record service (Bhoomi) kiosks that operate sustainably at the subdistrict level.

Local Environment

Agriculture accounts for about 28 percent of Karnataka's domestic product and represents the largest source of employment in the state. Land records are critical to farmers' lives. This explains the success of the Bhoomi kiosks; however, many other types of services are lacking in rural areas and require people to travel long distances, spending both time and money. The ultimate goal is for each village to have easy access to a wide range of business and government services, quickly and cheaply.

Organizational/Business Model

The state government owns the project. As part of the build-operate-transfer (BOT) model, Comat builds, deploys, and maintains the kiosks for an initial five years. Comat and its partners expect to recover their investment in equipment, infrastructure, and human resources within that five-year period. A stringent service-level agreement (SLA) has been established between the state government and the private sector partners. SLAs include daily hours of operation, maximum wait time, and other metrics.

Comat is responsible for software development, hardware procurement, systems integration, and kiosk deployment and operations. 3i Infotech is providing financial backing to Comat, but is not involved in any operational role. Comat will take over the existing n-Logue kiosks in Karnataka and upgrade them with new computer and communication equipment to make them an integral part of the 800-kiosk deployment. Kiosks operators are employees of Comat, whom Comat hires and trains, rather than independent entrepreneurs.

Services and Content

The BOT model is a public-private partnership model. Both G2C and B2C services will be offered through the kiosks. Prices for G2C services are mandated by the state government. For example, the fee citizens pay for a copy of their Land Records Certificate is Rs.15 (approx. US$.33). Prices for B2C services will be established based on consultations between Comat and private service offerers.

Box 12: Bhoomi

Land ownership is critical to efforts to increase farm incomes and empower farmers. Land ownership must be documented, and land records are vital documents for farmers and the government. They are used to prove ownership, are required for many administrative functions (e.g., three times a year to secure crop loans), and are used to access pensions and other government programs.

Since its inception a decade ago, the Bhoomi model has led to the computerization of 20 million land records and has benefited 6.7 million farmers in Karnataka. Through Bhoomi kiosks, farmers have access to the land records they need for which they pay a standard fee, avoiding many of the challenges of the old manual system.

The Bhoomi kiosks (see Box 12) are service-specific. While they may be sustainable at the subdistrict level, they would not be at the village level. When a range of other services is added, however, the kiosks become sustainable at the village level, so Comat is taking the Bhoomi kiosk concept and scaling it up. In this case, it is both a functional scale-up, increasing the number of services provided, and a quantitative scale-up, increasing the number of kiosks throughout the state; one could not happen without the other.

The kiosks are referred to as multiservice rural business centers (RBCs). When multiple services are offered through the RBC, the incremental cost of adding a new service is small and the infrastructure cost is shared across many services, making the RBC operation "more viable," even at the village level.[13]

Services delivered through the RBCs, comprising more than 30 government processes, include copies of land records, approval of old age pension for senior citizens, issue of caste certificates, issue of income certificates, etc.

The Education Department of the State of Karnataka is also proposing to use the centers to deliver computer-aided education. Similarly, the Agricultural Department is looking to use the centers to deliver information related to agriculture, prices for agricultural commodities, and availability of agricultural inputs.

Appropriate Technologies

The government electric utility-supplied power is unreliable and limited to a certain number of hours per day. All kiosks have diesel-operated, backup power, and Comat is exploring solar power solutions. Most RBCs are equipped with one or two computers, a printer, camera, and an uninterruptible power supply (UPS). In addition, some RBCs have thin-client terminals to provide additional access. The computers are operated primarily by RBC staff.

In terms of connectivity, VSAT appears to be the most reliable and scalable solution at present. As a backup to VSAT, wired and cellular telephone modems can be used for data connectivity.

Comat has also developed a software platform, Global Services Infrastructure (GSi), which provides a common platform for delivery of a diverse set of services.

Replicability, Sustainability, and Scalability

This initiative should be watched closely to analyze the sustainability of kiosks at the village level and to address unexpected scale-up challenges. The multiservice approach is not new or unique to this initiative, yet the way services are to be developed and delivered—in partnership with the public sector but delivered via for-profit kiosks—is new.

The first phase involves the deployment of 800 centers by the end of January 2007. A second phase would involve further deployments.

5.9. CASE STUDY: E-CHOUPAL—EMPOWERING FARMERS IN INDIA[14]

e-Choupal is an interesting example of very specific services provided to farmers by ITC, one of India's leading companies, which overcome constraints of the *mandi* system of intermediaries.

Local Context—Rural Environments and Farmers

Agriculture is the primary—if not the only—source of livelihood for 72 percent of India's population, who live in more than 600,000 villages. In spite of the progress brought about by the Green Revolution of the 1960s and '70s, most farmers have remained poor. Most of them are small farmers who lack bargaining power when buying farm inputs and selling their produce. Most of them also lack access to real-time information about prices, weather, or other news critical to their agricultural activities.

Organizational Model—Social Responsibility and Corporate Profits

Conducting business in rural India is difficult—transportation, electric power, and information infrastructures are inadequate; business practices are underdeveloped or outdated; and the lack of access to modern resources has resulted in a poorly trained workforce. These constraints have discouraged many companies from taking on the challenge of rural business development. Yet ITC has done just that, creating synergies between its business plans and community development programs. In addition, ITC's Agri-Business is one of India's leading exporters of agricultural products.

Through the e-Choupal initiative, ITC has managed to increase its own competitiveness and to empower farmers through access to technology and the Internet.

Services and Revenue Model

A local farmer acting as a *sanchalak* (coordinator) runs the e-Choupal—often located in the *sanchalak*'s home—along with a local commission agent, or *samyojak*, who provides logistical support.

Each e-Choupal costs between US$3,000 and US$6,000 to set up and about US$100 per year to maintain. Using the system costs farmers nothing, but the host farmer, or *sanchalak*, incurs some operating costs and is obligated by a public oath to serve the entire community. The *sanchalak* does benefit from increased prestige and a commission for all e-Choupal transactions.

Farmers can use the computer to access daily closing prices on local *mandis*,[15] track global price trends, or find information about new farming techniques. They also use the e-Choupal to order seed, fertilizer, and other products, such as consumer goods from ITC or its partners, at prices lower than those available from village traders. At harvest time, ITC offers to buy the crop directly from any farmer at the previous day's closing price. The farmer transports his crop to an ITC processing center, where it is weighed electronically and assessed for quality. The farmer is then paid for the crop and receives a transport fee. "Bonus points," which are exchangeable for products that ITC sells, are given for crops whose quality is above the norm.

Farmers selling directly to ITC through an e-Choupal receive a higher price for their crops than they would if they sold them through the *mandi* system, where the intermediary makes all the money. In addition, e-Choupals provide farmers with lower prices for inputs and other goods they need as well as higher yields through the education and information services offered.

ITC also benefits, saving about 2.5 percent in commission fees and transport costs that it would otherwise pay to buying agents at the *mandis*. In addition, it has more direct control over the quality of what it buys. The

company reports that it recovers its equipment costs from an e-Choupal in the first year of operation.

Technology

The computer, typically housed in the farmer's house, is linked to the Internet via phone lines or, increasingly, by a VSAT connection, and serves an average of 600 farmers in 10 surrounding villages within about a five-kilometer radius.

Power outages and the low quality of the power supply have been significant issues. Battery-based UPS systems have been provided, backed up at times with solar power.

As the e-Choupal model has progressed, ITC has realized that dial-up connectivity is not sufficient to drive proposed future applications. To support transactional capabilities and multimedia applications, the company needs reliable connectivity with better throughput. It has decided, therefore, to adopt a satellite-based technology (VSAT) that enables a throughput rate of up to 256 Kbps. This solution is expensive, however, costing about Rs.120,000 (US$2,650) per installation.

Replicability and Scalability

The e-Choupal network currently reaches more than 3.5 million farmers in nearly 31,000 villages through 5,200 e-Choupals in six states (Madhya Pradesh, Karnataka, Andhra Pradesh, Uttar Pradesh, Maharashtra, and Rajasthan). ITC plans to establish more e-Choupals, each serving about 10 villages within a five-kilometer radius. Its vision for the next decade is to expand from nine to 15 states, to reach 100,000 villages, and to benefit a total population of 10 million.

Through the e-Choupal system, ITC has empowered farmers by giving them more control over their choices, that is, what they grow, how much they sell their crops for, a higher profit margin on their crops, access to information that improves productivity, and improved crop quality, which contributes to making Indian agriculture more competitive. Villages benefit in other ways as well. For example, children often use the computers for schoolwork and games and to receive information on school test results.

Large profit-seeking companies can invest in rural development in ways that are affordable, sustainable, and replicable. e-Choupal benefits farmers, rural communities, and the company's shareholders.

e-Choupal is also expanding the range of its activities to support rural communities, using its network to deliver a broader range of services

and working in partnership with government agencies and civil society organizations in watershed development, animal husbandry, human capacity development, education, health care, and gender empowerment.

As such, e-Choupal is an excellent example of scaling up in terms of both the geographic reach of its activities and the scope and potential impact of its activities in rural India.

5.10. LINKING TELECENTERS TO BROADER DEVELOPMENT GOALS—PROJECT SIRU, PERU

Project SIRU (which stands for Rural-Urban Information System) is a partnership established by eight local governments from the department of Cajamarca (a province in the highlands of northern Peru) and six development agencies. Cajamarca is one of the poorest areas of Peru, and a very rural area—75 percent of its population lives in rural areas. To raise the productivity of farmers and support small-business owners and local governments, Project SIRU created a new space for information exchange. The project has a "hub"—called the Information Processing Center—collects, analyzes, and produces information based on the demand of users. It works with a network of telecenters or infocenters established in 15 towns.

With support from Practical Action (previously ITDG), the project is innovating with podcasting as a means of disseminating information. Podcasting is a method of publishing audio files via the Internet. Users can subscribe to a "feed," which allows them to receive new files automatically when they are uploaded. Any digital audio player or computer with audio-playing software can play podcasts or burn them to CD. Local radio stations can then rebroadcast the podcast to traditional radio receivers, or computers at community infocenters can be used to create audio CDs of the podcasts.[16] The infocenters are managed by local partners who act as infomediaries to deliver information to rural communities and, at the same time, as access points.

Telecenters provide many opportunities for local and international NGOs and donor agencies to deliver development-related information, whether in agriculture, health, education, or other areas. A mix of new and old technologies can be used to create connections between information synthesizers at the provincial level, infomediaries at the local level, and the people who need access to information within the community. It is conceivable that telecenters operating as social enterprises could enter into agreements with donors, government agencies, private service providers, or local nongovernmental organizations to facilitate dissemination of critical information to rural and underserved urban populations.

5.11. GRAMEEN VILLAGE COMPUTING[17]

From March 2003 to September 2004, the Grameen Foundation, in partnership with ASA (local microfinance partner in India) and Drishtee (an organization that has launched more than 1,200 village computing kiosks in Northern India) ran a pilot village computing project in Tamil Nadu, India. ASA served as the project implementer, hiring a local team with expertise in ICT, small-business development, and rural marketing, to manage the project on the ground. Drishtee provided its local language software portal through which the kiosks could access e-Governance services, agricultural information, and other private services. The foundation funded the pilot and provided business and program management support.

Each center was equipped with a personal computer, printer, and Internet access, and 16 of them also had digital cameras. The equipment was purchased with a loan from ASA. The centers provided a range of services to the local community such as e-Government services, passport photographs, desktop publishing, and technology training.

Organizational Model

The kiosks were launched under a franchise model in which all operators had to pay an initial franchise fee to join the program (approximately US$42) and an ongoing monthly franchise fee (approximately US$11), which also permitted access to Drishtee's online software services. Projected revenue from these franchise fees formed the basis of the business plan. As the project reached efficiencies of scale, these fees would enable the village computing program to achieve financial sustainability.

On a very practical level, the pilot was successful in that it created locally owned, sustainable businesses that 1) provided access to critical information and services to their community; 2) empowered the rural poor with the tools of the information age; 3) presented opportunities for isolated communities to engage in the larger economy and society in an informed way; and 4) provided an opportunity for people to receive technical training (and, consequently, better employment opportunities). The kiosks were extremely profitable—but largely because of desktop publishing services and printing, not through the "services" offered by the franchise company. This created challenges for the franchise-based business model. Upward of 95 percent of the kiosks' revenue was generated by offline use, specifically desktop publishing and computer education.

Local Content Generation

The kiosks were located in areas with fairly reliable dial-up Internet connectivity. However, the big challenge with respect to Internet use was creating locally relevant information for the users. Attempts were made

to develop local content, and the more successful efforts included a local matrimonial database (at the time, the matrimonial web sites in India had almost an exclusive city/urban focus and did not include people from more rural villages) and astrological services. The pilot also provided e-Governance services, local crop prices, and a local classified listing service. However, the time and effort required to maintain these services, and the reality that the matrimonial/classified databases are only useful once a significant scale has been achieved, revealed that these were not viable options. Although there is much talk in the field about the success of this "local content" and "locally relevant services," the actual revenue generated by this content is minimal. Until the sector grows and matures as a whole, further business development to create local services and content will be challenging. It is very difficult for a franchise to develop and cultivate services, especially e-Governance services, which were incredibly labor intensive to execute and manage.

Another factor inhibiting use of online services was the financial incentives for the kiosk operators to promote and sell these new services. Everyone in rural India recognizes the value of a computer class (signs for C++ programming classes can be found in even the most remote villages), and the kiosk operators did not have a difficult time selling computer training for Rs.500 (approximately US$11). At that price point, they were strongly motivated to spend their time promoting computer training rather than trying to explain and sell a much cheaper (Rs.5–20) e-Governance service or matrimonial listing. The high demand for training may be unique to the Indian market and should not be generalized to communities without similar socioeconomic and technology needs.

Some kiosks had just a single computer, while operators at others expanded their operations to include multiple computers (usually used and lower-quality ones than those purchased originally). The kiosks with multiple computers typically had larger and more profitable computer classes (i.e., they could teach more students at a time); however, there were similar issues with respect to use patterns and revenue collection in both single- and multiple-computer establishments.

Financial Challenges

Collecting monthly fees from the kiosk operators was also a significant challenge. Unlike Village Phone, which uses prepaid airtime cards to collect money up front, collection of fees from the kiosk operators proved to be labor intensive, time consuming, and expensive. The question foremost in the kiosk operator's mind is: What value does the franchise provide to me? For a network operator, the question becomes, "What services can I provide to the kiosk operator that will be of high perceived value to him or her?

Locally appropriate and relevant services are an expensive proposition for the network operator to develop and maintain, so he might look elsewhere for high-perceived-value services to entice the local operators to pay their monthly fees. Cheaper connectivity costs would have been one way for the franchise to provide ongoing value to the kiosk operator. In South India, where the local infrastructure is much better, it is not unusual to have multiple Internet service providers (ISPs) covering the same area. If the franchise can provide a discounted connectivity rate to the kiosk, this approach might have had more success.

In this immediate example, the amount of marginal increase in revenue from better connectivity would probably not have been enough to provide the franchise with a significant income. When the pilot was conducted, the infrastructure was a major limiting factor—Internet connectivity through the mobile phone was not yet available, so kiosks had to connect to the ISP through the phone line. The per minute cost of phone use was actually greater than the ISP charge, which obviously mitigated the value of cheaper connectivity provided by the franchise. This issue may now be moot with mobile connectivity (e.g., WiMax, general packet radio services [GPRS], EDGE) becoming more widespread in India.

Another contrast to Village Phone is the size of the loan. The village kiosk loan was approximately 10 times greater than the loan for a village phone, so the former required a much greater resource commitment by microfinance institutions and presented a different level of risk.

5.12. FUTURE TRENDS IN SERVICES

In the future, we can expect both a broader range of services to be available overall and a number of truly multipurpose telecenters, but also the emergence of more specialized telecenters in some environments. There is an interesting trend toward polarization in the types of telecenters: more specialization for some and more generalization for others in the kinds of services being offered. There is a secular trend toward focusing on some amount of revenue generation in all models, as the challenges of long-term sustainability become more and more apparent. There is an encouraging tendency toward separation of responsibilities, with access provision being handled by efficient commercial operations, and the community development organizations acting as their customers. Content provision is appropriately done by organizations that are primarily involved in rural development; those same organizations seldom perform very well at running the business of providing access to the people the community developers want to reach. And there is an ever wider consensus that access to information and services contributes to development and is a social equity issue for the least privileged.

In terms of services, a very large impact will be seen from the growth in availability of local content. In the past, telecenter operators generally had to create from scratch any content they wanted to be available to their customers. This was driven as much by lack of local content as by the fact that the connectivity component of the infrastructure was insufficient to access information provided by others. The evolution that has been seen in the industrialized world, where the tipping point has already been reached, results in massive quantities of information being freely provided on the web. This same transformation is in process in the rest of the world, and will soon result in a wealth of information being available. As noted earlier, the implications of this change for telecenter operators is that they can add value by: 1) organizing that information (through online portals that point to information relevant to their specific clientele, or through e-mail newsletters letting users know of sites others in their community have found useful, or through infomediaries in the centers); and 2) making the information more accessible or useful through adaptation strategies (translation into local languages, adding short annotations on the portal to help users decide whether to visit particular sites, linked addenda that offer "localization" of more general information, or organizing online fora where users can comment and share their own perspectives or adaptations).

There is currently a trend toward vertical specialization in some categories of telecenters, for example, telecenters specifically for health information or e-Governance. This kind of specialization will probably shift away from specialized *telecenters* to a specialization in specific *services* to be delivered through any variety of telecenter. In many cases the current trend is driven by necessity—if a country wants to make e-Government services available to its citizens, it has little choice but to create access points to accomplish that. Once generalized access is more widely available, one would expect those services to adjust themselves to a mode of delivery suitable for a general public access point, and to move away from the added expense of a vertical network of access points.

Somewhat tautologically, the collective history of the telecenter movement has been for concentration of services—telecenters rely on a number of computers in a staffed facility where face-to-face support can be offered to inexperienced users. We can expect to see the movement begin to incorporate a trend to de-concentration as well, since the center notion carries with it certain intrinsic limitations. The early notion of telecenters was spawned when computer literacy was rare, power and connectivity were major limiting factors, and the notions of virtual community and access to massive quantities of information were in their infancy. It was logical to address these constraints by putting the rare resources in a single place where they could be managed, and where the traditional mode of face-to-face support for computer help and community development could be accomplished.

As time passes, we can expect to see users more comfortable with membership in virtual communities, more capable with electronic or asynchronous communication via e-mail or chat, and more likely to be integrating ICT into their daily lives. Their needs will change from the occasional "event" usage of ICT where they have to have a big need before they would travel to a center and access information, to a "routine" use, where they would stop by a neighborhood store to use an un-staffed single computer to send e-mail, place a quick VoIP call, and check commodity prices while doing their errands. We are already beginning to see the more commercially oriented centers establish such outlying access points by using WiFi or point-to-point wireless modems to enable a connected kiosk to be placed in (for example) the checkout area of a grocery store, or the common area in a pharmacy, just as we have seen photocopy machines appear in the same types of places in a previous technology adoption cycle. The "de-centralized" machines usually require a prepaid account, and when a user logs in to use the unstaffed machine, the charges are automatically deducted from their account.

As "routine" use evolves, one would expect the applications and services offered by the groups that have pioneered shared access to evolve with them. If so, it's likely that the offerings of current telecenters will be expanded to accommodate use by individual, remote users, who stop by the kiosk at the bus stop near their residence, rather than taking a bus to town to visit the telecenter.

Growth in Microfinance, Employment, and Business Services

One trend in service development is so rapid and so significant that it deserves special treatment—the growth in microfinance, employment, and business services.

IIT Madras's TeNet Group has spun off a company, called DesiCrew Pvt. Ltd. whose vision is to enable livelihood creation through rural business process outsourcing (BPO) throughout India. Currently, the organization has kicked off its efforts in the state of Tamil Nadu and plans to expand to two other states. Twenty rural Internet kiosks have been converted into business process outsourcing/information technology-enabled services (BPO/ITES) centers. Services offered include data entry; engineering (2D and 3D conversion; computer-aided-design [CAD]); and localization (translation, Tamil typing, desktop publishing, multimedia works).[18]

The DesiCrew head office will be the front end of the operations and the interface point between the BPOs and the world at large. It will procure orders and pass them on to the Chiraag Internet cafés established by n-Logue Communications. Based on need, the café owner would recruit additional help or involve his or her own family members to complete the project. This

is a very compelling example of combining the power of telecenters with the opportunity to drive livelihood opportunities within a village setting.

Other types of services to be provided in the near future may include e-Banking and rural automatic teller machines (ATMs), possibly located in telecenters,[19] as well as insurance products and more advanced e-Learning alternatives. Microfinance is also likely to be linked increasingly to ICT applications. There is tremendous potential for increasing efficiencies in microfinance programs by computerizing systems and allowing borrowers and microfinance program officers to access individual borrowers' files online—perhaps even borrowers' individual credit ratings.

In China, PlanetFinance has established four community-based technology learning centers (CTLCs) in sites where the organization has ongoing microfinance programs. In addition, microfinance officers, disadvantaged groups, and the general public have received computer skills training. Mini-centers have also been set up, mostly in loan officers' homes, which are equipped with a computer. These are available for microfinance clients and other local farmers to access market information when they come for financial services.[20]

It should be noted that while India is moving ahead with innovative applications, other regions are not progressing as quickly and still see telecenters primarily as a means of providing shared access to basic telecommunication services rather than as delivery channels for a broad range of services across sectors.

Another interesting trend that may apply to all regions is the third-party payee model, whereby a third party, perhaps a government agency, pays for specific services to be delivered through telecenters (as in the case of Akshaya's e-Literacy campaign). Donor agencies and NGOs also may want to consider using telecenters as channels for the delivery of health education campaigns, for example.

5.13. TAKE-AWAYS

The range of topics in this chapter has been broad, and the environment has been one of very rapid change. We can expect the rate of change to accelerate, so the lessons will undoubtedly change rapidly too. The more salient ones include:

- Some content and services must be developed locally and must involve local institutions and the local community.
- Some services are developed more effectively at a higher level—whether a franchise network organization, a telecenter network, a government agency, or a university or other educational institution.

In a scaling-up context, this dimension of specialization in telecenter service provision becomes increasingly important. Individual pilot initiatives may have tried to provide their specific mix of services, but it is inefficient and often impossible for individual telecenters to develop more advanced transactional and e-Government services on their own. Therefore, partnerships with both private sector service providers and government agencies become essential—the telecenter ecosystem becomes essential.

- We are likely to see a trend toward unbundling services and developing rural services and applications that can be delivered through a multiplicity of platforms and telecenter models. For example, Microsoft® India, through its Saksham program, telecentre.org, and the National Alliance for Mission 2007 in India are working together to create a special fund to encourage development of software applications and other services that can be delivered through rural kiosks or telecenters.[21] This development should be factored into the planning of revenue models for services being developed now.
- The types of public-private partnerships emerging in India and other developing economies are not easy to foster in many developing countries where 1) the private sector is not as actively engaged in the development of applications and services for rural areas, and 2) governments are not as advanced in their thinking and planning in terms of decentralization of services through e-Government and rural access points.
- As illustrated by the case studies in this chapter, the issue is not only to decide which services to deliver, but also how to best deliver them and how to price individual services to build demand and generate sufficient revenues to become financially sustainable.
- Identifying the right mix of services for a specific telecenter is a multidimensional puzzle. Key dimensions include 1) the market and the competition (if any); 2) the goal orientation of the telecenter; 3) the extent to which the operator can and wishes to do internal cross-subsidization from within the revenues received for services; and 4) the extent to which the operator is able to generate revenues from sources other than users (i.e., government funding or donor support for specific services).
- Public funding can take many forms and may be essential to build demand and ensure equity of access and achieve a balance between the telecenters' social and economic goals. The investment can take the form of free (or almost free) services, often on a limited-time basis, to increase awareness of and demand for services or to increase the capacity of users to purchase other services in the future. These are often distributed in the form of vouchers that individuals within the community can redeem for services. In most cases, all services are

not equally profitable, and it may be worthwhile even for a for-profit telecenter to cross-subsidize certain services internally. Services can also be financed by government or donor agencies, leveraging the telecenters as a delivery mechanism for their development-related programs.

- Mechanisms for accessing and using services need to be addressed. Intermediaries can play a key role in ensuring that low literacy levels and other barriers to effective use of ICTs do not exclude the most disadvantaged individuals in the community.
- Computer training at all levels is usually in high demand as well. With a growing segment of the population—especially youths—becoming computer literate, other forms of ICT-enhanced training can be delivered through telecenters.
- Individual telecenters and networks or franchises need to keep an eye out for the potential to expand services in new areas. For example, new wireless technologies make it relatively easy to extend the reach of connectivity. Usage patterns will evolve to more frequent short visits as they become accustomed to regular use of e-mail and information access, and this usage pattern should lead operators to consider remote kiosks. A telecenter can become an ISP for local organizations, schools, businesses, or even individuals by reselling connectivity.
- The strengthening of the focus on employment and economic transactions is a major opportunity for telecenter sustainability. In particular, computer jobs like keyboarding or electronic publishing—employment that can be generated by ICT skills—will likely be eclipsed by employment that *uses* ICT as a tool, such as BPO and call center employment. Training for these new types of jobs, and revenues that come from the individuals' use of center facilities while they work, should offer considerable promise for sustainability.

5.14. MAKE IT YOUR OWN

Some of the areas that merit special consideration in planning include:

- Do you know what types of services are currently offered by telecenters in your country? What are key differences in the types of services offered across telecenters? Are some telecenters more innovative than others in the range of services they provide?
- Are there some examples of innovative pricing, business models, or marketing strategies telecenters use to help build demand for new services? Where do most of the telecenters' revenues come from?
- Are telecenters working independently of each other with regard to services, or are there some emerging partnerships for the development of common services or content? Which organizations (public or private)

or experts could contribute to the development of services to be delivered through telecenters?

- Are parallel national efforts underway to get the development-oriented organizations in the country—government ministries, NGOs, development agency-funded projects, commercial organizations—to put their materials in their local language and locally relevant content resources on the web?
- What opportunities can you identify for employment generation and business transactions to take place in your context?

5.15. ANALYZING YOUR SITUATION

In Chapter 5, we have discussed considerations related to the definition and selection of services that might be appropriate in different situations. As a simple example of how these questions might factor in the systematic development of a plan, we will hypothesize that there are three different categories of hardware capability that we consider relevant for some specific situation. In this case, the levels might be defined as:

- Voice Only (level 0): either fixed line or cellular
- PC (level 1): single PC + printer, with or without connectivity—a PC-based kiosk
- PC (level 2): multiple PCs + printer(s) with connectivity—a multipurpose telecenter)
- PC (level 3): multimedia center—advanced computing, printing capabilities, photo and video editing, etc.

In matching these with the likely characteristics of the potential sites, we might decide that the best matches would appear to be the ones depicted in Table 10 below:

Table 10: Example of Categorization of Telecenter Services and Content

	Telecenter e-Readiness		
Services & Content	**Low**	**Medium**	**High**
a. Voice only (cellular or fixed line)	✔		
b. PC (level 1)	✔	✔	
c. PC (level 2)		✔	✔
d. PC (level 3)			✔
e. Other			

This example is discussed in more detail in Chapter 9.

5.16. SELECTED RESOURCES

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Content

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ITrain Online. "Basic Skills." http://www.itrainonline.org/itrainonline/english/basic_skills.shtml

ENDNOTES

1 Raihan, Hassan, Chowdhuri, and Uddin, 2005.

2 More information about this interesting project can be found at: http://www.byrrajufoundation.org/gramit.htm

3 This activity is described at: http://www.tenet.res.in/Activities/Products/doc/ruralIIITS.php

4 AED/dot-ORG, 2005a.

5 This refers only to services offered for a fee.

6 Five of the CLICs, located in larger communities, received 128Kb, while the remaining five, in more rural areas, received 64Kb.

7 See AfrikLinks web site: http://www.afriklinks.org

8 UNESCO/Bureau de Bamako, 2006.

9 Akshaya web site: http://210.212.236.212/akshaya/; list of study reports (with links) at http://210.212.236.212/akshaya/studiesresearch.html; Siochru and Girard, 2005; Kurien, Toyama, and Ray, 2006.

10 Other characteristics of Kerala may make it unique as an Indian state, including its geography and population distribution, high levels of job-related migration, and near universal literacy. Malappuram itself has a high population density, with residences located primarily along roads, making it relatively easy to establish centers within reach of most households.

11 Tegizcom eCenter Franchise Business Model, November 2006.

12 COMAT, 2006; BusinessLine, 2006; personal e-mail communication with Ashim Roy of Comat; COMAT web site: http://www.comat.com

13 COMAT, 2006.

14 This case study draws heavily from Kuttayan and Rao, 2003.

15 *Mandis* is a government-mandated market yard where farmers sell their crops.

16 Podcasting Pilot Project, Practical Action website: http://practicalaction.org/?id=podcasting_peru; listen to podcasts at http://chilepodcast.blogspot.com/2006/02/podcasting-pilot-project.html

17 We are grateful to Tim Wood of the Grameen Foundation for sharing these findings with us.

18 IIT Madras' TeNet group promotes rural BPO. (2006, August 16).

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21 telecentre.org/Microsoft® Saksham, 2006.

CHAPTER 6:
Identifying Appropriate Technologies

6.1. QUERIES TO THE TELECENTER HELP DESK

We only have four or five hours of electricity on a given day. We can't afford a generator, and we haven't been able to find a donor willing to provide funding for a solar system. What are our alternatives? What are some examples of successful power solutions for shared-access facilities?

(Telecenter operator, Country I)

We're planning the deployment of a network of telecenters and information centers in rural areas of the country. The plan is for the telecenters to have at least 10 networked computers sharing the telecenter's connectivity. These telecenters will serve as information hubs for the information centers that will have two computers each with no connectivity. We've been talking to a number of rural connectivity experts, but we're not experts ourselves and we don't know how to compare what they are proposing? So our question to the Help Desk is this: What rural connectivity options should we be looking at, and what criteria can we use to assess the proposals put before us?

(NGO manager, Country J)

If the government's goal is to establish a telecenter in every district of the country, how cost effective is it going to be to set up connectivity solutions for each of the telecenters individually, based on available infrastructure, versus expanding connectivity throughout the country and having telecenters as one of many clients?

(Rural telecommunications advisor, Country K)

6.2. TECHNOLOGY PACKAGES

Since telecenters come in many different forms, their technology requirements also vary a great deal. However, whether it is a one-PC kiosk operated by a single individual or a fully equipped multimedia capable telecenter with 20 PCs, the technology issues are similar. A telecenter's "technology package" consists of four interlocking systems:

- power supply system;
- durable computing and other end-user devices;
- software and applications; and
- connectivity supply.

A lack of reliable electrical power, a lack of affordable and reliable connectivity, and difficulties associated with maintaining equipment in working order are the three most common technical challenges facing telecenters.

The first two challenges result from weaknesses in the power and telecom infrastructure common to most developing countries. To address these two challenges, instead of waiting for the infrastructure to improve, telecenter initiatives often try to provide their own reliable electrical power and connectivity solutions. This approach increases both complexity and costs, and these costs result in higher user fees, which may limit the telecenter's capacity to deliver broad social benefit and prevent the telecenter from achieving financial sustainability.

The third challenge, difficulties associated with maintaining equipment in working order, stems from a set of interrelated factors:

- Most computing equipment and peripherals are not designed for the intense demands in telecenters or the harsh environmental conditions, heat, and dust, common to telecenters in rural and underserved areas.
- Routine maintenance skills to prevent damage to and repair equipment when it fails are in limited supply, especially in rural areas.

Telecenter managers often ignore this third challenge, so equipment fails and telecenter sustainability is hampered.

Challenges from power, connectivity, and equipment reliability are intimately related to the type of computing devices and the applications selected for use in telecenters. It is common for telecenter owners and managers to purchase equipment based primarily on price. This often results in apparent short-term cost savings, but higher costs over the long term for energy consumption and reliability problems. Selecting the best mix of equipment is complex and requires balancing countervailing considerations, such as initial cost, convenience of local service, operating costs, expected service life, reliability, warranty coverage, etc.

Addressing power, connectivity, and equipment reliability challenges and selecting the most appropriate computing equipment and software solutions starts with a set of assessments within the context of the broader analysis of the local ICT environment. Some key questions common to this assessment include:[1]

- What are the characteristics of the local power infrastructure? If the community is on the electricity grid, how many hours of reliable electricity are available each day? Are there any problems with fluctuations in voltage?

- What is the existing telecom infrastructure? Are there local ISPs? What is the cost of connectivity, and is broadband connectivity available or is there only dial-up service? If Internet access is available, how can it be provided (copper wire, wireless, satellite, etc.)? How far is the community from the nearest connection to the Internet backbone?
- If wireless connectivity is being considered, is the terrain hilly or flat?[2] Is there a clear line of sight to any necessary communication relays? If public frequencies in unlicensed bands are being considered, are there risks of interference, such as from other users of the same frequency who are violating power emission limits?
- What kinds of telecenter services will experience the greatest local demand? How much revenue will each of these services generate? This assessment will help the telecenter team prioritize service against local demand and net revenue earning potential. What software and applications will be needed to provide these services? How might demand for services evolve as people's skill in using ICT increases and they become more aware of the advantages of using ICT? This analysis will help determine what level of connectivity is desired and help define the specifications for computer equipment, peripherals, and applications.
- What types of computing equipment and peripherals would be needed to provide essential services at the telecenter? What types of equipment would be best suited for the local power and connectivity environment? What is the total cost of ownership for different equipment packages (not just the initial purchase price)? The responses to these questions will likely be very different for a one-computer kiosk operated by a small business versus a telecenter with 10, 20, or more computers operated as an enterprise and used by many people at a time.
- What are the power requirements for different equipment packages?
  - Is there sufficient electricity available at the telecenter to run all of the equipment at the same time?
  - If not, how costly will it be to provide additional power at the telecenter?
  - If the telecenter is established outside the national or local electrical grid, what is the comparative immediate and long-term cost of using solar or generator power systems?
- Will a backup power supply system be required to keep equipment operating when electricity from the grid, solar panels, or generators is not available? Is it essential to "clean" the electricity from the grid so that equipment is not damaged by frequent and disruptive power fluctuations?

- Will other types of power-hungry equipment, such as photocopiers and air conditioning, be running?
- What bandwidth do the telecenter's Internet services require? Bandwidth requirements are affected by the types of applications and services that will have the greatest demand (e-mail, web surfing, telephony, video, music, e-Learning, e-Government, etc.); the average and peak number of simultaneous users; the type of data generated by the application (symmetric versus asymmetric, burst versus continuous, real time versus delay tolerant); and the telecenter's ability to manage bandwidth use among patrons based on use and fees paid by users.
- What costs are associated with each element of the technology package?[3]

In the end, a number of other factors may enter into this analysis, including the availability of bundled low-cost software packages and the skills of the telecenter management to make effective use of open-source software; the availability of local, reliable, and affordable maintenance and repair services; and the total cost of hardware, peripherals, and software purchased locally. The need for, and the cost and availability of, providing quality training and ongoing professional development training should be factored in when making decisions about equipment, software, power, and connectivity procurement.

Selecting the optimum solution is a balancing act among options that may not be clear-cut or ideal situations. It's best to start with an assessment of what's immediately available or knowable: What is the power situation like? What connectivity can I buy right now, and how well does it work? What services will be the main business of the center? Then you can go through an analysis of the more limited range of options that are realistic in the actual context. For example, you might conclude in that analysis that even short power failures compel you to install a charger and a battery bank to keep your machines running for at least an hour, so your clients don't leave before the power returns. Or you might conclude that, even though the ISP promises a nominally high bandwidth, it doesn't actually deliver that, so you'll have to abandon your hope of using VoIP as a revenue producer. Once you have a fairly sound idea of what is feasible in the near term, you can start to project options that anticipate improvements in infrastructure or that let you take into account what changes will come as your client base grows and becomes more computer literate. This analysis will also have to consider what is feasible from a financial perspective. Your initial funding and projected revenues matter, of course, but finances also depend on the size and expected rate of maturation of the latent demand, since you will need a cash reserve to last you until you reach sufficient cash flow to maintain and grow operations. This kind of planning is full of uncertainties, of course, but the more systematic you can be about it in the beginning, the more likely you will be able to avoid unpleasant surprises.

In the remainder of this chapter, we address each of the four elements of a telecenter's technology package in more detail to provide the basic information needed for your deliberations.

6.3. POWER ISSUES AND SOLUTIONS

When developing ICT-based projects in off-grid or poorly electrified areas, the cost of providing electricity can consume as much as 80 percent of initial project funds to establish the telecenter if energy demand is not managed carefully from the outset.

Box 13: Energy-Efficient ICT Options

- LCD monitors consume 50–66 percent less energy than CRT monitors.
- Notebook computers consume 85 percent less energy than do desktop systems with a CRT.
- Inkjet printers consume 40–80 percent less electricity than laser printers.
- Thin-client and "virtual client" solutions are inherently less.

The best first move is keeping your total power requirements as low as possible. Selecting low-power ICT equipment, such as notebook computers, low-power desktop computers, LCD screens, and inkjet printers (see Box 13), can result in significant net savings in the total cost of operating a telecenter over time because of less demand for electricity. This lower demand for electricity also results in smaller and less costly power-generating facilities (solar or diesel/gas generators) needed to provide electricity to power equipment. Energy management is particularly important when purchasing solar photovoltaic (PV) systems, small wind generator systems, bio-gas systems, or conventional diesel/gas generators.[4] In addition to selecting low-energy computer equipment and peripherals, it is equally important to consider low-power lighting systems (fluorescent or LED lights) and alternative air conditioning, cooling, and heating systems.

Even when inexpensive grid power is available, purchasing equipment that consumes less electricity may also lower operating costs and increase reliability of equipment, both of which result in greater net revenue. When the grid has frequent outages, a backup battery system may be needed to ensure continuous availability of electricity. Such systems can also extend the life of computer equipment by isolating the equipment from grid power fluctuations. As with energy-generation systems, the cost of a backup battery system increases as the capacity of the battery bank grows to meet electricity demand.

In general, more energy-efficient technology packages result in lower total costs associated with any power shortfalls that may arise during the project.

It is also important to note that, over the long term, the cost of electricity from most sources will increase. When national or local electrical generator and transmission systems are privatized, as is happening in many countries, the cost of electricity can increase rapidly. As a result, careful analysis is needed to choose between technology packages based on immediate purchase prices and long-term operating costs. Decision support tools such as the "Powering ICT Toolkit" can provide some useful guidance.[5]

Table 11: Energy Options[6]

Energy Solution	Capital Costs & Operation & Maintenance	System Lifetime	Availability of Resources
Solar Photo-voltaics	High capital costs (US$12,000–US$20,000 per kW); Low operating costs (US$5 per kW/h)	20–25 years	Widespread
Generator sets (diesel/gas)	Low capital costs (US$1,000 per kW); High operating costs (US$250 per kW/h)	3–10 years	Widespread
Small wind	Medium capital costs (US$2,000–US$8,000 per kW); Low operating costs (US$10 per kW/h)	10–15 years	Site specific
Bio-gas systems	Low–medium capital costs, low operating costs	10–20 years	Site specific
Micro-hydro	Low–medium capital costs (US$1,000–US$4,000 per kW); Low operating costs (US$20 per kW/h)	50–100 years	Site specific
Battery backup systems	Battery backup systems are an essential complement to solar PV, wind, and bio-gas systems. They can also supplement unreliable grid electricity and lower the cost of using generators. Battery backup systems can also improve telecenter revenue by ensuring that equipment remains operational despite problems with grid electricity, and by protecting computer equipment from failure from power spikes. Such systems can also use conventional lead-acid truck/car batteries or more expensive deep-cycle marine batteries.		

A variety of field-tested, commercial power systems is available to provide electricity for telecenter and kiosk computing systems in off-grid and poorly electrified areas. Widely available options include rechargeable battery systems (with and without inverters) that are recharged when grid power is available, solar PV systems with battery backup, and diesel or petrol generators with or without battery backup systems. In certain environments, small wind turbines, micro-hydro systems, and bio-gas systems can also be cost-effective options (see Table 11). The equipment and installation costs in developing countries for these energy systems typically range between US$1,000 and US$20,000 per kilowatt. The renewable power systems typically incur most of their costs up front with the initial purchase and

installation of the system, whereas power options based on fossil fuels tend to have lower initial investment costs and much higher recurrent costs for fuel over time. Maintenance costs, frequently estimated at 10 percent per year of the capital investment; do not include cost of the capital equipment replacement cycle as equipment dies or becomes obsolete.

In many parts of rural Africa—and rural areas around the world—the electricity grid either does not exist or is unreliable. The case study below focuses on three telecenters established in Rwanda with funding from USAID and technical support from AED. Their experience with electricity challenges is typical of many telecenters around the world.

Example from Rwanda of Designing and Implementing a Cost-Saving Battery Backup Solution[7]

Three community information centers (CICs), or telecenters, were established by private entrepreneurs with partial funding from USAID and technical support from AED over two years. During this time, the entrepreneurs received training in business practices to build on their existing skills and help them address their sustainability challenges.

Within a few months of operation, however, it became clear that the unreliability of the local electricity supply was having a considerable negative impact on their ability to generate revenue. Power shedding often happed during peak periods of demand, and without power the CICs were forced to shut down regularly. AED asked Winrock International to identify alternative power solutions, to evaluate these alternatives, and to recommend the most cost-effective and sustainable approach.

The first step in determining what solution would be most appropriate was to calculate the daily energy demand at each of the telecenters, based on the requirements of its respective equipment and hours of operation. One of the CICs was equipped with LCD monitors, the others were equipped with CRT monitors. Table 12 (below) illustrates the impact of monitor type on daily energy demand.

Table 12: CRT versus LCD—Comparing the Average Daily Energy Demand (Wh/d)

	CRT	15" LCD
Monitors (10)	4,000	1,000
Printer (1)	160	160
CPUs (10)	1,800	1,800
Lights (4)	320	320
Total	**6,280**	**3,280**

While solar PV was also considered as an option initially, the detailed analysis focused on combinations of battery backup systems and generators to supplement the supply from the grid. The costs associated with three different options were compared (see Table 13 below).

Table 13: Power Solutions Initial Cost Comparison[8]

Option A	Option B	Option C
Grid + charged battery backup system	Grid + diesel generator with battery storage	Grid + diesel generator without storage[9]
$3,976	**$5,659**	**$7,160**

Based on this analysis, a battery backup solution was designed for each of the three sites. The solution involved charging batteries when grid power was on and using the batteries when grid power was off. The higher capital investment of generators plus batteries in Option B was more than offset by the high fuel consumption of Option C, where the generator had to be started and run every time power was interrupted.

Box 14: Key Elements of Total Cost of Ownership and Use

- *Buying the right equipment*—initial capital costs
- *Beyond opening the box*—installation costs
- *Paying for donations*—cost of getting and maintaining donated equipment
- *Powering IT*—energy costs
- Software and software upgrades
- *Getting everyone ready*—cost of training
- *Keeping someone at the helm*—cost of support staff
- *Keeping things up and running*—technical support and maintenance costs
- *Staying connected*—connectivity costs
- *Expanding services*—investing in new revenue streams
- *Fixing equipment*—repairs and loss of revenue due to downtime
- *It can't be fixed; what do we do with it now?*—disposal costs
- *Computers don't last forever*—replacement costs

In short, a successful power solution must be both cost effective in terms of initial investment and recurrent expenses and robust. Cost-effective power solutions involve a combination of judicious selection of energy-efficient equipment to limit energy requirements in the first place and a reliable energy supply, based either on a combination of alternative energy sources, such as solar energy and energy storage systems (batteries), or on a combination of grid electricity and batteries.

Anyone interested in setting up anywhere between one and 5,000 telecenters, whether or not the electricity supply is a challenge, will benefit from using existing decision-making support tools, such as the

Powering ICT toolkit, if only to get a sense of how to minimize electricity costs, which tend to be a significant component of *total cost of ownership* (TCO). A list of the issues normally encountered in a TCO analysis is included in Box 14.

6.4. COMPUTING DEVICES

The birth of the modern information society is usually traced to the beginnings of "personal computing," with the emergence of the first affordable, mass market desktop computers in the 1980s. Obviously, many of the enabling factors—the development of mainframe computers and their adoption by business, the initial work on networking computers together, the development of chip production technology, and the focus on user interface design—began far in advance of that, but we can trace the real tipping point to the availability of affordable, stand-alone computers. The subsequent decades have seen a dizzying pace of development of new hardware, and with it new applications that took advantage of each step forward in capability. The personal computer has matured into a broadly capable machine, useful for both computing and communications. It is the most capable tool in the toolbox, but it is not the only one.

Simultaneous with the progress being made in computing hardware, great advances were being made in communications technology, both for data communication and for wireless communication. The famous "convergence" of these technological developments puts us at a special place in history, where the primary devices from each stream are each beginning to adopt elements of the other. Computers are now platforms for Voice over Internet Protocol communication. Cell phones have added many nonvoice services, such as SMS messages, e-mail access, and in some cases Internet access. Somewhere at the intersection of computers and phones one finds personal digital assistants (PDAs), which have lately been more tightly integrated with voice services and access to information through the cell phone's communication capability.

These devices are all in states of rapid change, but there are a few points that are worth making as we discuss them here.

- The first is that the nature of each device makes it attractive for some tasks and inefficient for others. The limited input/output characteristics of phone and PDA devices make them unlikely candidates for drafting a long report. By the same token, carrying around a heavy, power-hungry laptop all day just to receive VoIP calls and send short messages isn't too attractive a prospect, either.
- The second is that devices and applications co-evolve. When a technical capability becomes possible, users start to imagine what they might do with it, and applications emerge. The user demand for

the appropriate device stimulates further hardware and infrastructure development, and makes it more worthwhile to invest in new applications as the size of the potential user base increases.

- The final point is that these devices are not really in competition with each other. Each does what it does, and while there is overlap in the functions they can serve, each excels in some area. The primary issue here is matching the hardware selected to the user needs.

Cell Phones and Personal Digital Assistants

As cell phone use has increased around the world, some observers have argued that these phones are more immediately relevant than PCs to the poor and less educated populations of developing countries. There is no denying that cell phones have transformed the communication landscape in developing countries, and that cell phones are gradually transforming from voice devices to much richer information-handling devices. They have their limits as information processors because of their input/output limitations, but they excel as communication devices and as information-seeking tools for certain types of information. The high penetration achieved in developing-country environments in a very short time make them a very attractive platform for some kinds of applications.

Cell phones were initially essentially audio devices. The current installed base of cell phones in developing countries tends to be fairly basic voice devices with capability for sending short text messages. Even the new generations of cell phones, dubbed "smart mobile computing devices," and new mobile applications allow for an increasing number of transactions to take place via phones as well as some text viewing and composing capabilities. There has been a strong interest in using cell phones to permit uses beyond voice conversations, such as using Interactive Voice Response (IVR) platforms to let people request and receive information (these are the devices that allow you to check the balance in your bank account), to carry out financial transactions (in a way quite similar to debit card use), to check market prices and receive news updates, and the like. As these types of applications emerge, the capabilities of phones purchased in developing countries will gradually rise, and a new market will have arisen. Then, no doubt, an enterprising soul will spot a new opportunity to meet some need with that platform, and the cycle of co-evolution of device and application will continue.

Some of the literature about the emergence of cell phone communication has noted that there is already a broad base of benefits and economic improvements that can be attributed to their use. One, a study from McKinsey and Company, attributes a surprisingly large amount of the economic growth in some countries to the new flexibility provided by high cell phone penetration.[10] Another, a study performed by Vodaphone and the London

Business School, looked at the economic and social impact of cell phones in Africa, and found that the patterns of use were different from country to country, but that all were different from the patterns in developed countries, and almost all had direct impact on economic activity.[11]

The general parameters of difference between cell phones, PDAs, and personal computers have traditionally had to do with raw computing power, available applications, user interface, and portability. The form factor of phones and PDAs favors portability by being small, but trades off ease of reading and composing instead. Conventional stand-alone PDAs are losing ground to cell phones as the problems of computing power and portability work themselves out. We may see a nearly complete melding of the two in smart phones, and the near disappearance of the PDA as a separate category, because adding voice to a PDA clearly improves its functionality, and miniaturization of components has brought the size down to the cell phone range. In spite of new browsing software designed to facilitate web browsing on cell phones, text capabilities (text messaging or web browsing) of handheld devices, including personal digital assistants (PDAs), will likely remain limited simply by virtue of their small screen size and the difficulty of text input from small keypads and multifunction keys. In the end, most people's computing experiences will be based on a combination of cell phones, other mobile devices, and PCs.

Personal Computers

The dominant platform for telecenters has always been the personal computer. Should we expect to see telecenters emerge that abandon personal computers for smart phones? Indeed, what would a "center" based on cell phone usage look like? We already have good models of development-facilitating cell phone use, pioneered by the Grameen Bank in Bangladesh; they take a very different form from the historical telecenter. In short, the cell phone and PC serve different, yet complementary purposes. People who use smart cell phones with advanced computing functions don't use them in place of computers but as a complement to computers. The platform used (whether cell phones, PDAs, PCs, and devices not yet invented) is not as relevant as the ability of all these devices combined to help people connect—both among themselves and to knowledge resources. In fact, many telecenters have realized the importance of leveraging multiple communication channels, including radio—which despite its limitation as a one-way device remains the best way to reach a very broad target audience in many rural and underserved areas of developing countries.

Cell phones and PDAs with more advanced capabilities may help to increase awareness of the value of information and the power of PCs. Browsing the Internet on a cell phone may prompt people to demand greater capability and to turn to PCs. Checking market price information by phone or making

payments by phone may be the first steps toward using a wide range of devices and applications.

There are many options for structuring the shared access platform in a telecenter, and the decision-making process requires a consideration of many different factors. The selection of computing devices has an important impact on TCO in terms of 1) power consumption; 2) the availability of technical support, maintenance and repair, and associated costs; 3) user-friendliness and training needs; and 4) costs for software, essential peripherals, and consumables. Selection also has an important impact on the type of services offered.

A number of initiatives have been launched in recent years to develop low-cost, low–power, robust computing devices. Mike Trucano (of InfoDev) compiled a useful list of such devices;[12] these include some very high-profile initiatives, such as the "One Laptop per Child" project and India's Simputer, but also lesser-known and country-specific projects such as South Africa's Ndiyo! pilot, an ultra-thin-client computing solution using open-source software. Some of these efforts are more relevant than others to telecenters. Interest in simplified and "ruggedized" PCs designed to operate in remote communities with challenging environmental conditions (as exemplified by Intel's and AMD's exploration of specially adapted PCs) remains strong, and thin-client solutions have attracted a lot of attention for potential application in African telecenters.[13] Trade-offs between thin client and rich client systems are discussed in Box 15.

Efforts are ongoing to enable individual users and telecenter operators to purchase PCs through pay-as-you-go schemes or low-interest loans. Microsoft's FlexGo™ program is one example. Customers who normally couldn't afford to buy a computer and who are unable to finance the equipment can make a small down payment and take it home. Use of the computer is based on purchases of time credited on prepaid cards or through a monthly subscription. There are innovative possibilities for entrepreneurship here, as well. An enterprising individual can purchase one or more Microsoft® FlexGo™ machines and sell access to them, in effect helping to capitalize the telecenter operation but not requiring them to pay for the "loan" any faster than the speed with which the customer base grows. This allows dynamic cash flow management for the entrepreneur, instead of paying a sizable, fixed monthly loan payment.[14]

In some countries, the impediment to time payments for purchasing computers has been identified as the cost of billing and the lack of any asset to secure the loan, so an innovative approach has been adopted: cell phone subscribers have been able to make installment payments through

Box 15: Comparison of Thick Clients versus Thin Clients for Telecenter Purposes

A **thick client** (also known as a fat client or rich client) is a client that performs the bulk of any data processing operations by itself. While think clients are usually networked in a telecenter, they do not necessarily rely on the server for anything but connecting to the Internet and local peripherals. The think client is most common in the form of a personal computer, as PCs or laptops can operate independently.

Thin clients, on the other hand, are groups of computers with very little computing capacity, which use the resources of the server for most of the actual computing. A thin client's job is generally just to generate and display the screen views provided by an application server, which performs the bulk of any required data processing.

From the users' perspective, the two architectures appear quite similar, but there are significant differences in cost and operational demands for the telecenter. Thin clients have regained some popularity in recent years as a possible alternative for shared-access facilities such as telecenters. Whether a thick-client (PC) or a thin-client solution is more appropriate may depend on a number of factors, including the types of applications to be used. Some key criteria to keep in mind:

- **Costs:** Initial hardware cost favors thin client, but lost revenues—if the thin client server goes down, then all the terminals in the telecenter are down—must be taken into account. Software and peripherals costs vary by the specific configuration.
- **Power requirements:** The power requirements are somewhat lower for a thin client, making it easier to build solar- or battery-powered labs.
- **Control over applications used:** With a thin client, it is easy to lock down terminal users to particular applications (e.g., web browsing and word processing) to prevent the use of the computers for games or other nonessential activities. On the other hand, if video gaming or VoIP is an important revenue source, a thick client may be more appropriate.
- **Theft:** There is less temptation to steal thin-client devices, because they are not useful unless they are connected to a server.
- **Maintenance:** Thin clients are less vulnerable to viruses and have few or no moving parts, so they should last longer than conventional PCs. Software installation and server configuration may be more complex for thin clients, a challenge for remote sites. If the telecenter is connected to the Internet, the thin-client server can be serviced and upgraded by remote technicians if such a service is available and affordable.

their cell phone bills. The marginal cost of billing is reduced to nearly zero, and the "security" for payment is possible disconnection of the cell phone.

6.5. SOFTWARE AND APPLICATIONS

There are two categories of software relevant to running telecenters:

- Telecenter management software
- End-user software and applications

Telecenter management software can help managers and owners track users and telecenter members, manage and control bandwidth, track use and provide billing by time or types of service provided, and evaluate uses by revenue and lower telecenter operating costs. More commonly available cybercafé management software can also be useful to telecenter managers in handling per minute billing.

UgaBYTES in East Africa developed a telecenter management software package that helps telecenters monitor their operations. The software can be downloaded for free from the UgaBYTES web site.[15] Another telecenter management software, the ADEN Pack, was developed with support from the French Ministry of Foreign Affairs.[16] In addition to these packages, there are many commercial software titles in multiple languages to help with different aspects of telecenter management. These and similar applications are rapidly developing tools to help telecenter managers price different telecenter services. For example, gaming and viewing video requires significant bandwidth, so it may make sense to price these services higher than basic e-mailing, or simply to measure the bandwidth use and charge for the amount used.

Another useful innovation for telecenters is Windows® SteadyState™, a toolkit for helping operators set up and manage shared computers (see Box 16).

Box 16: Windows® SteadyState™

Microsoft® created Windows® SteadyState™, a freely downloadable tool to help make shared computers more reliable and less time consuming to maintain. Unlike PCs, shared computers are:

- Used by many different people who generally don't know or trust each other
- Used in public places where privacy and security are big concerns
- Subjected to greater wear and tear due to their frequent use and public availability

Windows® SteadyState™ is ideal for computers in schools, public libraries, community technology centers, rural kiosks, and Internet cafés. It allows those who manage shared computers in these environments to easily:

- Defend shared computers from unauthorized changes in their hard disks.
- Restrict users from accessing system settings and data.
- Enhance the user experience on shared computers.

In terms of end-user software and applications, the options are many and diverse. Telecenter managers, like any other businesspeople, need to know where their costs are and how to price services to optimize their service levels and sustainability. Are young users who play online games and stream audio and video using up so much bandwidth that business customers can't get work done? Do enough people use the scanner to make it worthwhile to

replace it when it breaks? Are certain managers letting their friends print large quantities without paying for them? If rates vary by time of day, will work flow be smoother?

A common debate among proponents of telecenters focuses on whether they should use free and open-source software (FOSS) solutions, proprietary commercial software solutions, or a mix of both.

If initial costs of acquiring software were the principal criterion for deciding between FOSS and commercial versions, then the FOSS solution would win. Initial costs are not the only cost to consider, however, and even total cost is not necessarily the critical factor; the types of applications needed for the services that users want are more important considerations.

For many common types of software such as word processing and spreadsheets, there are comparable FOSS and commercial products. This is not the case for less common types of applications or utilities such as antivirus and antispyware software intended for commercial use. Furthermore, even though it does not cost anything to acquire FOSS, there may be longer-term costs in terms of staff time to support and maintain the software. It is important for telecenter managers to carefully evaluate the immediate and long-term costs of FOSS and commercial software when deciding between the two.

It is also important that telecenters provide users with software applications with which the users are familiar or will need to use in their employment. This is not an either/or situation; telecenters might find it useful to offer a choice of applications. Thus many users might want to have access to the Microsoft® Office Suite they already know. Telecenter clients may be interested in learning to use Microsoft® Office applications if these are required to get jobs. Providing access to similar FOSS applications only may satisfy some clients but result in a loss of revenue as other users find different venues to use the tools they know.

It is important to look at all of the issues involved in setting up and maintaining telecenters. What are the immediate and long-term cost implications for a small-scale entrepreneur with a one-computer kiosk versus a larger-scale enterprise consisting of one or several multi-PC telecenters? In the end, software that is free does not necessarily have a lower TCO than software that one has to pay for. It is critical that decisions about software be based on situation specific analysis, not on ideology.

A 2003 bridges.org study[17] on public ICT access and software choices in Africa came to the conclusion that there were trade-offs on both sides of the equation. The adoption of FOSS was not as simple or inexpensive as many people believe, but still had cost advantages. The use of standardized proprietary software had

advantages for mainstream application integration, and updates and support from the software publisher. Among their conclusions:

- Both free/open-source software and proprietary software can be used to offer technology solutions appropriate for African public access computer labs.
- The thin-client model provides a reliable, cost-effective, and popular solution for public access computer labs in Africa.
- Software license costs for proprietary software are significant in principle but in practice they are not borne by many African public access labs.
- At ground level in Africa, the potential for cost savings gained from the use of FOSS depends on many factors:
  - General ICT skill levels—especially for installing and maintaining software
  - Training courses available—generally more available for proprietary software than for FOSS
  - The fact that FOSS makes source codes available and encourages modifications is not exploited by the vast majority of public access lab staff
  - Availability of local and quality technical support
  - Success of FOSS relies heavily on efforts of a small group of enthusiastic FOSS supporters

6.6. CONNECTIVITY SOLUTIONS—FROM ASYNCHRONOUS NETWORKS TO BROADBAND[18]

Rapid advances in wireless technologies are making it increasingly cost effective to deploy networks in rural and underserved urban areas. These new wireless technologies are also more scalable and can be deployed more rapidly than ever before. Versions of these technologies are being used to distribute broadband Internet access across cities, regions, and even, as in Macedonia, an entire country. It is now possible to bring Internet access quickly and relatively inexpensively to communities that are outside the national telecommunication network. Similarly, the technology makes it possible to connect two or more computers in a telecenter to distribute access to the Internet and other common resources among users at a lower cost than with conventional cabled networks. As a result, cheaper, easier to use, more robust, and more energy-efficient end-user equipment is making it possible for small businesses and entrepreneurs to start up telecenters and similar shared-access facilities.

The connectivity options available to telecenters generally include mobile cellular networks (GPRS and CDMA), fixed wireless networks (WiFi and

WiMax), and satellite-based connectivity (VSAT and INMARSAT BGAN). Wireline technologies, including copper and fiber optic cable, are usually too expensive to deploy in rural areas; instead, a combination of wireless technologies is often used to connect end users to backbone networks.

Until recently, deployment of advanced telecommunications networks beyond major urban centers was rare. It was simply too expensive and perceived as unprofitable. In remote locations, far from the Internet backbone, a VSAT connection is often the only effective solution for providing broadband connectivity to telecenters. Unfortunately, the fees local people can pay to use telecenters in remote areas with only 10 to 20 computers often cannot cover the cost of VSAT connectivity. In addition, dial-up access, even when it is inexpensive, is often too unreliable for commercial operations. When the low level of bandwidth is shared across multiple users, access is extremely slow. Where possible, a network of telecenters using the same VSAT access point may be able to share the bandwidth and distribute the cost, thereby making it affordable for each telecenter.

Another approach, one that has been tried in various settings where national telecom policy allows, is for the telecenter to resell surplus connectivity from its VSAT connection and act as a mini-ISP for local organizations that cannot afford their own VSAT but need more frequent connectivity than can be accommodated easily with visits to the telecenter. Two or three local organizational "subscribers" can split the bill to make the telecenter's connectivity sustainable. The challenges in making this happen are not technical. Setting up wireless connections among the subscribers that are within 5–10 kilometers of each other (where there is line of sight between the locations) is relatively easy and inexpensive. The challenge is in developing the legal and managerial tools to ensure that all parties are happy with the arrangement.

More generally, wireless technologies such as the more mature *WiFi* technologies and the new *WiMax standards* offer some of the best opportunities for providing rural and underserved communities and telecenters with high-quality, affordable, broadband Internet access. The WiFi protocols were developed initially to provide "hotspots" in offices or residences, but they can also be used in "mesh networks" composed of many low-cost access points communicating with each other to spread coverage over municipal-size areas. This enables users within the "mesh" of access points to communicate using inexpensive adapters. Access to the Internet connection is then controlled by the network; some are free, others require subscriptions.

In contrast to WiFi, the WiMax protocols were designed to cover larger areas with broadband connectivity. WiMax digital transceivers are typically mounted on cell phone towers and take advantage of frequency reuse and variable transmission strengths in the same way that cell phones do. They can handle

a given amount of traffic on their assigned frequencies. If the density of potential customers is low, the transmission range is increased to include more service points. A 24-kilometer (15-mile) radius in a reasonably flat rural area can deliver service to an 1,800-square kilometer (700-square-mile) area. In a more typical, higher-density environment, an eight-kilometer (five-mile) radius will cover 200 square kilometers (75 square miles).

If there is more demand than the available bandwidth, the transmission radius can be reduced, and additional towers can be brought into service using different frequencies in adjacent zones. A single tower can also be used with multiple WiMax transceivers using directional antennae, with frequency reuse by transceivers pointing in different directions from the same tower.

While the WiMax equipment required on the customer's premises is still likely to cost a few hundred dollars, that price will fall rapidly as the scale of implementation increases. In addition, the WiMax reception point can be used as the hub of a hotspot for local connections via WiFi, which reduces overall costs dramatically.

The net result is that broadband levels of connectivity can be achieved over very large areas, with charges to customers remaining quite affordable. This is truly a revolution in rural connectivity. The options are summarized in Table 14.

Table 14: Wireless Connectivity Options

Technology Options	Typical Throughput	Salient Features
VSAT	64 Kpbs– 5 Mbps up 128 Kbps– 11 Mbps down	Can redistribute locally via cable and wireless. Installation costs $2,500 to $5,000, and service costs $300–$3,000 per month, depending on contract and bandwidth. Cost independent of distance.
corDECT	70 Kbps	Developed by IIT Madras and used by n-Logue kiosks and other commercial institutions around the world.
Cellular-based Data: GPRS, EDGE, EVDO, CDMA 2000, etc.	Analog modem to DSL speeds	Good for intermittent mobile use, with bursty traffic; availability still limited; not optimized for fixed service; performance varies with service and congestion.
WiFi	<=54 Mbps	Last Mile solution (802.11 a, b, g), for short distances, community wireless networks; can be used to complement VSAT, DSL, or cable Internet connections.
WiMax	1.5–2.0 Mbps	802.16d: metropolitan networks and backbone—up to 35 km 802.16e: mobile services—up to 20–25 km

Below are five brief case studies illustrating the use of a range of connectivity technologies as well as combinations of technologies to provide reliable and affordable connectivity to diverse rural and underserved environments. These include:

- Asynchronous networks in India and Cambodia: DakNet
- VSAT connectivity for CLICs in Mali
- n-Logue's corDECT technology in India
- A nationwide broadband network in Macedonia
- CDMA to support Mission 2007 in India

6.7. CASE STUDY: DRIVE-BY WIFI CONNECTIVITY—DAKNET IN INDIA AND CAMBODIA[19]

One approach to connectivity in rural areas assumes that affordable "store and forward" asynchronous access is more important to rural communities than is real-time access. DakNet is a wireless network that takes advantage of existing communications and transportation infrastructure to distribute connectivity to outlying villages. This asynchronous solution basically brings the link to the remote computer by mounting a mobile access point (MAP) and a computer on a local bus or a motorcycle. The mobile computer drives by a fixed computer, delivers any messages it has for that computer, and downloads whatever outgoing traffic is waiting for it. It then moves on to the next computer. At the end of the day it goes back to the bus depot, where it passes the collected traffic onto the Internet backbone. A single vehicle passing by a village once a day is sufficient to provide daily information services.

A capital investment of US$15 million could equip each of India's 50,000 rural buses with a US$300 MAP, thereby providing mobile ad hoc connectivity to most of rural India's 750 million people. Costs for the interactive user devices that DakNet supports—including thin-client terminals, PDAs, and VoIP phones—may soon become far more affordable than traditional PCs or WLL equipment.

Villages in India and Cambodia have been using the DakNet system. One of the earliest deployments was as an affordable connectivity solution for the Bhoomi e-Government project. In Cambodia, rural schools were connected through a similar wireless ad hoc system using motorcycles equipped with MAPs. Similar networks have been established in Rwanda, Costa Rica, and South Africa, where beer trucks provided this type of connectivity to schools. Obviously, the service provided is best for "store and forward" content like e-mail, but, limited as it is, it is a big improvement over nothing at all.

Asynchronous broadband wireless connectivity is a start for rural areas where demand is still limited to primarily storing and forwarding e-mail communication and where it is not yet cost effective to establish real-time networks. Such asynchronous networks, however, can be scaled up easily to a real-time network when demand increases and end-user applications requiring real-time connectivity are available.

A similar system with CDMA connectivity is being used by the e-Tuktuk project in Sri Lanka.[20]

6.8. CASE STUDY: COST SHARING FOR SUSTAINABILITY—VSAT CONNECTIVITY IN MALI

Most of the 13 community learning and information centers (CLICs) around Mali initially used modems for dial-up connectivity to an ISP in Bamako. The connection proved too slow and unreliable, and the CLICs were losing revenue essential for achieving self-sustaining operation. USAID, the CLICs' external sponsor, funded the installation of VSAT systems for 10 of the 13 CLICs and provided decreasing support for connectivity costs over the project term. Once installed, the VSAT connection, providing 128 Kbps down and 64 Kbps up, cost about US$400 per month.[21]

It was difficult for most of the CLICs to earn enough from telecenter activity to pay this high monthly cost. A wireless system was installed to connect at least three other clients to the CLICs, including community radio stations. The synergy between radio and Internet in Mali is described in Box 17. For some of the CLICs with VSAT systems, sharing connectivity costs made them affordable. Unfortunately, few organizations, businesses, or government offices in rural Mali have sufficient money to maintain a shared connection.[22]

Box 17: Internet and Radio in Mali

In many developing countries, community radio stations are part of the rural landscape and a key source of information and entertainment for even the most isolated communities. Radio remains the medium of choice in many developing countries to ensure widespread dissemination of information and to reach less literate segments of the population.

While radio can help the Internet by extending its reach, the Internet can also support radio by allowing 1) radio programmers to access information on the Internet; 2) downloading of audio files from portals with radio content; and 3) accessing of online training.

Of the 13 CLICs established in Mali, two were hosted by community radio stations, which by using satellite radios, could access digital content from the WorldSpace satellite and use the content in their radio broadcasts.

Mali is an extreme case, since local incomes are so low. However, it makes a good case about trade-offs for VSAT connectivity; while quite expensive, VSATs are really the only means of delivering reasonable bandwidth to isolated locations, but they are not an attractive solution when clients are very price sensitive or when the number of locations to be served increases. Difficult though the Mali situation was, the model of using low-cost local redistribution to reduce the average cost per user and increase the scope of public access has tremendous potential. With the help of bandwidth management hardware and software, telecenters could become "community ISPs," similar to a micro-telco in terms of providing telecom services to clients on their own premises, yet retaining the traditional features of a telecenter, such as shared access within the telecenter itself.[23] This option has become popular with many telecenters in Africa that have no connectivity option other than VSAT. However, to afford the recurring cost of the connection, they must resell some of their bandwidth.[24]

6.9. CASE STUDY: COST-EFFECTIVE CONNECTIVITY SOLUTION—N-LOGUE'S CORDECT[25]

An often-cited example of a cost-effective connectivity solution adapted to developing countries is corDECT, a fixed wireless local loop (WLL) technology developed by the TeNet Group at IIT Madras in association with Analog Devices and sold by Midas Communications. The point-to-multipoint wireless frequency technology supports simultaneous voice and data channels of 25–70 kbps to subscribers within a 10-kilometer radius of its broadcast location. The technology has been exported to more than 20 countries, and the next generation, Broadband corDECT, offers broadband Internet access with speeds of 256 kbps or higher.[26] It has been used in India by n-Logue in its Chiraag Internet kiosks[27] and in other places around the world.

corDECT was designed with the economic realities of developing countries' rural areas in mind. It is low cost, easy to deploy, and has minimal maintenance requirements. Key components of the system, such as the DECT Interface Unit (DIU) and relay base stations (RBSs)—used to extend the network's reach—are energy efficient and can use solar power.

6.10. CASE STUDY: CONNECTING MACEDONIA[28]

In 2006, USAID funded the Macedonia Connects (MK Connects) project, which was designed and implemented by AED. The basic logic of the project was that there was strong public sector demand for connectivity (in this case for schools) that was going to be very expensive to supply if the schools were the only clients. However, the market power of all of the schools as a client base was sufficient to entice a private sector firm to build a national network that could serve anyone in the schools'

communities. The guaranteed business of the schools for a multiyear period significantly reduced the entrepreneur's risk and was a strong inducement. This market power enabled the public sector to procure school connectivity under a contract that required the winner to implement a business plan for a national broadband service.

Under this initiative, AED put out a competitive procurement to local firms, offering them the connectivity contract for all of the nation's schools for a certain period, if they would build a network that could also offer affordable service to all residents of the area around the school. The contractor could use any technology it liked, provided that other residents throughout the country could buy service at price levels that were geared to the least expensive comparable service in Western Europe. The contracting firm had to serve all the schools in the first year, which ensured that rural communities would get their service at the same time as urban areas.

The winning proposal, from an ISP, called OnNet, used a combination of prestandard WiMax-like technology and WiFi mesh networks to offer very inexpensive service in every community with a school. The aim of the initiative, which will end in September 2007, is not only to increase Internet access and use across the country in schools, but also to accelerate economic and social development by connecting individuals, NGOs, businesses, and government offices to the Internet. In this case, the simple act of using the schools' connection to leverage a larger, private sector investment catapulted Macedonia into the position of having the first national wireless broadband network in the world.

Box 18: MK Connects

During the project, MK Connects provided free Internet access to 545 schools, universities, and local government offices across Macedonia. These locations in turn serve as distribution points, connecting 5,000 individuals and businesses using Canopy subscriber units (a technology developed by Motorola) in 36 cities and 170 villages throughout the country. Today, people living in the most remote areas of Macedonia have the opportunity to use broadband services identical in quality and price to those received in urban areas.

The network has created competition in Macedonia that has lowered the overall price of broadband Internet services from €200 per month to as little as €22 per month. Lower Internet prices have created new opportunities for service providers who are anxious to deliver services to the growing number of broadband customers. The demand for broadband has ballooned from 500 users two years ago to more than 20,000, and this number is projected to reach 50,000 over the next two years.

MK Connects provides a model for nations that want to invest in their development and improve their education and socioeconomic conditions. The biggest challenge to installing a network was Macedonia's mountainous terrain (see Box 18). Now, through wireless technology (Motorola's Canopy), OnNet can deliver broadband services to customers everywhere in the country. Wireless technology made it possible to build the entire network and bring service in quickly, because construction consisted of installing data radios on existing cell towers. One of the features of this project that made it possible to move so quickly was that the government owns the national network of cell phone towers and rents out space on the towers to all providers. This avoided a long delay to acquire rights of way and a possible battle over predatory pricing from the incumbent cell carriers. Currently, more than 300,000 students and teachers have their own e-mail addresses, and every school has its own web page and flat rate access to the Internet. One of the achievements of this project is that the Macedonian Internet provider built the entire network backbone in less than six months.

6.11. CASE STUDY: CDMA TO SUPPORT MISSION 2007 IN INDIA[29]

In July 2006 QUALCOMM Incorporated, a leading developer of code division multiple access (CDMA) (a wireless technology), announced an alliance with the NASSCOM (National Association of Software and Service Companies) Foundation to provide CDMA2000-based wireless Internet connectivity solutions to 65 village resource centers (VRCs) under NASSCOM's Rural Knowledge Network Program.

This program supports India's larger national initiative, Mission 2007, to establish 600,000 VRCs. Under the scope of this alliance, NASSCOM and QUALCOMM will provide connectivity and content to VRCs in the states of West Bengal, Orissa, Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu, Goa, Gujarat, and Kerala. As NASSCOM's technology supporter, QUALCOMM will provide Internet connectivity through CDMA2000 fixed wireless terminals to the centers.

Through its Wireless Reach Initiative launched in 1995, QUALCOMM is using CDMA to provide connectivity in a number of locations in India, Mexico, Vietnam, Indonesia, South Africa, and Peru.[30]

6.12. TECHNOLOGY ISSUES IN A SCALE-UP CONTEXT

A number of parallel and mutually supportive strategies may speed up the process of scaling up broadband connectivity for telecenters from a technology perspective.

- Connectivity and power solutions may need to be addressed separately from the provision of services to be cost effective.
- Extending the reach of the networks into rural and remote areas on a large scale will likely require creative combinations of technologies to address the specific needs of geographically diverse areas.
- Scaling up the development impacts of telecenters will continue to require extensive attention to the appropriateness of various end-user technologies. These may include continued efforts to link shared-access facilities with radio stations or to provide Internet connectivity to radio stations as a means of extending the reach of the Internet for the poorest and least literate segments of the population. They should also include continued efforts to develop and use multilingual content management platforms and software applications designed for use in rural developing-country ecosystems.
- The emergence of new, high-bandwidth wireless solutions makes it possible to provide affordable broadband access in many rural areas. This will ensure that residents of rural areas can be an integral part of the development of the Information Society.
- The continuing evolution of devices—personal computers, cell phones, and PDAs—leaves this field in constant flux. The planners of telecenter activities must remain alert to how their target community uses the various devices, and must think carefully about how to take advantage of the convergence.

6.13. TAKE-AWAYS

The place to start is an assessment of the existing environment; the current infrastructure of the power and communications grids will limit your options in those areas. Once the constraints are known, plans can be structured to respond to issues like irregular power or expensive bandwidth. The selection of hardware and software for the telecenter should be seen as an integrated process in which the purchase price is only one factor—operations costs, maintenance, and availability of technical expertise will figure prominently in determining a total cost of ownership. The following checklist may be helpful in analyzing the situation.

A Technology Package Checklist

- What are the power requirements for the different types of hardware and end-user equipment identified for the telecenter?
- Has a cost-effective and reliable power supply solution been identified?
- Has a cost-effective and reliable connectivity solution been identified?
- Have key elements of TCO (and use) been taken into consideration in projecting expenses and developing a business plan?
- Have the end-user equipment, software, and other applications been selected based on identification of local demand, local capacities, and telecenter operation requirements?
- Have maintenance and technical support requirements been taken into consideration?

6.14. MAKE IT YOUR OWN

This chapter has introduced a series of concepts with complex relationships between them. The technology itself is, and will remain, quite dynamic, so planners must assess the current state of play of hardware and infrastructure in their situations on a regular basis. Questions for the reader to consider include:

- How are the feasibility and cost effectiveness of the technology options discussed in this chapter related to the analysis of the local rural environment discussed in Chapter 3? What are the characteristics of typical underserved and rural areas in terms of population density, geography, distance from transportation networks, and telecommunications network?
- How does the policy and regulatory environment affect the menu of technology options available to you and the costs associated with these options? Which licensing, interconnection, and spectrum use regulations may have an impact on the establishment of new telecenter networks or the expansion of existing networks?
- What is the likely impact of continued rapid technological advances on the technology and organizational models of the future?
- What are the linkages between connectivity solutions and organizational models? To what extent are they interdependent? What are the linkages between connectivity solutions and the menu of services and content to be offered?

6.15. ANALYZING YOUR SITUATION

This chapter's consideration of the variability in the quality and availability of technological resources suggests the need to analyze both the availability and the suitability of different configurations for specific types of environments. To give an example that is based on analyzing local infrastructure for power and connectivity, we might structure an analysis that looks like the one illustrated in Table 15.

For example, you may want to consider whether to establish a minimum criterion of eight hours of electricity per day to consider a location as viable, or to set a minimum requirement for bandwidth to the Internet for a multicomputer telecenter. Examples like these are examined in more depth in Chapter 9.

Table 15: Example of the Distribution of Technology Options

	Telecenter e-Readiness		
Technology Options	**Low**	**Medium**	**High**
A. Power			
a. Grid		✔	✔
b. Grid +	✔	✔	
c. Alternative	✔		
d. *[Add your own]*			
B. Connectivity			
a. WiMax/WiFi		✔	✔
b. VSAT	✔	✔	
c. Asynchronous	✔		
d. CDMA			
e. GPRS/EDGE			
f. *[Add your own]*			

6.16. SELECTED RESOURCES

Power solutions

***Powering ICT Toolkit*:** The toolkit is a decision support tool that includes background information on the energy efficiency of computer-related equipment and energy supply options. http://www.dot-com-alliance.org/POWERING_ICT

The Powering ICT Toolkit includes a "Telecenter Model," which allows visitors to manipulate key variables and observe cost effects of different configurations of telecenters and different computer options, http://www.dot-com-alliance.org/POWERING_ICT/File/telecenters-Options/telecenters-Options.htm

Uganda Thin-Client Computer Lab:

Deploying low-energy ICT: A technical overview. (2006, February). *DOT-COMments Newsletter*. dot-EDU/Education Development Center (EDC). Retrieved from http://www.dot-com-alliance.org/newsletter/article.php?article_id=148

Low-energy Internet for education—Where energy is a challenge. (2005, December). *DOT-COMments Newsletter*. dot-EDU/EDC Retrieved from http://www.dot-com-alliance.org/newsletter/article.php?article_id=142

Connectivity solutions

Association for Progressive Communication (APC). Training materials, http://www.apc.org/english/capacity/training/index.shtml; this area of the APC web site provides links to a broad range of training materials, including some on wireless connectivity; see also ITrain Online, http://www.itrainonline.org/itrainonline/english/wireless.shtml

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DakNet

Chyau C., and Raymond, J-F. (2005, October). What works: First Mile Solutions' DakNet takes rural communities online. What Works Case Study. Washington, DC: World Resources Institute. Retrieved from http://www.firstmilesolutions.com/documents/FMS_Case_Study.pdf

First Mile Solutions web site: http://www.firstmilesolutions.com

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Dravis, P. (2003). Open source software—Perspectives for development. Washington, DC: InfoDev/World Bank. Retrieved from http://www.infodev.org//en/Publication.21.html

MK Connects web site: http://www.mkconnects.org/new/mainUS.php

MK Connects Project Brief, http://www.dot-com-alliance.org/resourceptrdb/uploads/partnerfile/upload/402/030106_Macedonia_KP.pdf

Appropriate technology issues

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UNESCO's *CMC Guide*—see chapter on Choosing appropriate equipment and technology, http://portal.unesco.org/ci/en/ev.php-URL_ID=15709&URL_DO=DO_TOPIC&URL_SECTION=201.html

UNESCO Portal—list of links to software and hardware appropriate and relevant for telecenters worldwide, http://portal.unesco.org/ci/en/ev.php-URL_ID=15281&URL_DO=DO_TOPIC&URL_SECTION=-473.html

ENDNOTES

1 Some of these questions will have been addressed in a scanning or mapping of the community (as described in Chapter 3).

2 Additional, more technical questions might include the following: Are there path obstacles or interference from nearby radio sources and electricity installation? Is there an appropriate location for mounting an antenna? What will the distance be between the antenna mast and end-use terminals? What is the geographic distribution of end users?

3 Cost factors influencing the selection of computers and other equipment include: a) whether the computers and other equipment are imported or locally assembled—locally assembled clones or "white boxes" cost significantly less than imported models, and b) power consumption.

4 See the Telecenter Model in the *Powering ICT Toolkit* at http://www.dot-com-alliance.org/POWERING_ICT, then use the left column content navigation to > THE BASICS > Telecenter Model. This model allows you to compare electricity costs associated with three different sizes of telecenters and four different hardware solutions, including laptops, based on a solar power solution.

5 See the *Powering ICT Toolkit* at http://www.dot-com-alliance.org/POWERING_ICT

6 For details, see the *Powering ICT Toolkit*, Energy Options in "THE BASICS."

7 AED/dot-ORG, 2005b.

8 The total costs indicated include all capital costs and three years of operating costs. For details of these calculations, see the Rwanda CIC case study in the *Powering ICT Toolkit*.

9 It is important to note that most conventional diesel or gas generators produce poor-quality electricity that is not considered computer safe. More costly CycloInverter generators produce electricity that is suitable for use with computers.

10 McKinsey and Company. (2006, December). Wireless unbound: The surprising economic value and untapped potential of the mobile phone. Retrieved from http://www.mckinsey.com/clientservice/telecommunications/WirelsUnbnd.pdf

11 The Vodafone Group. (2005, March). The impact of mobile phones—Moving the debate forward. The Vodafone Policy Paper Series, No. 2.

12 Trucano, 2006.

13 See details of a thin-client solution in a rural teachers' college in Uganda, Educational Development Center/dot-EDU, 2005, 2006.

14 For more about the Microsoft® FlexGo™ program, see http://www.microsoft.com/whdc/flexgo/default.mspx

15 UgaBYTES web site: http://www.ugabytes.org

16 ADEN Pack web site: http://www.africaden.net/article.php3?id_article=241

17 bridges.org, 2003.

18 A detailed discussion of technology options can be found in "New Models for Universal Access in Latin America," Section VII.2—Transmission technologies for local access and transport; also useful as a technology overview is the technology chapter in Hudson, 2006.

19 Resources used to develop this short case study are listed above in Selected Resources.

20 eTuktuk web site: http://www.etuktuk.net

21 Some of the sites had a 64 Kbps connection rather than 128 Kbps because of lower expected demand for Internet services.

22 More technical details about this example can be found in "Case study: Finding solid ground in Gao" in *Wireless Networking in the Developing World*; see http://www.wndw.net

23 For more technical details on bandwidth management, see Flickenger, 2006.

24 For another example of a planned wireless network based on a single VSAT connection, see technical details in Escudero-Pascual, 2006.

25 n-Logue Case Study developed based on Paul, 2004; Jhunjhunwala, Ramachandran, and Bandyopadhyay, 2004; n-Logue website (Tech overview), http://www.n-logue.com/cordect.htm

26 Midas Broadband corDECT, http://www.midascomm.com/products/bbcordect.html

27 n-Logue's web site: http://www.n-logue.com

28 Sources for this case study are: *U.S. provides free wireless Internet access to over 50 municipalities in Macedonia*. Retrieved November 13, 2006, from http://www.mkconnects.org/new/dynamicpage.php?id=000049

29 Press release (2006, July 28). Retrieved from http://www.qualcomm.com/press/releases/2006/060728_forms_alliance_nasscom.html

30 QUALCOMM, 2006.

CHAPTER 7:
Using Networks to Strengthen Telecenters

7.1. QUERIES TO THE TELECENTER HELP DESK

I have been operating a telecenter for over six months now, and I am starting to get frustrated. I can't get people to come to the center, and, when I do, I rarely have the content or services they ask for. Hasn't anyone else figured this stuff out before? Aren't there other telecenters that have solved this? Help!

(Telecenter operator, Country L)

Our NGO runs telecenters in five communities. The good news is that these centers are thriving, with interesting community services and a lot of people coming in to use them. The problem is, we just can't find or keep good staff. Most of the people we hire don't have the basic skills we need, so we have to spend a year training them (which is a lot of work!). Once we train them, they usually take their new skills and go to other jobs. Isn't there somewhere I can turn for people who are already trained and committed to the idea of working in a telecenter?

(NGO manager, Country M)

I have developed a remote health care system that I think would be perfect for telecenters. It lets people talk to a doctor by video, and the doctor can see their heart rate, temperature, and so on. The problem is, I only know a few people who run telecenters. I really want this thing to scale up. How can I get my new product out to thousands of telecenters at once?

(Social entrepreneur, Country N)

7.2. NETWORKS

A telecenter network is any group of people working in telecenters whose members come together to learn from each other and cooperatively access services. Some networks are informal groups, simply using an e-mail list and occasional meetings to connect people working in telecenters. Others are more formal associations, offering concrete services that help their members with day-to-day telecenter tasks such as business management, technical troubleshooting, and service delivery. The common thread is that networks are about telecenter people working together to make their centers more effective, sustainable, and valuable to the communities they serve.

Telecenter networks are slowly starting to emerge in many parts of the world; the benefits and services these groups offer to their members can include:

- A sense of community that comes from meeting people who work in other telecenters (and other telecenter programs)
- Access to products, services, and content a local telecenter can offer community members; networks are excellent distribution channels
- Training courses on such topics as entrepreneurship, community development, grassroots marketing, services and content, and technology
- Ongoing mentoring and skills refreshers that provide people working in telecenters with opportunities for continuous learning
- Support and coaching on management issues, including everything from basic bookkeeping to developing new social enterprise services
- Technical support ranging from free call-in telephone lines to peer-support e-mail lists to onsite computer maintenance
- Opportunities to learn about services and techniques used in other telecenters, and then adapt these for use in one's own center
- Monitoring and evaluation (M&E) of telecenter activities and sharing of lessons learned across telecenters and across networks
- Advocacy- and policy-related activities to support the growth of the telecenter movement

Box 19: Networks Around the World

There has been significant growth in the number of national telecenter networks around the world in the past few years. At the international level, the work done by the Global Knowledge Partnership, particularly through its Information and Communication Technology for Development (ICT4D) program, deserves special mention. A few regional and national examples:

Asia: Mission 2007 (India); Sri Lanka Telecenter Family (Sri Lanka); Mission 2011 (Bangladesh); PHILCeCNET (Philippines)

Africa: UgaBYTES (Uganda); Telecentre Association of South Africa (S. Africa); Rwanda Telecenter Network (Rwanda); Fédération des télécentres du Mali (Mali)

Europe: ESPLAI and CTIC (Spain); Hungarian Telecottage Association (Hungary)

Latin America: Activate (Caribbean); ATACH (Chile); RIA (Peru); RUTELCO (Uruguay); Somos@telecentros (regional)

North America: Community Technologies Centers' Network (USA); PCNA (Western Canada); Telecommunities Canada (Canada)

In any other field of endeavor, support services and learning opportunities such as these are taken almost for granted; they are considered essential for success. Yet, telecenters have rarely had access to this kind of support in the past. Networks offer a way to solve this problem, helping individual

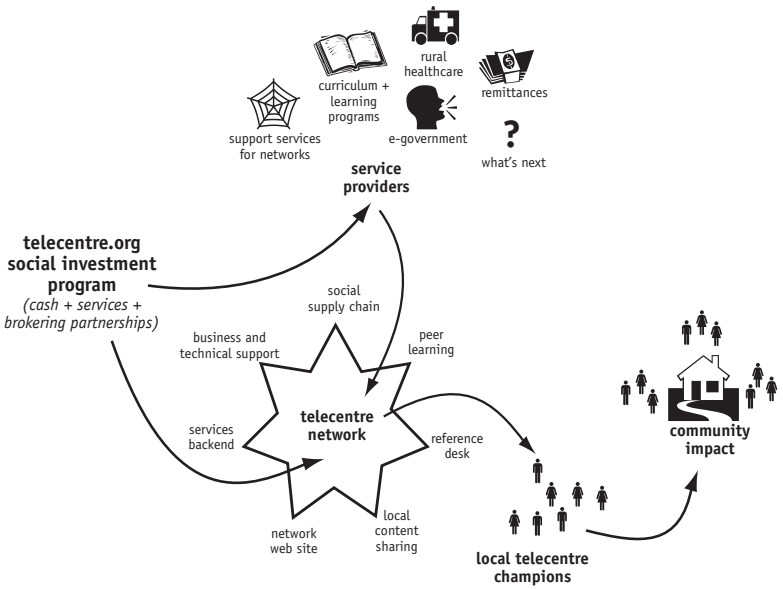
telecenters to become more sustainable and making the overall movement stronger. Box 19 describes a few of these networks. Links to some of these networks' web sites can be found in section 7.14 at the end of this chapter.

7.3. NETWORKS AND THE TELECENTER ECOSYSTEM

Networks play an essential role in the telecenter ecosystem; they are the connection points between all other players. Figure 6 illustrates how the telecenter ecosystem in a particular country might work and the pivotal role of a network in this ecosystem.

As Figure 6 illustrates, telecenters can connect and collaborate with each other through a network. They can also organize ways to access shared services, such as technical support or training, services they couldn't afford to create or access on their own. Similarly, organizations with content and services that could be offered to communities can reach out to thousands of telecenters simultaneously using networks. Without this sort of networked access, it's almost impossible to get things out to telecenters; they are simply too numerous and too dispersed.

Figure 6: Telecenter Ecosystem



Source: telecentre.org, 2006.

7.4. TELECENTRE.ORG: SUPPORTING THE GROWTH OF TELECENTER NETWORKS

There is increasing recognition that we need to invest not only in good telecenters but also in strong telecenter networks and a resilient telecenter ecosystem. The telecentre.org social investment program was created to make exactly these kinds of investments. Drawing on a funding pool from Canada's International Development Research Center (IDRC), Microsoft®, and the Swiss Agency for Development and Cooperation (SDC), the program provides grants and technical assistance to telecenter networks around the world. It also invests in knowledge-sharing activities within the telecenter movement and in the development of services telecenters can offer to communities.

Since launching at the World Summit on the Information Society in November 2005, the telecentre.org program has supported the work of telecenter networks in a number of countries. The program has been active in supporting national telecenter networking events, for example, during its first year, the program collaborated with networks to organize more than 40 events for grassroots telecenter managers.

While these initial activities are important, the telecentre.org vision is much bigger than just a social investment program. Over time, telecentre.org is intended to grow into a broad umbrella or community that gathers networks, service providers, social investors, and others around the world who believe that telecenters have an important role to play in development. This broad umbrella will undertake the following:

- Act as the "connecting point" among dozens of telecenter networks around the world. These networks will be both the primary stakeholders and the core drivers of the broader telecentre.org community.
- Provide a common home for a network of sustainable institutions offering training and capacity building for telecenter managers in countries around the world. This will ensure that telecenters have the trained staff they need.
- Increase the number of products and services telecenters can offer to their communities by making it easier for social entrepreneurs and companies to reach out to telecenters.
- Develop an international "telecenter academy" that coordinates the efforts of telecenter manager training programs around the world and offers a platform for the development of common curriculum, certification standards, and training methods.
- Promote coordination among social investors, governments, and others financing telecenter-related activities, with the ultimate aim of getting money efficiently into the right places at the right time.

- Create a sustainable flow of information that helps telecenters and investors learn quickly about innovative new practices, services, and activities.

Ultimately, the notion is that the telecentre.org umbrella offers a strong sense of common cause and shared identity among people working in telecenters and community technology around the world. What these centers are called doesn't matter; it's the shared commitment to grassroots technology access for development that's important.

This broader telecentre.org community is already emerging in its own right. As noted above, many of the networks supported through social investment programs are already working together, creating publications such as *Telecentre Times* and collaborating on the creation of an international "telecenter academy."[1]

7.5. STEP-BY-STEP: THE TELECENTRE.ORG MODEL FOR HOW TO BUILD A TELECENTER NETWORK[2]

As the previous section describes, **telecentre.org** has played a leading role in fostering the creation of telecenter networks and ecosystems around the world. In the process, they have developed a well-articulated model of how to proceed. In this section, Mark Surman of telecentre.org presents a single, unified description of the telecentre.org approach. Its work has influenced everyone's thinking, including our own, so the reader will certainly recognize elements of the telecentre.org model in the work of many of the groups described in other sections of this book.

As the case studies in this chapter demonstrate, networks can play a central role in improving telecenters' sustainability and impact. At a basic level, networks are a powerful tool to ensure that those running telecenters have the skills and support they need to be successful in their day-to-day work. However, networks can also play a central role in developing and distributing value-added services that telecenters can then offer to these communities. It is these services—education, health care, banking, and e-Government—that have the greatest potential to generate revenue for telecenters and drive development impacts in communities.

Whether you are a policy-maker rolling out a national telecenter program or a grassroots telecenter leader, you should consider taking an active role in establishing a telecenter network in your country. In its work with

networks around the world, telecentre.org has developed five steps to help with this process:

- **Organizing:** Pull together the telecenter stakeholders in your country to ask: how can a network help you? Get people excited about the idea of networking!
- **Planning:** Develop a strategic business plan for your network based on the outcomes of your organizing efforts. Decide what services the network will offer to participating telecenters.
- **Rollout:** Working with grassroots leaders, implement basic network communications infrastructure and develop a first generation of service offerings.
- **Sustainability:** Continue to engage members, hold meetings, and refine services. Providing real value to telecenters will make it easier to sustain the network financially.
- **Renewal:** Networks are dynamic; they need constant listening, leadership renewal, and new service development to remain vibrant.

While this may sound like a great deal of work, it is actually quite achievable. Networks leverage the power of all their members, which makes the seemingly impossible completely doable. Also, the telecentre.org community—which includes telecenter networks from around the world—is available to help new and emerging networks develop.

Each of the "building a network" steps is described in more detail below to help policy-makers and telecenter leaders who want to integrate networks into their own telecenter efforts.

Step 1—Organizing

A good network has two things at its foundation: an enthusiastic community of telecenter managers and a clear vision of what these telecenter managers need to succeed in their work. These basics ensure that there is enough social capital—trust, motivation, collaborative spirit—to start and sustain the network. They also provide the environment necessary to develop network services that add real value to the work of telecenters.

The organizing phase of network development focuses on building these foundations through one or more meetings of telecenter managers. Some things to keep in mind when running these meetings include:

- **Make your meetings highly participatory.** The idea is to build relationships among telecenter managers and to gather input on telecenter needs. Hearing a full day of speeches from "important people" doesn't achieve this.

- **Allow people to showcase their grassroots innovations.** The most important innovations in telecenters happen locally. Let telecenter managers show off their services, training programs, and marketing techniques so other managers can learn from them. telecentre.org has successfully used a technique, called Speed Geeking, for this kind of showcasing.
- **Use visuals and think outside the box.** When asking telecenter managers about their biggest challenges, consider using group drawing exercises and other techniques that help people think outside the box. Networks like the Sri Lanka Telecenter Family have found that this really helps draw out new ideas, especially in multilingual situations.
- **Watch for grassroots leaders.** The leadership and energy that drives a network needs to come from its membership. Of course, people like you who are organizing a network meeting provide a big part of this leadership. But it is also important to watch for new and emerging leaders from the grassroots and involve them in the next phases of network building.

While some of these suggestions may seem a bit frivolous, they are actually quite serious. This sort of interaction is essential if you want to build the trust among telecenter managers that will be required for a network to succeed. It is much more effective than traditional focus groups in getting people to come up with ideas about what a network should do. And, of course, it lends itself to "learning as you go," so organizing the network also includes a component of peer learning and training for everyone who attends these meetings.

Emerging networks can turn to a number of places for help running these kinds of meetings. One good resource is the Aspiration facilitation web site: http:// facilitation.aspirationtech.org. Many telecenter networks around the world have used the techniques described on this site to run their organizing meetings. telecentre.org also has videos showing these kinds of network meetings in action.

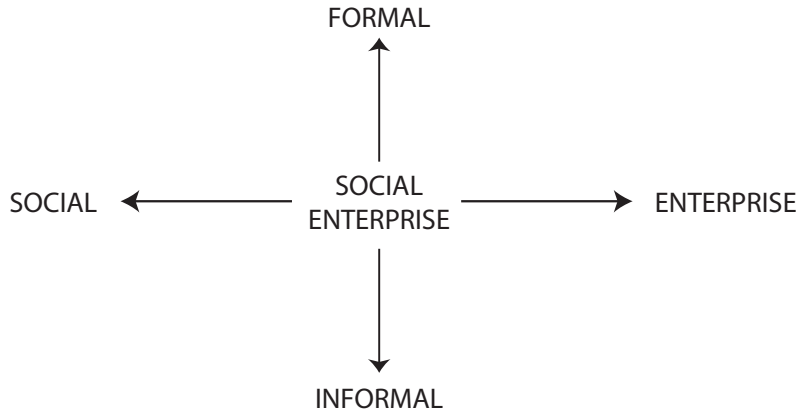
Step 2—Planning

Once you have started to build excitement about the network through a series of community meetings, it is time to begin planning. You need to answer two main questions at this stage: How will you structure the network, and what services will it offer?

There are many ways to structure a telecenter network. Some are very informal and require little effort; they focus on simply gathering telecenter managers from time to time so they can learn from each other. Others are much more formal affairs with a concrete slate of services for telecenters

and a professional staff. There is also a spectrum of sustainability models for networks that is similar to telecenters themselves: some networks are solely social purpose and receive outside funding, others are more enterprise-like, and still others act as social enterprises. Figure 7 shows the spectrum of different telecenter network models:

Figure 7: Spectrum of Different Telecenter Models



Which model to choose really depends on the outcomes of the organizing phase. If the members of the network just want to be connected through e-mail and meetings, a low–cost, informal structure will be perfectly adequate. However, if there is demand for a number of concrete value-added services for telecenters and their communities, some sort of formal structure and revenue model will likely be required. Whichever model is chosen should be written down and explained in a business plan so all can understand and comment on it.

The other element needed in a network business plan is a detailed description of the services and activities that will be created by the network. Table 16 describes some typical services that might be offered.

A network can also act as a distributor for third-party products and services it does not develop itself. For example, a network might act as a channel for discounted computer hardware and software that companies want to get out to telecenters. Or it might repackage and support such services as e-Government, e-Banking, and e-Health, which telecenters can offer in turn to community members. While individual telecenters often find it hard to access these kinds of discounts and services, a network is in a better position to negotiate because it represents a number of telecenters.

Of course, the organizational model and service offerings will also influence the financial side of the network. A small, informal network with limited

services can often sustain itself simply through volunteer labor and donated resources from partner organizations. In contrast, formal networks with professional support and training services need to find an ongoing source of revenue. This revenue could come from membership fees, training and service fees, or small markups on discounted products and services. Another alternative is third parties, such as governments and large NGOs, which may be willing to pay networks to help distribute their content and services to telecenters. In any case, networks should consider financial sustainability early on in the planning process.

Table 16: Typical Services that Might Be Offered

Service	Description	Complexity
Workshops	Meetings where telecenter managers share experiences and train each other. Simple way to keep energy up and do capacity building.	Low
Training programs	Formal training in entrepreneurship, community development, marketing, and technology. Can include certification.	High
Mentoring and coaching	Ongoing coaching and skills development that ensures people running telecenters have opportunities for continuous learning.	High
E-mail discussions	Open discussions among telecenter managers. Creates camaraderie and offers place to ask tech and business questions of peers.	Low
Newsletter	Regular e-mail or print updates on telecenter issues. Can offer tips on running telecenters and stories about innovative techniques.	Medium
Support line	Telephone or Internet service for on-demand help to common telecenter problems, including technology, business, and marketing.	Medium
Tech maintenance	On-site or remote tech support for computers in telecenters.	High
Discounts	Access to discounted hardware, software, and connectivity. Negotiation of bulk deals for telecenters belonging to a network.	Medium
Resource library	A collection of curriculum, sample business plans, and other materials that telecenters can use in their work.	Medium
Content sharing	Access to content that telecenters can offer to their local communities.	High

All of these decisions about organizational model, services, and financing should be documented in a straightforward strategic business plan. Development of this plan should include not only the original initiators of

the network but new grassroots leadership identified during the organizing process as well. In addition, this is a good time to engage with other telecenter networks that have done this before and with potential funding partners such as the telecentre.org program at IDRC.

Step 3—Rollout

Once the planning is done, it's time to turn the network dream into reality. This may seem like a straightforward task; however, this probably involves the most work and risk. Issues to consider when starting to build a telecenter network include:

- **Roll out the highest-value services first.** If your network is focused on training or support services, for example, start with the ones that will help the telecenters in your network most immediately. This will allow them to see the benefits of the network early on.
- **Test. Test. Test.** Don't assume that services are done as soon as you have finished building your web site or writing its content. You need to test things with network members to make sure they are understandable, easy to use, and helpful. Feedback from the testing should be used to improve services before you launch them.
- **Use partnerships wherever possible.** Many services can be developed (or have already been developed) by partners outside the network. For example, other telecenter networks may have created the kind of curriculum that you need to run your telecenter manager training programs. Or an existing NGO may already have a hardware and software donation program on which your network can build. Leveraging the work these partners have already done will make it possible to get better services up sooner.
- **Keep network members engaged.** During rollout, it's easy to focus too much on services and forget about network members. It is important to keep running network meetings, engaging with people via e-mail lists, and sending out e-newsletters during the service rollout process. This will keep up the excitement and consciousness of the network among members.

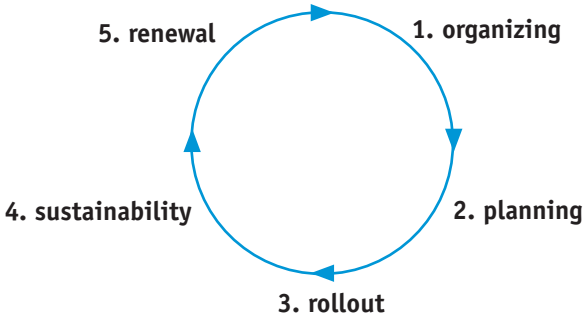
As with planning, rolling out the network should actively involve grassroots leaders identified through the organizing process. These leaders ensure that the process is well grounded within the diversity of the telecenter community and that it provides a constant testing and feedback process. It also spreads out ownership of the network: the more members who are involved in building the services, the more people there will be to promote and sustain them over time.

Step 4—Sustainability

Sustaining a network is first and foremost about providing value to the telecenter managers who belong. This value could be in the form of concrete benefits: access to services that help telecenters generate revenue locally; training that provides staff with essential skills; and technical and business support services to help with troubleshooting. It may be something organized in a formal way, such as establishing a mentoring program by business leaders or more experienced operators to help the new operators develop their business sense, or in the form of a structured training program for operators and staff members. Or it could be something more intangible, such as access to a network of telecenter friends who face similar challenges and can help you out when you're struggling. In either case, the excitement and engagement of participating telecenters is key to the social sustainability of a network, and this only comes if the members see value in belonging.

Of course, you also need to secure the financial resources necessary to keep the network running, especially if you plan to offer complex services. It will be easier to find funds—either by generating revenue or from external donors—if the value to members is clear and demonstrable. And, of course, doing something that reduces costs for telecenters (discounted products) or helps them generate revenue (services they can offer locally) makes it easier to add a social enterprise component to a network. This social enterprise may become the primary focus of a network, or it can cross-subsidize other, free services.

Figure 8: Continuous Cycle of Renewal



With both social and financial sustainability, constant work is needed. Services don't run themselves. Members tend to drift if they are not engaged regularly. Partnerships lose energy if they are not maintained. Network leaders need to remain focused on these issues if they want their networks to thrive over the long run.

Step 5—Renewal

Of course, thriving over the long run also involves renewing the network as it grows and evolves. In fact, the process described in Figure 8 is a continuous cycle that networks need to revisit every few years.

The good news is that a well-run network has built-in mechanisms for this kind of renewal. Regular network events and mailing lists offer a way for members to learn from each other and for network leaders to listen constantly to what network members are calling for. These activities also offer a way to watch for and recruit new leaders for the network from the telecenter managers who belong to the network.

The telecentre.org community and other networks can play a particularly important role at the renewal stage. People who have "done it before" can offer ideas and advice on new services, membership development, and sustainability. Participating in international discussion lists and events with other telecenter networks offers a way to access this broader community of network leaders.

To summarize, the steps of the process are described in Box 20:

Box 20: Checklist of Steps

Each of the steps is summarized below:

- **Organizing:** Pull together the telecenter stakeholders in your country to ask: how can a network help you? Get people excited about the idea of networking!
- **Planning:** Develop a strategic business plan for your network based on the outcomes of your organizing efforts. Decide what services the network will offer to participating telecenters.
- **Rollout:** Working with grassroots leaders, implement basic network communications infrastructure and develop a first generation of service offerings.
- **Sustainability:** Continue to engage members, hold meetings, and refine services. Providing real value to telecenters will make it easier to sustain the network financially.
- **Renewal:** Networks are dynamic; they need constant listening, leadership renewal, and new service development to remain vibrant.

7.6. SNAPSHOTS OF CASE STUDIES

The case studies in this chapter highlight the different roles and approaches telecenter networks take on around the world:

- The Hungarian Telecottage Association shows how building community among telecenter managers makes the movement stronger.

- UgaBYTES in Uganda illustrates the potential of using networks as a platform for technical and business support services that help telecenters.
- Esplai demonstrates that networks can serve as developers *and* distribution channels for services telecenters offer to their communities.
- The Mission 2007 Training Commons points to the important role networks can play in training new telecenter managers.
- The Sri Lanka Telecenter Family offers an example of peer learning through telecenter networks.

Some of these networks are quite formal, while others are looser and more organic. We have already mentioned the global scope of the Information and Communication Technology for Development program of the Global Knowledge Partnership. Global Knowledge Partnership (GKP) is the world's first multi-stakeholder network promoting innovation and advancement in Knowledge for Development (K4D) and Information and Communication Technologies for Development (ICT4D). GKP brings together public sector, private sector, and civil society organizations with the goal of sharing knowledge and building partnerships in K4D and ICT4D. Its meetings and publications have contributed very substantially to the growth of the telecenter movement. More information about its programs can be found on its web site.[3] In addition to these national networks, we present telecenter.org as an initiative designed to support such networks—a network of networks.

7.7. CASE STUDY: HUNGARIAN TELECOTTAGE ASSOCIATION—BUILDING COMMUNITY

One of the simplest—and most important—things a telecenter network can do is to build a sense of community among people working at telecenters within a particular country. The friendships formed through this kind of networking quickly become a channel for sharing innovative practices, providing peer technical support, and developing collaborative projects among telecenters. They also provide a foundation of trust, one of the most essential elements of long-term network sustainability.

This focus on community building was central to the creation of such early telecenter networks as the Hungarian Telecottage Association (Magyar Teleház Szövetség). Founded in 1995, just a year after the first telecottage was established, the association is a civic organization seeking to organize people working in telecottages and support the establishment of new telecottages. From this foundation of community organizing, the association quickly grew to represent telecottages to other parties such as the central government or foreign bodies, establishing relationships with business partners and organizing cooperative projects with them, and working with

them to organize network services. Over time, the association started to take on more formal roles such as lobbying for financial support, making applications (and further applications!), and operating the telecottages' internal information system.

As the Hungarian movement evolved, the association was split into seven regions, each representing its own telecottages to the executive and implementing programs originating from the central office. These regional associations assist the development and operations of the telecottages with their education, mentoring, and monitoring apparatuses. There are now regional resource centers and an increasing strong system of internal, democratic processes.

Through its work over the past decade with telecottage managers, the association has gained thorough knowledge of the capacity-building needs of telecenter managers and staff. Based on that experience, the association has been involved in transforming existing training material to meet the needs of other European countries.[4]

7.8. CASE STUDY: UGABYTES— TECH SUPPORT AT HOME AND ABROAD

If you are running a telecenter, you often need help with technical issues, business management practices, or accessing funding. Yet, in most countries, telecenters have not had easy access to people who can provide this kind of support. Networks provide a perfect platform for addressing this problem, with help desks to which people working in telecenters can turn for advice.

The UgaBYTES Initiative in Uganda offers exactly this kind of assistance to telecenters across the country (and sometimes in neighboring countries). Its support offerings began in 2000, with a technical maintenance service for telecenters within reasonable driving distance of Kampala, the national capital. It has now expanded to include a help desk that offers on-demand advice on technical and management issues, and it runs an e-mail listserv where hundreds of telecenter managers from across Africa gather to discuss considerations and support each other on issues ranging from solar power to social enterprise.

The help desk service is particularly interesting. UgaBYTES offers the core service, including a web-based Q&A interface, a Q&A mailbox, and a telephone line. However, a community of volunteer experts from across the telecenter movement answers the questions. These people are able to answer questions on topics ranging from technology to business management to content production to marketing. Answers from the experts are provided to

the person who asked the question and posted to a knowledge base that others can access in the future.

UgaBYTES is now expanding this service to support other countries, regions, and even languages. At a technical level, UgaBYTES will offer its platform to networks in other countries so they can offer their own versions of the help desk. These networks will share a common pool of experts able to answer questions and a common pool of answers to telecenter questions. The result will be locally tailored help desk systems, but with wisdom, reach, and sustainability based on a global community of people committed to strengthening the telecenter movement.

7.9. CASE STUDY: MISSION 2007 TRAINING COMMONS—USING NETWORKS TO TRAIN TELECENTER MANAGERS

A scale-up of telecenters and information kiosks cannot happen without a large cadre of qualified local operators. Individual telecenter managers and kiosk operators require a mix of technical and business skills as well as an understanding of the communities in which they operate. Few individuals in rural communities possess this mix of skills, so there is a need for ongoing training and support in skills as diverse as business management, community development, and technical maintenance.

Almost all telecenter networks should consider offering some form of telecenter manager training program. This kind of capacity building can be delivered effectively by the network itself, or by working closely with established distance education groups. Networks can also play an important role in identifying and cataloguing existing training materials and developing standardized curricula, and they can work with other networks to adapt outside material for local languages and contexts. In addition, networks may consider offering ongoing mentoring and coaching that will ensure that people running telecenters continue to improve their skills over time.

India's Mission 2007 is an example of a network that provides a platform for training telecenter managers. Mission 2007's Training Commons initiative is developing and piloting a shared curriculum for rural telecenter or kiosk operators across the country. This curriculum will be used by Mission 2007's National Virtual Academy, which seeks to recruit and train one million grassroots fellows by 2010. These people will be trained—and then will train others—in the basic skills needed to run a local telecenter, including community development, entrepreneurship, grassroots marketing, information gathering, and computer technology. Other kiosk networks and programs associated with the Mission 2007 network will use the curriculum as well. Figure 9 illustrates the process.

Training Commons activities to date have included mapping out existing curricula and conducting workshops with training managers from such leading Indian telecenter programs as MSSRF, TARAhaat, n-Logue, e-Choupal, Akshaya, and others. These train-the-trainer workshops are held in association with a number of local partners in India. These activities have identified five areas as priorities for curriculum development: entrepreneurship, community development, grassroots marketing, infomediary skills, and computing.

Figure 9: Training Commons

Source: telecentre.org, 2006.

In late 2006, a consortium of Mission 2007 partners, including NASSCOM Foundation, MSSRF, WorldCorps, and TARAhaat began developing modules in all of these areas. Each module is going through an iterative, community-driven development process, with early versions of the curriculum being tried out with and shaped by grassroots telecenter activists. This participatory development process is being run in Hindi, Tamil, and Telegu to ensure that the material is accessible and relevant to the rural residents who are on the frontlines of the telecenter movement in India.

Over time, it is expected that the Training Commons curriculum will form the foundation for offerings at an ongoing Telecenter Academy in India. As telecentre.org partner networks develop their own telecenter manager training programs, they will be joined and coordinated through a global Telecenter Academy program. The Training Commons materials will form the cornerstone of this global effort.

The Training Commons concept (i.e., training modules that can be developed and used across networks of telecenters) can be replicated in other countries where materials can be developed in other languages and adapted to regional and national contexts; telecentre.org is particularly active in this area. To facilitate scale-up initiatives, it is essential to realize economies of scale in the development and use of training materials. A slightly different example is given in Box 21.

Box 21: SME Training for Community Internet Centers in Rwanda

In September 2004, in support of a USAID-funded dot-ORG project in Rwanda, an international consultant was contracted to provide training in how to manage small and medium enterprises (SMEs), focusing especially on the management of community Internet centers (CICs). The 12 participants included the four CIC operators who were part of the project, two staff from the project, and other small-business owners/managers. A key criterion for participation in the training was that they had to be computer literate as the training used a computer-based toolkit (the SME Toolkit), which has been used elsewhere.

To optimize the training course, the consultant first conducted monitoring and evaluation (M&E) activities at the three dot-ORG CICs to understand their business needs, constraints, services, clients, etc.

After the training, one of the main emphases of the project's monitoring activities was to assess the impact of the SME training on the performance of the CIC operators. All three operators improved their ability to monitor the performance of their businesses more effectively through the use of such tools as monthly income/expenditure statements. They also became better able to monitor their daily energy availability and to relate it to daily income from the business. Their monthly income/expenditure analysis, conducted after the training, showed that all three CICs had been making net profits consistently.

7.10. CASE STUDY: ESPLAI—DEVELOPING AND DISTRIBUTING SERVICES THAT TELECENTERS CAN OFFER TO COMMUNITIES

People don't come into telecenters because they need a telecenter; they come because they have a particular need for information or assistance with which a telecenter can help. This is where services and content come in: training services, agricultural services, health services, e-Governance services, and so on. These services are what bring people to a telecenter.

As individual telecenters can only go so far in developing their own services, networks have an important role to play. They can act as distribution channels to help member telecenters access valuable content and services from government, NGOs, and the private sector, and they can develop and distribute their own services, which telecenters can offer. With either approach, networks are an essential link in getting services out to telecenters (and communities!) on a major scale.

Fundación Esplai in Spain is a good example of how a network can build and distribute services. Based in Barcelona, Fundación Esplai supports a number of telecenter networks in Spain, including its own telecenter network, called Red Conecta (or Conecta Network). One of its priorities is to help telecenters innovate and diversify their services. And now, with the help from the Spanish government, Esplai is implementing a program that encourages and supports Internet use in communities.[5] This program focuses on two actions:

- Supporting telecenters to identify concrete services for telecenter users—the kind of services that, in Esplai's words, can "touch the hearts of people." For example, they can include helping someone to write a CV, find a deal on train tickets, or communicate with a loved one.
- Promoting the use of telecenters as an attractive means for public services and/or private companies to offer their services to the public.

With 5,000 existing telecenters across the country (based mostly in rural areas), Esplai is in a good position to help those companies and public services think about targeted promotion of their services to more than a million people.

These interactions with the public have led to demand-based outcomes such as workshops on Skype[6] for telecenter operators about the program's applications. Also, the national postal service now provides a service that receives e-mails from telecenter users, prints them, and delivers them to their final destination—particularly in rural areas—which substantially decreases the time it takes the information to arrive and the cost of communication.

The *Conecta Joven* (or Youth Connect)[7] project provides the opportunity for youth to work together with telecenters to offer ICT training in various community access points such as neighborhood groups, schools, or cultural centers. This has two benefits: a new community service is offered, and youth have the opportunity to gain work experience, starting with helping others to write that first line of a CV.

7.11. CASE STUDY: SRI LANKA TELECENTER FAMILY—PEER LEARNING AND KNOWLEDGE SHARING

In most cases, innovation is not about coming up with a brand new idea; it is about taking something you see others doing and making it a little bit better. Typically, this process of innovating—and of spreading innovation—is very social. People learn new practices and techniques not from books, but from friends and colleagues who share ideas with them. Telecenter networks can be a powerful tool, not only for service delivery, but also for this kind of learning and innovation sharing.

The Sri Lanka Telecenter Family project is a good example of a peer learning environment. The initiative started with a series of large-scale, grassroots workshops to discuss the challenges and potential of telecenters. Building on 50 years of community organizing experience from Sri Lanka's largest NGO, Sarvodaya, the workshops were designed specifically to create social connections that would promote the transfer of ideas, practices, and innovations. The workshop included daily opening and closing circles with more than 100 people, drawing exercises showing how people are using telecenters in rural Sri Lanka, and skits in which people acted out their visions of the role telecenters will play in communities in 2010.

While these techniques may sound process-oriented at first, they showed immediate results in terms of knowledge transfer. For example, one of the drawings included the simple idea of using handbills and posters that explained the value of ICTs to villagers. Dozens of telecenter managers started asking the group that made this poster questions such as: How much did it cost? How effective is it? Can you help me do this? The idea of "postering as marketing tool" hadn't been obvious to most of the operators at the workshop, most likely because they were so focused on ICT as their main communication tool, which can be limiting if you are trying to convince people to use ICTs in the first place. The simple group drawing exercise served as an important catalyst for further action.

An even more important outcome of these peer learning workshops was building bridges among different kinds of telecenter managers across the country. With a long history of NGO-run telecenters, Sri Lanka is now rolling out a government program that will create 1,000 new centers on the entrepreneur model and the temple model. When they arrived at the first workshop, the NGO people thought they were different from the entrepreneurs and the priests from the government centers and so on. However, with only a half-day of interactive visioning and knowledge sharing under their belts, all of the workshop participants began to see that they had common challenges and, in turn, that there was great potential to develop common solutions through the network.

Of course, these community processes are not only useful for knowledge sharing. In the Sri Lankan case, it is clear that they can also help build solid foundations for a formal network. The first two large workshops in the country gathered telecenter managers from the Information and Communication Technology Agency (ICTA) of Sri Lanka's *nenasala* program, Sarvodaya telecenters and village information centers, UNESCO community multimedia centers, and other local telecenter programs from across Sri Lanka. The organizations behind these centers quickly realized the benefits of being involved in the network and agreed to do so formally. The workshops also gave organizers a chance to identify—and test—strong

grassroots leaders from the group. In turn, these people have become regional coordinators for the Sri Lanka Telecenter Family.

With support from telecentre.org, the Sri Lanka Telecenter Family network has established itself formally and is expanding to offer training, content, marketing support, and other services to 300 (and growing) member telecenters. Ultimately, these concrete services will benefit rural Sri Lanka by helping the centers to become more responsive and ensuring that they have useful services and content to offer locally. Of course, the network won't just offer services; it will continue to serve as a participatory learning environment, offering workshops such as the one described here twice a year. Many telecenter networks around the world are starting to adopt similar approaches to peer learning.

7.12. TAKE-AWAYS

One of the most significant changes in the telecenter movement during the past few years has been the emergence of national-level telecenter networks.

- As the number of telecenters has increased over the years, so have opportunities for telecenters to band together and form networks. Whether formal or informal, these networks are essential to the continued growth and health of the telecenter movement.
- With these networks, telecenters have the chance to become more sustainable and more valuable to the communities they serve. They will be able to access all kinds of new products, services, and content that will be of value to the communities they serve. Of course, all of this only happens if networks are strong, sustainable, and well organized. There is still a great deal of work to be done to make sure countries around the world have networks like this.
- Training services are a crucial service that almost all telecenter networks should consider offering to their members. Not only do they build human capacity, but they also offer an environment in which personal ties, both as mentoring relationships and as peer linkages, can form and grow. Those personal ties contribute immeasurably to both the strength of the network and the skills of the local telecenter manager.
- New telecenter programs need to think about telecenter networks at the program design stage and to think through how to integrate existing telecenters into new networks. Telecenter networking, partnerships, and work on the overall telecenter ecosystem should not be an afterthought.

7.13. MAKE IT YOUR OWN

Sustainability depends on the commitment and competent management of centers, both at the micro level of a single center, and at the macro level of national and global coordination. One solution that has emerged is the creation of support networks that help new operators get into the field, and support and improve the operations of the existing centers. Creating a national network is a challenging task; some of the ways to help make it happen are:

- If you are a telecenter operator, find out about other telecenters, connect via e-mail or some other way, join any existing network, help to create a national network, learn about how other networks around the world were created, and shape the future of the telecenter movement in your country.
- If you are a social entrepreneur with a new service for telecenters to deliver, or an NGO with content that you want to get out to local communities, consider using a telecenter network as your distribution channel. Networks offer you a means to reach large numbers of telecenters simultaneously.
- If you are a government decision-maker, make sure that your telecenter and universal access programming are connected (and offer financial support) to an independent national telecenter network. Consider identifying and taking part in training regarding the impact of the policy and regulatory environment on telecenters and similar shared-access facilities.
- If you are a franchise owner, consider linking with other franchises or with independent telecenter or kiosk operators, and consider sharing your training programs and organizing exchange programs to learn from others.
- If you represent a donor agency, consider the impact of investing in a network organization rather than in a small number of individual telecenters. Also, make sure that any investments you make in training materials, content, and services have networks built into the plan from the beginning.
- Regardless of what perspective you bring, make a commitment to help by being a mentor for new arrivals, by sharing solutions you have found or learned about, by taking training that is offered, and as you become more expert, by offering to help train others, and by supporting the network organization.

7.14. SELECTED RESOURCES

i4D Online, III(9) (October 2005): http://www.i4donline.net/oct05/content.asp. This special issue of the magazine includes four articles related to telecenter networks: 1) the telecenter movement in the Pacific; 2) Somos@Telecentros; 3) African telecenter networks; and 4)the emerging telecenter movement in Sri Lanka.

iTrainOnline telecenters section: Collection of training materials aimed at improving telecenter capacity. Retrieved from http://www.itrainonline.org/itrainonline/english/telecentres.shtml

Last Mile Initiative Training Materials Matrix: A list of telecenter-related training materials can be downloaded from the DOT-COM Alliance web site: http://www.dot-com-alliance.org/library/librarydetails.php?partnerfile_id=349

See also individual network web sites:

- ATACH (Chile)—Asociación Nacional de Telecentros Activos de Chile.
- CTCNet—Community Technology Centers' Network—USA http://www.ctcnet.org
- European Union Telecottage Associations: http://euta.hu
- FETEMA (Fédération des Télécentres du Mali): See AfrikLinks, http://www.afriklinks.org
- Hungary Telecottage Association: http://www.telehaz.hu
- Telecottage e-Learning Training Materials Project: http://www.telecottage.mimoza.hu/mss/alpha
- Philippine Community eCenter Network: http://www.cict.gov.ph/index.php?option=com_content&task=view&id=144&Itemid=1
- Somos@Telecentros: http://www.tele-centros.org/paginas/inicio.php
- Telecommunities Canada: http://www.tc.ca
- UgaBYTES: http://www.ugabytes.org

telecentre.org

- Main web site: http://www.telecentre.org
- Funding program information: http://www.idrc.ca/telecentres
- News by and for the telecenter movement: http://community.telecentre.org

ENDNOTES

1 The *Telecentre Times* can be found at http://www.ugabytes.org/telecentretimes/

2 We are grateful to Mark Surman of telecentre.org for his thoughtful comments and additions throughout this document, and particularly for writing this section.

3 More information can be found at their website, http://www.globalknowledge.org/gkps_portal/index.cfm?&menuid=8

4 Maham, 2006, p. 72; Telecottage e-Learning Training Material project.

5 See the Ministry's website for more information: http://red.es/actividades/fomento.html

6 Skype is a free VoIP solution; see http://www.skype.com

7 *Conecta Joven* website: http://www.conectajoven.net

PART III:

PATHS TO SCALE-UP AT THE NATIONAL LEVEL

In Part I, we outlined the evolution of the telecenter movement and a vision for the near to medium-term future. Part II of the book provided a more in-depth look into the key elements of the telecenter ecosystem—key pieces of the puzzle. In Part III, we now put the pieces together and identify realistic paths toward scaling up telecenters. Scaling up will happen one village at a time, one country at a time.

In Chapter 8, we turn to the macro-level, national environment and identify enabling conditions for scaling up telecenters to reach the global access goal. Chapter 9 presents a practical framework for you to apply some of the lessons and insights highlighted in the book to your own context, and Chapter 10 offers some concluding thoughts.

CHAPTER 8:
From Organic to Programmatic Approach—Paths to Scaling Up

8.1. QUERIES TO THE TELECENTER HELP DESK

The government of Country O has come to us with a request for start-up funding for its initial telecenter scale-up phase to cover 150 telecenters. A second scale-up phase eventually will bring the total number of telecenters to approximately 1,200, or one per district. This is a government-sponsored program that fits within a broad strategy for integrating ICT into all aspects of society. Once established, the telecenters will be run by local entrepreneurs on a for-profit basis. What would be the best use of donor resources to support the government's efforts to provide access in rural areas? We are concerned that covering start-up costs may not be the most appropriate use of donor funds. What catalytic role could donor funding play within the context of a large-scale, government-led telecenter initiative?

(Donor agency economic growth team leader)

We have implemented a successful kiosk network for the past seven years. During these years, we have been able to learn a lot, and we have adjusted our model. Initially, all the kiosks provided a very specific and limited set of services. Based on monitoring and feedback from the kiosk operators, we realized that we needed to allow kiosks more flexibility and more options. We are now at the point where we think we are ready to scale up the network with a flexible model that will be adaptable to different contexts. Should we be looking for partners to work with, or should we expand our own capacity? We are looking for partners in several areas: 1) venture capital; 2) service providers in health, education, agriculture, banking, and finance; and 3) training providers.

(CEO, private sector kiosk franchise, Country P)

8.2. READINESS FOR SCALE-UP

There are no blueprints or how-to guides for scaling up, yet there are existing experiences and frameworks that can be leveraged and ongoing initiatives that can be studied. Different countries are at different points in the evolution of their national telecenter movements. Each country has its own telecenter history, which will influence when and how a scale-up may be considered. To succeed, we must build on what exists and on a realistic

assessment of the country's readiness. The scale-up pioneers' experience will offer solutions from which countries that scale up later will benefit.

At the national level, countries must assess their own readiness. From earlier discussions, we can identify some critical readiness criteria:

- Existing levels of telecommunication infrastructure and planned expansions
- Current performance and reach of the electricity grid as well as plans to improve and expand service
- Existence of appropriate national "models"—whether private sector, social entrepreneurship, or fully government supported—that have shown to work well nationally or in other countries
- Presence of an enabling policy and regulatory environment
- Maturity of the national telecenter ecosystem, in terms of experience in complex partnerships involving the private, public, and civil society sectors and around ICT for development

Scale-Ups Come in Different Sizes and Shapes

What constitutes a scale-up may also be quite different from country to country. A country with a relatively small population may be contemplating scaling up from a dozen existing telecenters to the 100 or so that would meet all of the country's needs. For a larger country, 100 telecenters, limited to a specific geographic area of the country, may constitute only the initial phase of a scale-up.

Other criteria, such as the country's overall economic development and literacy level, may dictate a phased approach linked to other socioeconomic development goals. Obviously, not being "ready" for a telecenter scale-up initiative does not imply that nothing can be done. It only means that more needs to be done to reach the appropriate e-Readiness level. Perhaps more important than thinking about the overall national e-Readiness is identifying specific "zones" within the country that have achieved a sufficient level of telecenter e-Readiness (see more on this in Chapter 9).

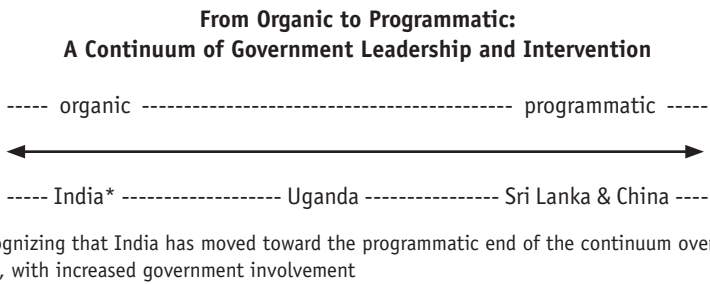
This chapter highlights two approaches, which are presented as part of a continuum of government leadership and intervention rather than as two alternative paths. At one end of the continuum, an organic approach to scale-up may involve only limited government leadership and/or intervention, yet require an enabling policy and regulatory environment—at a minimum. At the other end of the continuum, a programmatic approach to scale-up involves a significant amount of government leadership, intervention, and, possibly, funding. This approach will still require a

significant number of cross-sectoral partnerships and private sector involvement. Figure 10 presents the continuum in graphic form.

The main difference between the two approaches is in the degree of intentional planning and central leadership, versus the extent to which scale-up happens "organically" as a result of the aggregation of many different, perhaps loosely coordinated efforts. In practice, most countries will scale up with elements of both strategies, in an approach we are calling the "in-between" model; in this approach, the government is an active participant in ensuring the readiness and enabling environment are in place, perhaps also introducing some incentives or coverage requirements in the licensing programs, but then letting the process unfold without government direction.

Three case studies are presented to illustrate these approaches: India illustrates the transition from what was initially an organic approach to a more programmatic approach; Sri Lanka and China illustrate a programmatic approach; and Uganda illustrates a middle ground (an enabling environment with limited government intervention). These case studies are not presented as models to follow, but rather as examples to illustrate different approaches along a continuum.

Figure 10: Government Leadership and Intervention



*Recognizing that India has moved toward the programmatic end of the continuum over time, with increased government involvement

8.3. GOVERNMENT'S ROLE IN ESTABLISHING AN ENABLING ENVIRONMENT

A key difference between a pilot project and a scale-up initiative is the extent of the impact of national policy framework. While a pilot may be designed without much attention to national policy framework, a scale-up initiative cannot be designed in this way, even if it is not part of a government-led initiative.

When considering a scale-up effort, part of the focus should be on assessing what national policies either support or hinder scale-up, and what can be done to create the most favorable environment. Previous chapters noted

the policy and regulatory environment related to telecommunications and information technologies and connectivity in general, but small-business development and broader macro-economic and trade concerns can have a significant impact as well.

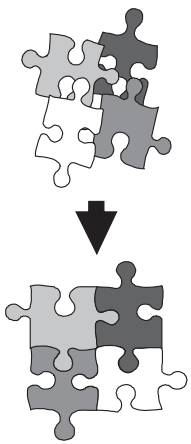
Prerequisites or desirable conditions for a scale-up include:

- A national ICT strategy that states a clear and realistic vision of how the country plans to integrate ICT into its development strategies.
- Ideally, the plan should include some of the following characteristics:
  - be developed through a participatory process involving all key stakeholders, to secure political support and create linkages to the private sector and development organizations;
  - mention shared-access facilities such as telecenters as one of the key vehicles for expanding access to ICT for underserved groups throughout the country—the government may or may not be directly involved in supporting deployment of telecenters;
  - mention telecenters as an outlet/mechanism to improve delivery of government services and to be linked to any e-Government strategy or activities;
  - be linked to poverty reduction programs; sector-specific strategies in health, agriculture, education; and any strategies linked to the achievement of the Millennium Development Goals (MDGs); and
  - include a detailed implementation plan with associated funding and staffing requirements as necessary.
- A comprehensive set of telecommunications policies that ensures:
  - competition;
  - deployment of services beyond urban centers through smart subsidies; and
  - transparent regulations regarding the use of new technologies and spectrum allocation.
- For scale-ups leaning toward the more programmatic side of the continuum, a set of rules and criteria for deployment of telecenters that includes:
  - criteria for site locations;
  - criteria for selecting and training telecenter managers, including attention to gender and ethnicity issues;
  - criteria for allocation of investment in various forms;
  - system monitoring requirements;
  - minimum service requirements; and

- guidelines for local community engagement, participation, and awareness building.

It is important for government-led schemes to be highly flexible and to allow myriad models to thrive. In the context of public-private partnerships, private entrepreneurs need to have sufficient flexibility to develop their own business guidelines, and nonprofit organizations need to be able to operate under their own guidelines as well. The best role for government leadership is to articulate the goal, and then allow and stimulate the innate creativity of the society in pursuing that goal. In other words, government-led initiatives should avoid being prescriptive or restrictive. The government's role should be to establish the proper policy and regulatory environment and to allow the private sector to be responsible for creating and managing telecenters.

Figure 11: Putting the Pieces of the Puzzle Together—Questions to Address



- What organizational model(s) should be deployed and where?
- What mechanisms or methodologies will be used to assess local ecosystems and determine the most appropriate mix of technologies, services, and organizational models?
- How will the deployment be financed?
- What will a detailed individual telecenter/kiosk "business" plan look like?
- How will capacity building be handled?
- How will partnerships for services and content be developed?
- What systems will be put in place to support individual telecenter managers?

Planning for scale, whether within a private franchise model or a national telecenter program, requires a comprehensive plan encompassing all key elements of a telecenter ecosystem, plus a vision of how to get from the existing ecosystem to where you want to be in 2020—or some other more or less arbitrary date in the future. Figure 11 lists the range of challenges that must be faced.

8.4. ORGANIC APPROACH

Scaling up does not have to be a tightly coordinated effort; it might just happen because of the natural evolution of the "ecosystem." The aggregate activities of different individual players within a country, each seeking a similar goal in its own way and sometimes collaborating with others, can result in an organic scale-up. This has been the basic approach in India. An organic approach to scaling up is most likely to emerge—and be successful—

in countries where there is a significant level of e-Readiness and market-based opportunities for disseminating ICT in rural areas. This existing level of e-Readiness may be the result of government policies and strategies, but government otherwise plays a low-profile, facilitative role. The government's most critical role is in creating an enabling macro environment—removing all obstacles and creating an environment in which the right set of incentives is in place for an organic scale-up to happen. In the absence of an enabling environment, key stakeholders within the telecenter ecosystem may be able to act as a group and lobby for policy reforms.

India: Transition from Organic to Programmatic Approach

When it was launched in 2004, India's Mission 2007 (first introduced in Chapter 1) could best be described as a loosely coordinated, multi-stakeholder approach to scaling up. It does not have much ability to implement activities, though, and serves largely as a framework within which individual initiatives are likely to continue to grow. Ideally, the result will be continued aggregate growth and evolution of the telecenter/kiosk ecosystem, strong in spite of, or perhaps because of, the lack of heavy government involvement.

The goal of providing access to all first emerged as a recommendation of the National Taskforce on Information and Software Development, which was set up in 1998 to draft a National Informatics Policy. The taskforce came up with the "Information Technology Action Plan" in 2001. Often, finalization of a plan does not lead automatically to implementation. Nothing much happened until the July 2004 national-level policy consultations convened to formulate an action plan for "taking ICT to every Indian village by 2007." The July 2004 consultation led to creation of the National Alliance on ICT for Basic Human Needs, a consortium of 240 organizations representing the public and private sectors and civil society.

The Mission 2007 Secretariat, with offices at the Pusa Institute in Delhi, and the MSSRF in Chennai, organized regular workshops and meetings with various stakeholders for likely policies and implementation strategies to achieve this task within the specified time frame. The participants also actively discussed and debated policies, new technological developments, etc., that were relevant to Mission 2007 through an online discussion group.

At one point Mission 2007 was explicitly linked to replication of the Information Village Research Project (IVRP), which has not proven to be financially sustainable. Other models, such as e-Choupal, are also being scaled up in India.

Initial plans suggested that the government would have to be a key player in facilitating scalability of shared access telecenters in the country, as is

Box 22: India's Challenge—Strengthening All the Elements of the ICT Ecosystem

To ignite the knowledge revolution in rural development, telecenters need more than robust and reliable connectivity and electrification. They need locally relevant content and applications, efficient human resources, and creative management. These things will attract dynamic community participation, which will energize the rural development process and transform the lives of millions of rural inhabitants. It is a major challenge to develop content and applications appropriate for rural population clusters that are socioeconomically diverse, speak 18 major languages and 844 dialects, and follow different religious and ethnic customs. By comparison, provisioning telecom and Internet connectivity in rural areas is easy. It is imperative that the efforts being undertaken in infrastructure building, content development, and ownership/management of telecenters in countless Indian villages provide locale-specific services to maximize impact on socioeconomic development.

paraphrased in Box 22 from a publication by Garai and Shadrach.[1] Areas where the government's role is essential include the following:

- relaxing regulations, particularly on wireless frequencies for rural areas;
- involving the *panchayats* (local government institutions) and linking with grassroots bodies;
- providing loans to rural entrepreneurs; and
- subsidizing rural service providers for connectivity for rural information centers.

This increased government involvement is now materializing through implementation of the National e-Governance Plan (NeGP) and its Community Services Centers' scheme, which envisions CSCs as the front-end, integrated delivery points for services to rural citizens of India. The challenge facing India is described in Box 22. The objective is to develop a platform that can enable government and private and social sector organizations to align their social and commercial goals for the benefit of the rural population in the remotest corners of the country through a combination of IT-based and non-IT-based services.

The CSC scheme has a three-tier implementation framework:

- At the first (CSC) level is the local village-level entrepreneur (VLE)—loosely analogous to a franchisee—to service rural consumers in a cluster of five to six villages.
- At the second/middle level is the service center agency (SCA)—loosely analogous to a franchiser—to operate, manage, and build the VLE network and business. An SCA is identified for one or more districts (one district covers 100–200 CSCs).

- At the third level is the state-designated agency (SDA), which facilitates implementation of the scheme within the state and provides requisite policy, content, and other support to the SCAs.

As noted earlier, the entrepreneurial ability and social commitment of local telecenter or kiosk managers is critical to the success of the CSC, so selecting and properly training CSC managers plays a vital role in making the CSC scheme a success.

The aim of the CSC scheme is to establish 100,000 rural kiosks across the country at the rate of one for every six census villages, thereby connecting all 700 million people who live in rural areas.

In India's case, there is uncharacteristically high interest in IT and widespread availability of expertise, which allows this more decentralized approach to flower. Smaller countries, those with a weaker IT industry, or those with weaker private and civil society sectors may benefit from a more scripted, programmatic approach and strong government leadership.

8.5. THE PROGRAMMATIC APPROACH

Some governments may take a very proactive approach to scaling up shared-access points and engaging significant public resources. This may involve establishing a national agency responsible for overall coordination of scale-up activities as well as a detailed strategy and national implementation plan. Such national strategies may involve significant private sector and civil society involvement, but all activities take place within this national framework.

Ideally, such a coordinated approach would involve specific steps for developing partnerships across the public and private sectors and civil society to address some of the challenges of scaling up, such as:

- Technology partnerships
- Content and applications partnerships
- Capacity-building and support partnerships

Strong government leadership always needs to be balanced with continued stakeholder involvement in design and planning.

Sri Lanka[2]

In its 2002 paper, *e-Sri Lanka: An ICT Development Road Map*, the Government of Sri Lanka (GOSL) identified ICT as a means to achieve the country's broader development goals—through technological and institutional transformation of key sectors in the economy. Through *e-Sri Lanka*, the government is leveraging ICT to improve public service delivery,

increase private sector competitiveness, promote new sources of growth, accelerate social development, bridge the digital divide, and support peace.

The key elements and objectives of the ICT program articulated by the government are to:

- develop the necessary capacity to lead and implement an ambitious ICT program;
- strengthen the information infrastructure serving poor and rural areas;
- create an enabling environment for the knowledge economy;
- develop specialized ICT skills and broad ICT literacy at all levels of education;
- deliver faster, more efficient, and more transparent government services to all citizens and businesses;
- use ICT as a lever for social development; and
- create jobs through a dynamic and competitive ICT sector and through diffusion of ICT among SMEs.

The Role of Telecenters within the e-Sri Lanka Program

Included in Sri Lanka's comprehensive ICT Development Road Map is a plan to deploy 1,000 telecenters—known locally as *nenasalas*[3]—by the end of 2008.

Four different types of nenasalas are being deployed, depending on the complexity and the type of services they will offer. These are:

- rural knowledge centers
- e-Libraries
- distance and e-Learning centers
- tsunami camp computer kiosks

Organizational Models and Services

These four *nenasalas* offer different types of services based on different business models. Rural knowledge centers and e-Libraries are discussed in more detail below.

Rural knowledge centers are run under a commercial/entrepreneurial model. Their main objective is to provide community access to Internet, e-mail, telephones, fax, photocopy, computer training classes, and other ICT services. They are also expected to act as sustainable hubs for information resources and to catalyze rural poverty reduction, social and economic development, and peace building.

e-Libraries, a smaller version of rural knowledge centers, follow a community model in which some services are provided free, with a few paid services to maintain the center's sustainability. These centers will have telephones and computers with high-speed Internet. Computer-based training (CBT) media are available to use offline in Sinhala, Tamil, and English, as is a large e-Library of books and periodicals for students of all ages. These centers are in the process of being established in existing village institutions such as places of worship, public libraries, and community centers. IT-trained clergy will also be used as instructors. Eight hundred of these *nenasala* e-Libraries are expected to be established in the coming years.

Connectivity

Initially, the GOSL had planned to create two high-capacity backbone transmission networks to address the long-term connectivity requirements for rural e-Sri Lanka services. However, the initial call for bids for deployment of these two networks was cancelled. Instead, intermediate solutions were developed to provide connectivity to the *nenasalas* in locations around the country. By November 2006, contracts had been awarded for providing connectivity to a total of 400 *nenasalas*, and an additional 200 *nenasalas* were to receive connectivity through a third contract announced by ICTA. The call for bids specified that the service provider would need to supply a guaranteed bandwidth of 128 kbps in both directions, and the services would be required for two years.

Some of the *nenasalas* are now operating with VSAT connectivity, which is expensive. These *nenasalas* are receiving decreasing support for connectivity costs from ICTA (100 percent for the first two years, then two-thirds in the third year, one-third in the fourth year, and none in subsequent years). It is unfortunate that the original plans for installing efficient infrastructure were not completed, because the dilemma they now face—expensive connectivity to only a few places, combined with declining external support—suggests that many of the centers will not be sustainable. In the long run, they could have used the planned government subsidy as a guaranteed business base for a private sector partner willing to invest its own money in an efficient and ultimately affordable network. Now, that money will simply have been consumed, rather than invested.

Capacity Building and Networking

The ICTA's *nenasalas* program has received support from a number of telecenter support institutions, including Sarvodoya, which has had extensive experience with its own telecenters in rural areas of Sri Lanka (see Box 23). Sarvodaya works as a "full-service institution" to facilitate the establishment of rural *nenasalas* and has worked under the e-Sri Lanka project to design and test a voucher scheme to encourage wide community engagement.

Box 23: Sarvodaya's Pre-e-Sri Lanka Experience with Telecenters and Village Information Centers

Sarvodaya is a nonprofit organization active in 15,000 villages across Sri Lanka, supporting a broad spectrum of activities in health, education, and microcredit. ICT has been integrated into this package of activities; starting with one pilot telecenter in 1997, the activities grew to 31 telecenters and 177 village information centers (VICs) in 2004. In that same year, Microsoft's Unlimited Potential Program supported establishment of six additional telecenters and upgrading of an additional four with facilities to offer comprehensive ICT training.

Telecenters were established at Sarvodaya coordinating centers, where infrastructure and security were already assured. Each telecenter acts as a hub for several hundred villages where Sarvodaya is active.

Youth leaders in community-based organizations (CBOs) were given ICT training and were expected to establish VICs in their villages. The VICs were expected to function as information hubs, but they did not have computers. Telecenters fed information to the VICs on demand and operated as rural ICT capacity-building centers for the local community. The three keys to the Sarvodaya telecenter model were:

- limited costs and limited connectivity;
- heavy dependence on volunteer youth; and
- strategic integration into complementary community development activities.

Eventually, some VICs (34 of 177) bought a PC, either on their own or through community fund-raising activities.

China's Cun Cun Tong Program and the Broader Rural Informatization Plan

China has also advanced along a programmatic approach, with the government's Rural Informatization Plan and, as a predecessor to it, the Cun Cun Tong program. In 2004, the Ministry of Information Industry launched a program, called Cun Cun Tong ("connecting each village"), which required all of China's six major telecom operators to provide telecom services in the country's remote rural areas as a transition measure before the government formalized a universal service obligation framework. The specific objective was to provide communication services to 37,741 "administrative" villages, which usually comprise little more than a natural grouping of farmhouses in an otherwise sparsely populated area. As a result of the program, China raised its village coverage from 91 percent in 2004 to 97 percent in November 2005; 100 percent coverage was likely achieved by the end of 2006. Some of those connections were fixed-line, but many were via wireless technologies, including cellular, WLL, and VSAT.

The Chinese government now seeks to complete the Cun Cun Tong program, with efforts focused on connecting the remaining 3 percent of villages, as a part of the country's telecom development plan for the 11th five-year plan

(2006–10). The government is also reportedly planning to look at various hardware and services options to be distributed to rural farmers, including the development of $30 mobile phones and low cost computers.[4]

8.6. SOMEWHERE IN BETWEEN—UGANDA

Somewhere between an organic and a programmatic approach, countries such as Uganda are taking a middle course, either by choice or by necessity. This is not better or worse, it is simply a different path to a fundamentally similar objective. They are electing to follow a strongly market-oriented approach, liberalizing the telecom sector, but not abandoning their role as regulator. They strive to establish an enabling, often pro-poor ICT policy and regulatory environment.

Uganda is often cited as a model case for good telecommunications development practice. It has gone from being much worse than the regional average in terms of telecommunications in the early 1990s, to ahead of its neighbors in more recent years. The telecommunications sector was privatized and partially liberalized between 1995 and 2000, and a set of policies guides the sector's development. Some of the relevant details are found in Box 24.

Box 24: Uganda's Telecom Sector Policies

The Communications Act of 1997 established an independent regulator, the Uganda Communications Commission (UCC), and emphasized that the communication sector should be subject to as little government interference as possible.

Part of the UCC's mandate was to establish and administer a rural communications development fund (RCDF). The Rural Communications Development Policy (RCDP) of July 2001, the key policy document on universal access in Uganda, provides clear detail on implementation strategies, benchmarks, and indicators.

The National Information and Communication Technology Policy of July 2002 unites otherwise fragmented efforts and creates clear links between ICT activities and overall national development objectives and strategies, and it puts ICTs into the larger framework of communication systems, including both traditional communication systems and mass media.

Implementing mechanisms for the universal access policy have included the following:

- Licensing obligations, using the RCDF where the market is insufficient, and increased liberalization after the end of the exclusivity period (2005)
- Identify underserved areas, allocate service lots to private enterprises via a least-subsidy method, and subsidize 30–50 percent of costs and 100 percent for content development

- Establish district-level cybercafés and telecenters, enable the market, pursue liberalized technology neutral policy, provide ICT training through vanguard institutions, and support development of locally relevant content
- Pilot projects that subsidize the start-up of business initiatives that will be economically viable over the long term

While Uganda's path to universal access involved market stimulation, other African countries with similar levels of government commitment to universal access and ICT, such as South Africa, took different paths. South Africa, for example, took a more direct approach to implementing universal access through the universal service agency.

During the late 1990s, a number of ICT projects—including the Nakaseke telecenter mentioned in Box 25[5]—were established with donor funding.

Box 25: From Pilot to National Policy—Nakaseke Telecenter, Uganda

According to a recent Voice of America (VOA) article, Nakaseke is thriving:

The telecenter in Nakaseke has demonstrated the immense possibilities of Internet use in rural areas. Its success has led to the establishment of six more centers in other districts of Uganda.

Martin Nsubuga of the Uganda UNESCO office says the lessons learned at the telecenter are the foundation of new rural telecommunications policy that is now in the works.

Government has [created] a policy where they have provided for Internet points of presence in every sub county…we are going to have a point of presence where you have a computer, a telephone for getting information…so we believe with that strategy we shall be able to move into the rural areas and try to capture a bigger part of the population of this country.

The project gets support from Uganda's Rural Communications Development Fund, UNESCO, and Canada's International Development Research Center. It was created with a 10 percent levy on the profits of Uganda's two telecommunications companies, designated for the development of rural Internet technology.

This is not to suggest that the Nakaseke telecenter's experience has been smooth since its inauguration in 1999. In 2001, a fire destroyed most of the building, equipment, and books, and lightning also destroyed a microwave link later that year. Until recently, the telecenter was also struggling with its power supply, like the rest of Uganda.

The level of continued external support provided to the Nakaseke telecenter is something that most likely cannot be replicated on a national scale.

This example demonstrates how successful pilots and existing activities can serve as building blocks. Pilot projects have played a key role in increasing

people's awareness of what was possible, of how telecenters could work and become sustainable.

While liberalization of the market and other policy and regulatory measures have addressed some market gaps, many rural and conflict-affected communities in northern and northeastern Uganda remain largely without services. Uganda's phased approach focuses on providing minimum levels of service at the district level and an emphasis on using the government as a lever for the use of ICT nationwide—through its e-Government strategy. These approaches are well adapted to the country's context. Given the limited resources available and other development-related priorities, expending huge resources to cover the country with subsidized telecenters would not be an appropriate strategy—at least not in the short run. Most rural areas of Uganda have a low level of e-Readiness for telecenters. The current effort to provide a minimum level of services at the district level should increase e-Readiness of rural areas to take the next steps.

8.7. TAKE-AWAYS

What approach would be most appropriate in a given setting?

- Solving the large policy issues generally must happen in a centralized way. For example, rural telecommunication infrastructure, national Internet gateway policies, liberalized regulations, and the introduction of competition into services cannot be addressed easily by a loosely organized, organic growth approach.
- In large countries such as India and Brazil, an emphasis on evolving different approaches to rural access facilities and developing the institutional infrastructure to support different subnetworks of service points functions very well in a decentralized, organic model. Supportive national government policies are the first order of business, after which both local and national services can proceed independently.
- Design and implementation of e-Government services and applications fall into an in-between status. e-Government is a crucial driver for accelerating the benefits of IT (and at the same time is a major element of demand for access services), but state and local government initiatives can proceed in a very organic fashion. National-level e-Government services can lead the way or follow later.
- National-level governments' role may be limited to establishing an enabling environment through policies and regulations that allow market forces to do their part. State governments can then play a crucial role in ensuring some level of equity and appropriate funding.
- Small countries have some advantages in the sense that,
  - From a policy standpoint, the affected parties and the trade-offs are likely to be easier to identify, though perhaps no easier to solve.

Smaller countries seem to have an easier time making bold decisions, when some core number of players shares a similar vision of the future. In larger countries, there are often just too many groups with vested interests for the government to make a decisive move.

  - From a connectivity infrastructure standpoint, it is more manageable to see an integrated path through the thicket and commit to it. The scope of investments required is much smaller, and drag of the cost of installed base is less. The argument that the country cannot afford redundant capacity is more compelling. Thus it is possible in a small country to provide nationwide broadband connectivity to the entire country in a matter of months (see the Macedonia example in Chapter 6).
  - Implementation of a national telecenter deployment plan in a small country is also less complex than it would be for a large country. A small country may have a handful of civil society organizations capable of supporting the effort and a handful of private sector partners to integrate in a nationwide collaborative effort. In contrast, India's Mission 2007 has tried to coordinate more than 250 partners. The complexity of partnerships and collaborative arrangements goes up exponentially with the number of partners.

- The "organic approach" can be thought of as a default approach, or what can be done in the absence of strong government leadership and direct intervention. While a programmatic approach where a decisive center asserts prescriptive guidance may be attractive, it does not guarantee success. In fact, programmatic approaches motivated by the central government's need to control the process may be self-defeating and unsustainable.
- The "in-between" approach offers a good balance of leadership, positive regulatory influence, and a way to create momentum that is very difficult under a pure "organic" approach. It carries with it some risks that the type or amount of control the government exerts will be inappropriate. However, the markets in developing countries are often not very mature, and with an undersupply of capital, there is a real risk that the private sector will restrict their activities to the high margin elite markets in the cities.
- The best strategy for groups that find themselves in an "organic" situation is to try to communicate and coordinate within the professional community.
  - Civil society organizations can collaborate with each other on projects or procurements; the increased size can generate economies of scale and better purchasing power for hardware and bandwidth.
  - In the context of the widespread tendency for central governments to "decentralize" government services, the lower levels of government (provincial, departmental, municipal) are natural partners. The lower

number of interest groups at the local levels means that the process of working out permissions and partnerships is simplified.

- Networks of interested parties, as we saw in Chapter 7, strengthen everyone's skills and bargaining power. Such a national network is vital when the central government is not very attentive to the necessary enabling environment issues—the collective voice of the network can be very helpful in getting appropriate policies in place. As was demonstrated in the case of India, there can be an important place for central government in a programmatic role—grassroots beginnings can be both the catalyst for broader government involvement and leadership and the source of creativity that allows operational successes.

8.8. MAKE IT YOUR OWN

Here are some questions to consider in analyzing your own context:

- Where does your country stand in terms of paths toward scale-up? What is its level of readiness for a scale-up? What immediate actions can be taken to strengthen the readiness while moving forward on larger policy and infrastructure issues?
- What approach would work best in your country? Where are the key institutions with the capacity to design and implement large-scale deployment of telecenters? What public-private sector partnerships may be necessary? What smaller actors in civil society could play a supporting role within a large-scale deployment? What research and educational institutions could support capacity-building requirements related to a scale-up initiative?
- What are the critical bottlenecks in your country? If the policy and regulatory environment is a critical bottleneck, a heavily subsidized, government-led effort establishing a significant number of unsustainable telecenters would waste scarce resources. What avenues may be open to address the policy and regulatory environment?

8.9. SELECTED RESOURCES

National frameworks, policy and regulatory issues—Establishing an enabling environment for scaling up

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ENDNOTES

1 OneWorld South Asia and MS Swaminathan Research Foundation, 2004, pp. 12, 15.

2 Sri Lanka Case Study developed based on: Information and Communication Technology Agency (ICTA) of Sri Lanka http://www.icta.lk; nenasalas (Sri Lanka's telecenters), http://www.nenasala.lk; Liyanage, 2006; 4) Proenza and Dewapura, 2004.

3 The program was initially referred to as the Vishna Gnana Kendra program, or VGK.

4 Chau, Tanner, and Tippu, 2006.

5 Were, 2006.

CHAPTER 9:
Making It Your Own

For those who are committed to rapid expansion of equitable, affordable, socially and economically effective access to the benefits of the information revolution, the central challenge is to understand and act effectively in many different playing fields. It is as if there were a job description for a "Shared Access Specialist" that read,

> *Must be an expert in: telecommunications technology and policy; regulatory procedure; computing hardware; Internet protocols and networks; small-business operations; community development; health, education, agriculture, and business applications; economics of franchising; political theory of national policy development; alternative supply sources for electricity; and public-private partnerships.*

Obviously, no individual will ever master all those fields, and no book could do all of them justice. The content of this book spans an incredible array of different topics, each of them relevant, and each of them worthy of a much more detailed treatment. In this chapter, we tie these threads together and try to show the relationship among all of the discrete pieces.

In each of the preceding chapters, we have included several sections at the end that are intended to encourage you to take action. To help you to take the next steps, we provide some tools to think about how what was discussed applies to you, suggest some questions, and provide you the challenge of identifying your own questions. In this chapter, we try to tie together all of these action steps, and present a framework to guide additional reflections and action. We mention, in each case, some of the major questions posed to the reader at the end of each chapter; you may find it useful to look back at the full list and reflect on how the issues raised in other parts of the book would now influence your perspective on that chapter's questions. This is the most important role of the book, where you take the experience of the rest of the shared access professional community, decide what it has to offer in your situation, and apply it.

Using the Tables

In the course of laying out a path through the sometimes complex analyses of the book, we have provided some tables to provoke systematic thinking about how the different topics are interrelated. We urge you to adapt them to your own needs—the tables in the rest of this chapter are illustrative only, and will not exactly fit your situation. We present them as aids to analysis,

not as a ready-made analysis. For example, some of the tables highlight four possible "zones" that correspond to key variables in rural and underserved areas, but you may find that a framework that identifies five or more different types of zones is a better fit for the specifics of the country you are analyzing. Or you may be interested only in a specific type of zone rather than the entire country and, therefore, you may use only part of this analytic framework. Similarly the variables in the left-hand columns of these tables will also need to be adjusted to fit the realities of your context of interest.

We have also included a substantial section on business and financial planning, to help you take the strategic direction you select, and then put it through a rigorous analysis that generates predictions on the long term sustainability of the effort. The financial planning suggested is done at a quite detailed level of analysis, which has the advantage of identifying which elements of the design or service mix contribute to sustainability, and which turn out to be drains on economic viability. The tables in the financial analysis are also illustrative, and need to be modified by you to match your strategy and local constraints.

9.1. INVESTIGATING YOUR SITUATION AND YOUR OPTIONS (CHAPTERS 1, 2, AND 3)

In this section we will give an overview of the approach taken throughout the book, and try to bring into focus the primary issues that are raised in each chapter. The first part of the book, chapters 1, 2, and 3, set the stage, and the subsequent chapters each went deeper on a more narrowly defined topic. Here, we'll review the appropriate questions for the first few chapters and show sample ways to organize your thinking to help apply that content to the local situation you face.

Getting Your Bearings

The first several chapters are fundamentally about surveying the environment and constructing an understanding of the environment within which you will operate. The core questions of the first three chapters focused on the following topics and questions.

- Your Vision of the Telecenter Movement (Chapter 1)
  - Develop your own vision and concrete goals and read this book with the specific intent to extract valuable insights that will help you achieve your vision.
  - Whatever your country of interest, your vision should start with an understanding of where that country stands in terms of evolution of the telecenter movement. What pilot projects have been implemented successfully? What is the scale of the initiatives currently being implemented? Are there any scale-up plans?

- [*Add your own questions or reflections.*]

- Learning from Your Own Experience (Chapter 2)
  - How do these lessons translate in your setting—your country, your community? Are there lessons that have been identified based on your own country's experience? Where could you find them?
  - What do these rather abstract lessons mean to you in practical terms?
  - What are some best practices in monitoring, evaluation, and knowledge management that might help your initiative to learn from its own experience?
  - [*Add your own questions or reflections.*]
- Analyzing the Local ICT Environment (Chapter 3)
  - To what extent is community ownership an important goal for you?
  - Can an analysis of rural ICT markets tell you something about where a market-oriented, for-profit model is feasible, and where a subsidized approach is needed? What business models make sense? When or if government investment should be provided?
  - What methodologies would be most appropriate for your purposes? Would you be able to pick and choose elements among existing methodologies to create your own?
  - *[Add your own questions or reflections.]*

Analyzing e-Readiness

A first step in identifying strategies for expanding rural access to ICT based on a combination of market mechanisms and funding opportunities is a thorough analysis of the "market" and designation of "market" and "development zones" based on specific characteristics.

The main idea is to assist in identifying potential sites for telecenters under different organizational models. Richard Heeks[1] suggests that a simple schematic identifies three different categories of locations: high, medium, and low telecenter readiness.

The criteria that ICTA established for setting up *nenasalas* can be assumed to be the conditions that correspond to locations that belong to "medium e-Readiness" locations.

When establishing criteria, it may be important to establish not only minimum criteria but a ceiling as well. In Sri Lanka, priority regions were identified initially based on poverty and other criteria, but locale-specific ceilings may be required as well. It is important to avoid setting up externally funded telecenters where the market already provides core services, and the subsidized telecenters may end up unfairly competing with

the private sector. In addition, there is a danger that subsidies could have a negative impact on long term sustainability of telecenters if the appropriate attention is not paid to building a self-reliant business model.

Developing a Typology of "Zones"

One of the fundamental lessons of the review of the history of telecenter efforts was that any program needs to take into account the degree to which the sites are ready to incorporate ICT inputs. The state of e-Readiness varies from place to place within a country, and the strategies appropriate to one level of readiness will not be appropriate for another. Table 17 offers a structured way to think about the characteristics that matter for defining different zones in your context.

Three different strategies can be identified for these three different types of locations. To paraphrase Richard Heek's[2] definitions:

High telecenter e-Readiness locations: The private sector will cater to this market, largely unaided. This corresponds to what Sarah Parkinson[3] identified as the first type of intervention—"Hands Off."

The development focus should be on development value added rather than on the telecenter infrastructure itself. This may mean ways to support outreach from the telecenters to more marginalized local groups—ways in which public information goods and services can be delivered through these private sector telecenters. The e-Centers in Kyrgyzstan, discussed in earlier chapters, fit this profile.

Low telecenter e-Readiness locations: Some locations simply cannot sustain a telecenter. Many of the examples of failed telecenters fall into the "low e-Readiness" category. Causes of failure include impossible economics (lack of a viable market), massive underuse (low demand and capacity), and a range of technology challenges. These locations may be perfectly worthy of other types of information-related interventions, based on traditional communication channels, which may even set the stage for a mini-telecenter, as has happened with the village information centers of Sarvodaya, discussed in the previous chapter, and linkages to a full-service telecenter in the area.

Medium telecenter e-Readiness locations: Traditional "development interventions" should focus on these locations, and various models involving governments, private sector, and civil society may be involved. These are locations where the market does not yet deliver services, yet there are potentially sustainable development benefits from investment in telecenters.

The characteristics of a community in each category will be different in every country. The factors of infrastructure availability must be weighed against size, and against the education level of the population, etc. The important point is for you to develop a categorization scheme that is useful for your purposes. In the most general terms, Zone 1 may correspond to remote and isolated rural areas, Zone 2 to small rural towns, and Zone 3 to more urban, yet underserved areas.

Table 17: Typology of ICT Ecosystem

	Telecenter e-Readiness Low -------Medium-------High		
Community ICT Ecosystem	**Zone 1**	**Zone 2**	**Zone 3**
Population Demographics			
a. Size of communities			
b. Literacy rate/languages			
c. Income levels			
d. Occupations			
e. Age distribution			
f. *[Add your own]*			
Institutional Readiness			
a. Government institutions			
b. Businesses, SMEs			
c. Health posts and hospitals			
d. *[Add your own]*			
Infrastructure			
a. Roads			
b. Electricity			
c. Basic telephony			
d. Connectivity			
e. *[Add your own]*			

9.2. IDENTIFYING APPROPRIATE SERVICES FOR EACH ZONE (CHAPTER 5)

The zones can serve as a guide for different types of private sector investments, allocation of government funds for the deployment of ICT infrastructure, or an NGO's decision to establish telecenters to support its existing activities in various areas of a country. Ultimately, you need to

match different types or levels of service with the market segmentation you have defined. Referring to Chapter 5, one might ask:

- What combination of services would best serve rural communities or underserved urban communities in your country?
- If you were to focus your efforts on a specific zone, what mix of services would be most appropriate to that zone?
- What partnerships would you want, or could you put together, to provide a wide range of value-added services to local communities?

Table 18 gives a hypothetical example of how one might assign services and content to telecenters serving the different zones. The actual uses to which the technology would be put will be extremely variable, depending on the earlier analysis of the portions of the ecosystem that are ready to participate.

Table 18: Telecenter Services and Content

	Telecenter e-Readiness Low------Medium-----High		
Services & Content	**Zone 1**	**Zone 2**	**Zone 3**
a. Voice only (cellular or fixed line)	✔		
b. PC (level 1)	✔	✔	
c. PC (level 2)		✔	✔
d. PC (level 3)			✔
e. Other			
In this hypothetical case, the levels might be defined as: • PC (level 1): single PC + printer, with or without connectivity—a PC-based kiosk • PC (level 2): multiple PCs + printer(s) with connectivity—a multipurpose telecenter) • PC (level 3): multimedia center—advanced computing, printing capabilities, photo and video editing, etc.			

Depending on the analysis of the local ICT ecosystem and telecenter e-Readiness, it may be possible to control the level of complexity and investment for different "zones." For example, the least e-Ready areas may benefit more from a mix of traditional ICTs such as radio and voice services, without the added complexity of PCs and connectivity.

9.3. IDENTIFYING APPROPRIATE TECHNOLOGY OPTIONS (CHAPTER 6)

Once expectations for the overall focus and penetration into the more isolated and underserved parts of the population are defined, it is time for a reality check against the available technology options that could support

delivery of those services to those populations. The questions we might address include:

- What are the technology needs and wants? What devices are best suited to meet these needs? What low-power and/or low-cost computing devices are available in your country?
- What alternative energy solutions have been used successfully to support telecenters in your country? Is there a sufficient level of local technical expertise to support such alternative energy solutions?
- Who are the national experts in telecenter technology (hardware and software) and telecenter connectivity? Who else has worked on these issues in your country who could be used as a resource? What level of support is available in your country for the various technology options?

Table 19 helps to structure that set of considerations, and to determine what constraints the connectivity and technology situation will put on the ability to address the desired services in the initial phases of the initiative. Again, the row categories need to be adjusted to local circumstances.

Table 19: Technology Options

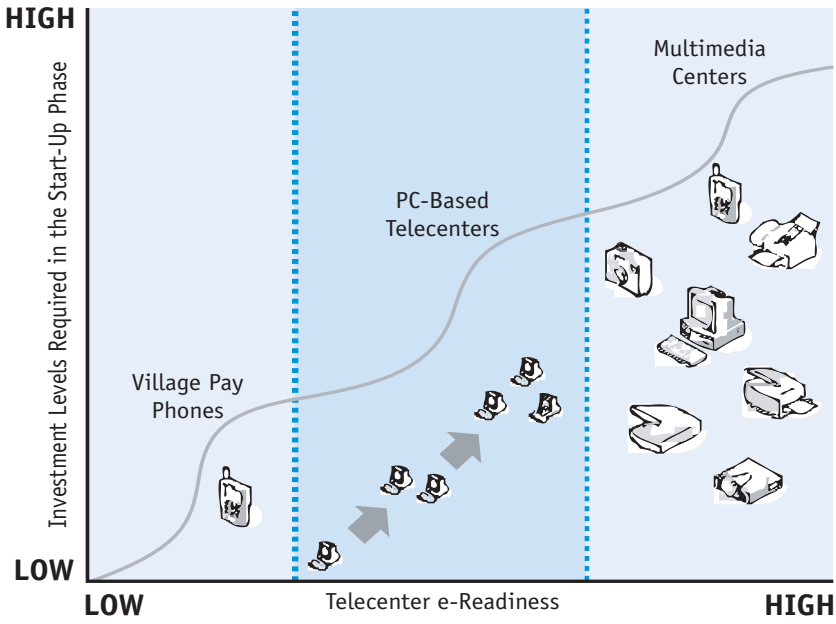
	Telecenter e-Readiness Low-------Medium------High		
Technology Options	**Zone 1**	**Zone 2**	**Zone 3**
A. Power			
a. Grid		✔	✔
b. Grid + generation/storage	✔	✔	
c. Alternative	✔		
d. *[Add your own]*			
B. Connectivity			
a. WiMax/WiFi		✔	✔
b. VSAT	✔	✔	
c. Asynchronous	✔		
d. CDMA			
e. GPRS/EDGE			
f. *[Add your own]*			

You may want to consider whether it is worthwhile to establish a telecenter in an area without a reliable source of electricity, or to establish a minimum criterion of eight hours of electricity per day to consider a location as viable. The decision about how to apply insights about available and appropriate technologies might be structured as a question of what to put

in a specific center, as in Table 19, or it might be structured as a question about various classes of centers, as is illustrated in Figure 12, below.

Having to deal with the electricity situation through a battery backup or alternative source of energy increases the complexity of the operation and the start-up costs. In a zone where profitability of the activity is not assured, this may not be the most effective use of funds. Establishing a reliable source of electricity for the village may be a more appropriate use of resources for that particular location.

Figure 12: ICT-Based Ventures



Source: Adapted from Microsoft®.

9.4. IDENTIFYING APPROPRIATE ORGANIZATIONAL MODELS (CHAPTER 4)

We now have enough information to address the two most practical questions we face: how shall we organize the actual delivery of the services, and at what cost. These two issues interact with each other, so we might think of this stage of the analysis as many iterations of what-if scenarios, in which we posit a structure and suite of services, and then analyze what kinds of markets could sustain them. There is a great deal of uncertainty around all of these estimates, so the risk can never be reduced to zero; but the more systematic we can be, the more likely we are to have successful outcomes.

Planning for Organizational Structure

- What organizational (or business) model is most appropriate for your purpose? What are your options (if any) in terms of organizational models? What are the options for partnerships and hybrid models, or for social entrepreneurship models?
- What types of communities or markets are you interested in serving?
- What payback period makes sense for your organization?
- What types of government investment funds are available? Are they restricted to specific geographic areas or target populations?

Table 20: Organizational Models

	Telecenter e-Readiness Low --------Medium------High		
Organizational Models	**Zone 1**	**Zone 2**	**Zone 3**
M1. Commercial Model			
a. Individual		✔	✔
b. Franchise		✔	✔
c. *[Add your own]*			
M2. Social Enterprise Model			
a. Individual	✔	✔	
b. Franchise	✔	✔	
c. *[Add your own]*			
M3. Public Service Model			
a. NGO-operated	✔		✔
b. Government-operated	✔		
c. *[Add your own]*			

These questions might lead us to an analysis like the one presented in Table 20. The model structures were discussed in detail in Chapter 4; the ones used in this table are illustrative only and need to be modified to match the results of your analysis to this point. It should also be clear that these categorizations are not rules, but descriptive probabilities. There will be multitudes of cases that fall outside of these classifications, such as commercial model centers appearing in Zone 1 communities. This analysis is just intended to give an example of one type of conclusion.

Table 21: Types of "Interventions" Based on Zones and Telecenter e-Readiness

	Telecenter e-Readiness Low -----Medium-----High		
Interventions	**Zone 1**	**Zone 2**	**Zone 3**
No intervention			✔
Demonstration project			✔
Start-up capital and training support		✔	✔
Short-term support to help build demand	✔	✔	
Ongoing government support or loans?	✔	✔	
Anchor user	✔	✔	

Planning for Interventions

Once the larger goals and possible models have been specified, it's possible to think through what kinds of interventions might be considered in the different zones. This analysis requires, in part, that you know how much these different approaches would cost; the analysis techniques for that are discussed later in this section.

The intervention types depicted in Table 21 and detailed below are based on analysis conducted by Sarah Parkinson in her comparative study of telecenters in Uganda and South Africa.[4]

- Hands off—no intervention: a center is established and maintained by the market; in cities, small towns, and their peripheries, local entrepreneurs perceive market opportunities and set up their own access centers, often motivated by services they have seen elsewhere.

  ➤ Intervention appropriate for **Zone 3**

- The local market can support access to services, but no local entrepreneurs have yet been inspired to do so. If people see from a demonstration project that they can start up an access center and run it successfully, they will do so.

  ➤ Intervention appropriate for **Zone 2** and **Zone 3**

- The third intervention addresses a situation in which local entrepreneurs or NGOs may not be able to start up an access center—even if they wish to, and there is a ready local demand—because of lack of capital and/or technical training. Support to meet such requirements allows the centers to start up successfully, and then run sustainably on their own or even generate a profit.

  ➤ Intervention appropriate for **Zone 2** and **Zone 3**

- The fourth intervention recognizes that it may take some time to build up demand for ICT services among the local population. Also, it may take some time for the center to establish itself and build up its internal capacity. A short-term public investment usually covers setup and running costs for about three years.

  ➤ Intervention appropriate for **Zone 2** and **Zone 1**

- The fifth intervention recognizes that there may be a basic gap between the cost of providing service and the required number of clients who are able to pay. Ongoing subsidization makes up the difference. The problem with such subsidization is that it is difficult to secure over the long term and tends to be unreliable. Thus, affordability issues need to be met, either at the national level, by lowering the cost of basic services, or the center itself must find a way to reduce the cost of offering the services.

  ➤ Intervention appropriate for **Zone 1** or **Zone 2**

- The sixth intervention is well suited to rural areas where ability to pay is low. However, it still requires the presence of affordable, reliable basic telecom and electrical infrastructure. An anchor user, such as a government office, covers some portion of the operational costs of the services and may even create extra public services such as training or access to specialized information. The public can use the services as well, for an affordable fee.

  ➤ Intervention appropriate for **Zone 1** or **Zone 2**

9.5. BUSINESS PLANNING

The task of developing a detailed plan for what a new center or new network of centers ought to look like and do is a necessary first step. It is a process that is conceptually like writing a proposal to obtain funding, but more demanding in many ways. In a proposal, the process might be compared to selling an idea to someone; in a business plan, the process is more like trying to imagine the smallest details of what a successful implementation of that concept would be, and then attaching estimates of the quantity and cost of those details. In the business plan, one is trying to answer the question of how the center would work, and where it would get and spend its resources. The plan must start at the larger issues of objectives and needs, and drill down into the smaller details of how many customers in a town of size X would be expected buy a specific service at a specific price within the first year. Ultimately, the analysis made in a business plan serves the larger goals, but answers the smaller questions of what it will cost to offer that specific service, and whether the revenue would be sufficient to keep the operation going. The full business plan looks at how the center would be designed, what services it would offer and what the competition

would be, and whether the revenue sources that are predicted from that effort would be adequate to survive, or to provide a profit.

The elements of a full business plan will include something like the following list, but modified to meet the goals, the needs of the location, and the services in question:

- Organizational Plan
  - Project description
  - Strategic partners
  - Capacity building
- Market and Competitive Analysis, and Product Plan
  - Customer and user profile
  - Products and services
  - Time and cost to develop new products and services
  - Marketing plan
- Financial Plan
  - Budget for the necessary capital equipment
  - Budget for the resources required to manage the activity
  - An estimation of the revenue stream and a cash flow analysis
  - An overall estimate of financial feasibility

Functions of the Components

The first two groups of components, the organizational plan and the market and competitive analysis, and product plan are, in many ways, the real focus of this book. Different aspects of these topics have received detailed coverage in the prior chapters. In the following section, we will add detail about the development of financial plans, because these are relatively complex, despite the fact that they seek to answer a deceptively simple question—"Can this activity sustain itself?"

The purposes of the different components of the financial plan might be described very briefly as:

- **Capital Equipment and Start-Up Expenses Budget:** The center will have to incur some expenses that occur only at long intervals, such as acquiring computers, software, and peripheral equipment and furniture, arranging connectivity, training new staff, renovating a facility, etc. These are often a challenge, because they are costs that are incurred before the revenue stream begins, and the required cash must be obtained. Capital equipment and start-up expenses are treated in slightly different ways in accounting systems, but the basic principle

is that the cost of investments like these is amortized, or spread over time, in the financial planning. Many of these costs recur at intervals, such as having to replace worn out computers or train new staff, but the reality on which the plan hinges is to have a clear vision of what will have to be spent in order to open the doors for business, and (in a later part of the analysis) to make sure that there is a capital equipment replacement budget in the plan to handle equipment failures as they occur.

- **Management and Operations Budget:** A staffing plan that takes account of management, daily operations, technical support, cleaning, security, and the other functions for the center is the basis on which the cost of operations is estimated. Labor and rental costs are usually the largest components, but it is important to recognize things like the costs of annual business licenses, telecenter franchise fees, fees for consultants to solve technical problems, employment taxes and necessary benefits, the interest costs for borrowed money, connectivity and communications costs, advertising, utilities, office supplies and printing, bank account fees, and the like. These costs may vary over time as the customer base grows, or as new centers are opened.
- **Estimation of the Revenue Stream and Cash Flow Analysis:** Once the essential elements of the cost of being in business are known, the revenues that might come from whatever sources must be estimated, so that the financial plan can finally compare the costs with the revenues. The revenue sources might include in-kind contributions, cash available from grants or universal service funds, customer payments—all sources may be counted as long as they will offset some cost that has been identified. Revenues will vary over time as well; many centers will find themselves in the position of having some kind of start-up grant that helps cover the costs of the initial year or years. For this reason, one projects the costs and expenses over time (often a five-year period is chosen) to give the situation a chance to stabilize.
- **Overall Estimate of Financial Feasibility:** The various analytic steps culminate in an overall judgment about whether the center has been designed in a way that has a good probability of sustaining itself in the long run. If not, the disciplined thinking that has gone into the analysis will almost certainly point to the kinds of changes that would be necessary to the business plan to achieve sustainability. The creation of business plans is usually a recursive process, that is, it is done repeatedly, making adjustments respond to problems or issues that emerged under the prior set of assumptions.

With the business plan's detailed assumptions about activities and local costs, it is possible to develop a matrix showing costs for a range of scenarios, from different telecenter models to different power and connectivity solutions.[5] Most of the work that has been done in this area

refers to the firm-level analysis of costs and revenues, with an eye to break-even points, operating capital required to survive the start-up phase until the client base has grown, or tests of different pricing schemes for services. All of these are relevant, but business plans can be done in a similar way for whole networks or franchise operations.

It is appropriate to be humble about the development of business plans. There is usually too little available information, and what exists is often of dubious quality. Assumptions about demand are piled on assumptions about costs, and there are so many unknowns in the equation that the estimates produced by business plans for new businesses are seldom very accurate. There is not an objective "truth" to be known about whether a strategy will work as planned; the purpose of the business planning process is simply to reduce the risk, and to bring the discipline of systematic thinking into a process that has (and should have) a healthy component of optimism and social commitment. The business plans force the participants to think about demand and costs in a disciplined way up front, and they permit comparison of different possible alternatives under equivalent assumptions. That said, no one should proceed further down this path without doing some kind of cost estimation and sustainability monitoring.

When thinking about telecenters that will receive start-up funding from governments or donor agencies, it is essential to recognize those contributions as temporary in the business and financial planning. It is easy for social entrepreneurs to fall into the trap of thinking that external contributions are just another source of revenue, but the experience with continuity of external funding is very clear: eventually, it goes away. If operators haven't planned for that, their survival will be jeopardized. Their closure or transformation might be seen as part of the natural evolution of the local market. They need not all survive, provided there is an anticipation of continuation of services, whether through a commercial telecenter or some other form of shared-access facilities.

9.6. FINANCIAL PLANNING

Regardless of what kind of model one assumes, the resources consumed by the telecenter and the revenues for covering the costs must come from somewhere. The difference among the models is primarily twofold: on the one hand whether the center hopes to generate a surplus over its costs (a profit, in commercial terms, or a "fund" in non-profit terms), and on the other whether the majority of the revenues will come from the users or from other sources.

Financial Projections—A Universal Tool

A "social model" case might try to generate some of the "revenues" in kind instead of in cash, for instance, by getting students to staff the center for free, or by community members helping to build the facility, or by persuading local corporations to donate the time of their technicians to keep things running. They may look to the donor agencies or to government to help fund start-up costs through grants, or even operating costs (such as through transfers from universal service funds). At the other end of the continuum, an "enterprise model" of more commercial orientation would not only be likely to look internally for all the revenues that were required to sustain operation, but would also be looking to generate a return on investment for the people whose money was used to fund the start-up costs. The "social enterprise" models occupy the middle ground of trying to be self-sufficient on the revenues they generate, but still directing a portion of the work of the center toward social objectives.

In general, aside from their choices about where to try to obtain the resources, and on what to spend them, all the models face the same fundamental issue; they need enough resources to keep seeking their goals, and they need to be able to make informed decisions about whether a given set of activities can be sustained, and whether they can muster the initial resources to start it up. The usual approach to this for all activities is a formal business plan, as detailed in the previous section that has as one of its components a detailed financial plan. The previous section gives a short overview of the business planning process. The financial plan is given special attention in this section, because of its vital role. The analysis will be shown first at the level of an individual telecenter, and second at the level of a network or franchise.

The financial plan is probably the most important element of the business plan, but it cannot be done well unless the other parts of the plan have already been developed. It needs to be based on the analyses that have been described in the other parts of the book. That is, one must be aware of what other sources of the services the center intends to offer, what the competition charges and how low they might be able to cut their prices in a competitive situation, what the value proposition is for the center's services as opposed to the competition, what the potential customers desire and what they will be able and willing to pay, how long it will take to grow the customer base to a size that produces enough revenues to sustain the operation, etc., in order to ask the question of what it will take to deliver those services, how much that will cost, and whether the resources that can be identified and projected will cover those costs.

It is virtually impossible to give precise answers to most of these questions—in particular, when introducing a never-before-experienced product to a

new market, the uncertainties are massively higher than for other types of enterprise. Most of these issues will be determined subjectively. However, the purpose of the business plan is to make sure that those planning for the center have given a very disciplined look at the situation, and made the best judgment they can based on the available information.

Spreadsheets for Financial Analysis

In the previous section, the kinds of components that need to be considered in a financial plan were described as a budget for the necessary capital equipment, budget for the resources required to manage the activity, an estimation of the revenue stream, a cash flow analysis, and an overall estimate of financial feasibility

The standard tool for carrying our the financial analysis is a spreadsheet which itemizes all the costs and revenues, spells out the assumptions for how they will change over time, and the basis for estimating the values that are shown, and then aggregates it into a multiyear time span. The resulting calculations shed light not only on the potential for profit or sustainability, but also on intermediate problems like cash flow and service mix. The techniques for estimating costs over time need to take account of the present value of money that is borrowed and will have to be repaid with interest, and in many countries it is necessary to factor in a consideration of inflation as well. These issues become more important over longer time spans, so if the planning team does not have spreadsheet and financial analysis skills, they may have to turn to local experts for help, or be careful to include those issues in their thinking about a less formal kind of analysis, and have correspondingly less confidence in the results of their analysis.

The technical skills for financial analysis are not the important issue here; the result of the business planning activity is always an estimate, subject to a wide range of uncertainty about its assumptions and predictions. What is important is the process of a careful, detailed thinking through of all the features of the center's operations and business case, so that serious decisions can be based on the best available analysis.

The logic described above primarily concerns the analysis for a single center or a few clustered together. There are more complicated cases that require application of the same principles, but taking into account additional variables. One is for the situation where there is more than one type of center, to accommodate variability in the size and readiness of local markets. These are often called "tiered networks," but they can also exist in very small enterprises, where a rural operator might have one large center and several small kiosk operations at different locations. Another is when the planning is being done for a larger network of centers that might share a common identity and support structure. Such circumstances can be

found both for national "networks" as described in Chapter 7, and for purely commercial franchise situations. Some examples of the kinds of analyses that might be encountered in these situations are presented here, with the objective of helping the reader imagine the kinds of factors that will prove relevant in the local situation.

The pieces usually thought of as a business plan in the "micro" context of a single telecenter's analysis are those having to do with financial costs, but that is a quite limited view of the risks faced by the small enterprise. There are numerous sources on the Internet for spreadsheets to help forecast costs and revenues and the time cost of money; some useful generic examples can be found at http://telecentres.isoc.am/references/sobusi/index.html and in the resource list compiled by the ict4d-social enterprise toolkit at http://www.un.org.kh/undp/ict4dtoolkit/planning.htm.

Example of a Financial Plan

This section walks through the process of gathering data and organizing it to prepare a financial plan. Because local circumstances are extremely variable, the process is presented at the level of steps that need to be executed, rather than with actual financial data. The reader is encouraged to use the structure of the tables to analyze his or her own situation using local data. This example of a plan is modified from a specific plan that was prepared under USAID funding for a potential national network of multipurpose telecenters in Kyrgyzstan.[6] The spreadsheets have been modified to make them more appropriate for the general cases being discussed here, rather than focusing on the details of that local case.

The overall approach of the financial plan is:

- to estimate the Management and Operations Expenses (essentially the fixed recurrent costs of simply being in business);
- then estimate the Cost of Sales and of Services Sold (the recurrent costs that vary with the volume and type of business); and
- then combine the two into an estimate of the Profit and Loss and Cash Flow of the center over a period of time.

This process is presented in some detail below. It gathers together the detailed data and assumptions that the planners have collected and uses them to predict whether the expected business can support itself on the identified sources of revenue, and whether the cash flow projections are adequate. (Even if the center can ultimately make a profit, it might find itself in a fatal cash flow crunch at some point before it reaches sustainability, an event definitely to be avoided.)

In this case, estimates are first made of the expected levels of cost for the various activities of the center. Each cost is estimated at "Low," "Medium," and "High" levels in recognition that it is not possible to know exactly what the costs might be. This later gives us the capability to use the costs for each level to produce separate forecasts for the profitability of the center, thus helping us to understand the range of risks that we face; should only the lowest estimates of expected cost show the center as viable, then we would rightly be concerned and go back to the planning process looking for ways to increase revenues or lower costs, or both. An illustrative spreadsheet for capturing the detailed data is shown in Table 22.

Table 22: Estimating Monthly Management/Operations Expenses for One Center

	Estimated Level		
Category of Expense	**Low**	**Med**	**High**
Rent, Utilities			
Payroll, Social Fund Tax, Other Benefits			
Staff Training			
Promotion and Advertising			
Internet, Telecom Expenses			
Product Development Budget			
Franchise or Co-op Fees			
Security and other Services			
Maintenance and Repairs			
VAT, Taxes Other than VAT			
Business Licenses			
Allowance for Expenses (Insurance, Supplies, Transportation, Legal Advice, etc.)			
Amortization of Capital Equipment, Cost of Loans, or Accrual for Equipment Replacement			

The table gives structure for thinking about the detailed types of expenses that will be incurred and enables the planner to acknowledge that the exact values cannot be predicted, but that a reasonable range of estimate can be established. The low, medium and high cost levels will be used to make separate estimates of profitability to gauge the risk that the center faces.

The second step in the process is to identify the sources of revenue that might come into play and begin to estimate the levels of demand, the supportable pricing, and the costs of actually providing the service. Note that this analysis generally treats the management and operations expenses as fixed recurrent costs, and the cost of delivering services as variable recurrent costs, depending on the quantity of those services sold. This gives the planners the

Table 23: Estimating Revenues and Gross Profits from Cost of Services Sold

Profit Center	Unit	Cost/Unit to Center	Estimated # of Units	Price to Customer	Gross Income	Gross Profit
Computer Training	month					
Computer Rental	hr.					
Internet Access	hr.					
Access to e-Government Services	hr.					
Multi-User Games	hr.					
Typing, Data Entry	list					
Printing, Business Cards	pg.					
Copying, Scanning	pg.					
CD/DVD Burning	disk					
Fax	pg.					
IP Telephony	min.					
Cell Phones and SIM cards	ea.					
Computer Support Services	hr.					
Office Supplies & Stationery	ea.					
Inkjet Cartridge Refilling	refill					
Laminating	A4 pg					
Instant /Passport Photography	print					
[Add Your Own]	item					
TOTALS						

ability to tinker with both alternative mixes of services, as well as alternative business volumes, to detect the sensitivity of their plan to variations in either. Table 23 shows the structure used to estimate the cost of services sold and compares the cost incurred by the center to deliver a service with the revenue it returns, to derive the gross profit from the sale of the service.

The usual approach is to price these as planned for at the beginning of operations, and then apply an inflation or deflation factor as time progresses. However, the final analytic step is performed on a month-by-month basis, in order to give maximum control over incorporating such things as planned "sales" that temporarily reduce price or seasonal variability in costs or volume, or to introduce special categories for volumes of business attributable to customers whom the center charges reduced prices or provides the services for free.

This last point is particularly important for centers with social development objectives, because it is easy to lose sight of the cost to the center for services, especially when they do not generate any revenue. Often, forgoing revenue in certain circumstances is simply good business, as when centers offer students discounts in order to bring them into the customer base, or offer free training on e-mail in anticipation of the revenue stream of e-mail users becoming frequent customers. However, the costs to the center are real and need to be accounted for in the financial plan. A similar analysis applies to advertising expenses and the cost of special promotions—early in the center's existence, community awareness will be a real issue, and the best strategy is probably to be very aggressive about promoting awareness. This can be general awareness, or it can be targeted at specific types of users. For example, it is probably a good idea to target high-frequency users, such as e-mail-oriented users, or businesspeople who will be high-volume users, with special promotions. Marketing expenses or discounted rates will probably prove to be money well spent if they quickly build a higher volume of business.

One way to think of these discounted sales to special customer groups is to represent them by a separate line in the spreadsheet. That way the particular pricing associated with their use can be entered, and the spreadsheet will also end up showing the nominal cost of the promotions to the center. (The nominal cost assumes that the facilities could have generated other revenue during the time the special customers used it, which is not always the case, so one has to think carefully about whether to record the unit cost of the service as equivalent to other categories or different. For example, if the discounted rates are given to students at slack times in the evening, the students will not be displacing other customers, and the staff had to be there in any case, so the cost of delivering the services is not entirely attributable to the users, unless the center would have closed in the evening if the student discount period were not offered.)

If it is known at the beginning, any evolution of the mix of usage can be projected in the financial plan. For example, if all the citizens will need to get a laminated identity card with a digital photo, one would project that there would be an initial surge of demand for this product as soon as the center opened, but that the demand would soon be satisfied and the service mix would change. Not only can that expectation be incorporated into the financial plan, but an alert center operator would see that business as an opportunity to introduce the customers to other products that would bring them back later.

This second step in the analysis also begins to incorporate the notion that some of the activities will generate a surplus of revenue over their costs. This is called gross profit in the spreadsheets, but it is really just

the surplus that that particular activity generates over its costs. The costs of management of the center, of its capital equipment, recruitment of and training of new staff, and all its other operational costs that were summarized in Table 22 are not reflected in Table 23; only the actual cost of the service itself is in Table 23. One needs to see many or all of the service categories in Table 23 generating substantial surpluses, called "gross profit," because the surplus revenue in this table is required to be able to pay the operational costs of the center, to pay off its loans, and to accumulate money to replace equipment as it breaks. If the center is an "enterprise model" with profit as a motive, then the surplus from these revenue sources needs to cover all of the above, plus leave an excess, call a "net profit."

The third step of the financial analysis is to put these two sets of results together, and to understand how the center's finances will fare from month to month, how long it will take it to reach a stable point of sustainability from the revenues it generates, and whether it has enough cash available during that period to enable it to survive. This part of the analysis is summarized in Table 24. In this illustrative example, Table 24 is actually a very large table with a separate column for each month during a five-year period of financial analysis. The representation on this page shows only one column for 58 of those months, but in a spreadsheet one would have a separate column for each, in order to reflect assumptions that change over time.

This table has four main blocks of data.

- **Revenue Analysis:** The first, showing the data on Gross Income and Gross Profit from the Revenue Analysis, captures the data on gross profit over the simple, narrowly defined cost of delivering the service (materials, consumables, and the extra staff support necessary for that specific sale). In Table 24, the Revenue and Gross Profits data from Table 23 are brought forward and put in the cell for the first month in the appropriate lines. The estimate from Table 23 is based on general assumptions about costs and business volumes that clearly will not be constant over time. Thus the values for the subsequent months need to be adjusted to reflect the best possible estimate of what the business volume and pricing will be in the subsequent periods. For example, it is reasonable to assume that business volume will grow as the center develops a client base. Will this be a constant growth percentage? Will it fluctuate seasonally? Are there externally funded projects that will provide a large contingent of paying users temporarily, but later close down? These kinds of factors can be incorporated in the business volume estimates by adjusting the formula in the spreadsheet cell. Similarly, if the center expects to have major discounts or promotions, these assumptions about discounted prices can also be factored into the cell for the appropriate months. For instance, if student discounts will be offered during vacations and holidays to try to offset the lost

Table 24: Profit/Loss Projections for Five Years, Single Center

Data drawn from prior tables. Cells reflect expected changes in business volume (growth, seasonality, or project life spans), impact of promotions on revenue, and tax payments, bonuses, rent increases, etc., on expense side	First mo.	Repeat Mo. 2–59 w/ adjs.	Month 60 (or other period)	**Total**
I. REVENUE ANALYSIS				
Gross Income (from Revenue Analysis)				
Gross Profit (from Revenue Analysis)				
II. MANAGEMENT AND OPERATIONS EXPENSES				
Rent, Utilities, Security and Other Services				
Payroll, Social Fund Tax, Other Benefits				
Staff Training				
Promotion and Advertising				
Internet, Telecom Expenses				
Product Development Budget				
Maintenance and Repairs				
VAT, Taxes Other than VAT				
Business Licenses				
Allowance for Expenses (Insurance, Supplies, Transport, Legal Advice, etc.)				
Capital Equip. Amortization or Accrual				
Total Expenses				
III. PROFIT AND LOSS				
Income/Loss Before Taxes				
Income Tax @ XX%				
Net Income/Loss on Operations				
Cumulative Profit/Loss				
IV. CASH FLOW				
"Revenue" Not from Ops (Donor agencies, corporate donations, universal service funds, etc.)				
Cumulative Cash Position, Ops+Non Ops Rev.				

volume of schoolwork-related business, those adjustments can be made in cells for the specific months when they apply. While the fluctuation in revenue for specific services will likely be wide, thinking about it in advance may enable the operator to help counteract the swings. If the operator expects, for instance, that a holiday season may have a negative impact on business, he might start advertising a promotion in advance to have customers come in and e-mail holiday greetings to their family and friends who live in other places.

- **Management and Operations Expenses:** The costs of other operations, including management and staff not allocatable to a specific service transaction, are included in the second block of data, which is the estimate of management and operations costs from Table 22. These figures represent an estimate of the costs that will be incurred that cannot be isolated as solely connected to a given service transaction. An important category that may not be too common in the experience of rural business people is an investment in marketing, which is far more relevant to the telecenter context because most potential customers may not understand what services the telecenter could offer, or how they could be relevant to the customer's life. Offering free or discounted training, distributing coupons for people to come in and try services for a discount or for free, or doing demonstrations are all legitimate and useful ways to help potential customers see how the services could be useful to them. In many accounting approaches, these kinds of marketing and operations expenses are referred to as "overhead costs," but in fact the environment of a center with many small transactions makes it difficult to assign operating costs anywhere but the unallocated operations budget. Thus, if an instructor came in for the sole purpose of teaching a skills class, the cost of the instructor would be allocated under the training costs estimated in Table 23, but the staff of the center who might perform a lot of individual services over the course of the day (including taking payment for a training course) are accounted here, in the management and operations expenses. These data also vary over time, so the management and operations costs are also entered for each month and adjusted according to whatever is known about their variability. Is it predictable that during the rainy season the center will have to rely on a generator for power most of the time? If so, the operating cost estimates for the rainy season months should reflect that expense. Do taxes or business licenses fall due in specific months? Will the venue have annual rent increases? Will some costs fall as the center begins to get more efficient? Will there be higher costs for legal advice and advertising in the early months? These are the kinds of adjustments to make to the forecast of the expenses. The total expenses for each month are summarized at the bottom of each column within this block.

- **Profit and Loss:** The third section summarizes the monthly result of the projected expenses and revenues, both before and after taxes. In some countries, when a civil society group is the owner of a telecenter, the tax rate will be zero. It is in this block that the Net Income after Taxes appears, which is the traditional definition of profit. This indicator shows whether the revenues have exceeded the costs in that month. Because any activity will have some months when it has a surplus, and some months when it has a deficit, the section also has a line for carrying forward a running total of "Cumulative Profit/Loss" that shows how the activity is doing over time. In general, an activity that is just starting up will show a deficit for a substantial period of months while it gets started. The point at which the cumulative profit and loss becomes reliably positive is the point that is usually called "break-even"; an activity has recovered from its revenues all the costs that have gone into delivering the services. The "Net Income/Loss on Operations" row shows the profitability in a given month, and the row entitled, "Cumulative Profit/Loss" carries a running total from left to right across the row so one can tell when break-even is achieved and how much net profit or loss has accumulated at a given point.
- **Cash Flow:** The fourth section includes "revenues" that come from other sources of funding than the business income. Many telecenters begin with start-up funds from donor agency grants or from government projects. These funds are often essential to the ability of the enterprise to get started, but they are not part of the overall sustainability model because the expectation is that the grant will be a one-time event. It is best to think of them as a variety of operating capital, which is money that a business must have when it begins to pay its bills until its customers pay theirs (and to make it through the initial lean time, while a customer base is built up.) In some cases, centers that serve underserved populations receive funds from the Universal Service Funds that have been established in many countries. These inputs are sometimes more permanent and could be thought of as real revenue, but they are often time-limited because the intent is to help establish service in underserved markets, not to pay for it forever. Permanent or not, these kinds of resources are reflected in this block of the financial analysis. Whatever the sources, the amount of grant or operating capital funds received is shown on the "Additional Revenue not from Operations" line, and the "Cumulative Cash Position" line shows whether the cumulative total of operating revenues plus additional revenues, minus the total costs, remains positive. If it is negative, the center will not have enough cash on hand to pay rent, salaries, and the like. The center would go bankrupt, even if in the long run its mix of services could be profitable.

This kind of financial analysis reflects the results that are attributable to the assumptions that went into the details—the volume of business, the

levels of pricing, the associated costs of being in business, etc. As was noted before, those assumptions are fundamentally subjective, so it is vital to keep in mind that the results of this formidable-looking analysis are no better than the guesses made in the beginning. In this seeming weakness, however, lies one of the real strengths of the financial analysis approach. Because we now have a structured, detailed analysis, we can adjust the assumptions easily and quickly and check the results for alternative assumptions. This does two things: 1) it lets us test the robustness of our business plan, asking such questions as, "What if the client base takes twice as long to develop as we thought?", or "What if costs of electricity or connectivity go up?"; and 2) it lets us understand the implications of our planned service mix and lets us test alternative approaches to the business plan, such as, "It looks like we will go bankrupt because it is costing a huge amount of money to provide free services to a particular subgroup—what if we implemented a fee for that service?", or "Our financial picture shows that we are not sustainable largely because rent costs for the center's space are very high—what if we move to a less expensive part of town or give up the community meeting space we had hoped to provide?" It is from these kinds of results that the real benefit of financial and business planning comes.

Extending Financial Analysis to the Network or Franchise Level

The example of the financial analysis given above reflected the simple case of planning for a single telecenter. The interest in helping telecenters to thrive often turns to networks of telecenters, which can share common support services, buy in bulk, and benefit more easily from lessons from outside the network. The technique of financial analysis can also be performed at this level, to understand how to achieve rapid scale-up on a national level. The structure of the network could be something like a cooperative, in which the individual operators pay to belong to the cooperative in order to participate in the benefits of collective action, or it could be on a much more traditional commercial basis like a franchise, where the support is very strong but the goal is for the franchiser to make a substantial profit. The analysis is essentially the same, regardless of what form the networking of the centers takes.

In either case, the structure involves transfer of resources from the center operator to the network center, usually in three different categories:

- An initiation fee, which is a one-time cost—in the case of cooperatives, it is to join the cooperative, in the case of commercial franchises, it is the capital payment by the franchisee to the franchiser
- An annual fee, which in the case of cooperatives is membership dues, and in the case of a franchiser is the royalty payment
- Fees for specific services or products one might use from the cooperative or franchiser

In return for these costs, the center operator usually gets such benefits as training, branded identity, the ability to purchase equipment or supplies jointly with other operators for substantial volume discounts, help desk support, technical development of innovations (perhaps ways to set up off-site kiosks using WiFi, for example), a lobbying presence in the political arena, and perhaps access to loans or participation in donor agency-funded projects. These can be substantial benefits. The primary difference between the two organizational structures is that in a cooperative, it is usually owned by the members, and the board and employees are very responsive to member needs. The services and costs are usually well matched to the operators' situations. In the case of franchises, the franchiser is essentially renting the intellectual property of the franchise (its branding, its business procedures, specific products or training, etc.) to the operators, often structuring the charges as a percentage of the center's revenues. While these charges are different in nature, they can be treated more or less the same in a spreadsheet to analyze the establishment of the cooperative or franchise.

Table 25 shows the financial analysis that would be applied to the question of how best to structure and price a *network* of centers. The assumption made is that the centers operate independently and have their own financial analysis to determine the best mix of services for their local context; in the case of franchises, the mix or selection of mixes might be determined by the parent organization.

This table has five main blocks of data, reflecting the different sources of revenues and expenses, plus the summarization of profit and loss, and cash flow. The assumptions in the table are:

- **Initiation Fee Analysis:** The initiation fee is the cost of joining the cooperative or franchise. Here, the row showing the number of new members allows one to specify an assumption about the rate of growth over the five-year analysis period. The row showing the cumulative number of members gives a base for multiplying the recurrent fees in the next block and also allows one to incorporate assumptions about the rate of attrition of registered members, which might vary because of withdrawal or bankruptcy. The total initiation fee line shows just the revenue resulting from the one-time fee payments for the centers that first become members in that month.
- **Recurrent Fee Analysis:** The recurrent fees are those paid by members for their ongoing participation and use of network services. Those can be monthly dues in the case of cooperatives (which might vary according to the size of the member's operation), or percentages of monthly gross revenues in the case of franchises. Those dues usually entitle the member to a basic package of services, with specific services being charged according to the members' use of them. For example, if a particular member used the technical support services to

Table 25: Profit/Loss Projections for Five Years for Network or Franchise

	Mo. 1	Mo.s 2–59, Adj.	Mo. 60	Total
I. INITIATION FEE ANALYSIS				
Number new centers joining/buying into franchise				
Cumulative number of members				
Total Initiation Fee Revenue				
II. RECURRENT FEE ANALYSIS				
Monthly dues or percent of gross revenues/member				
Total monthly membership revenue				
Monthly revenue/member for charged services				
Total monthly revenue for services				
Total Recurrent Revenues				
III. MANAGEMENT AND OPS EXPENSES OF NETWORK				
Rent, Utilities				
Payroll, Social Fund Tax, Other Benefits				
Promotion and Advertising				
Internet, Telecom				
Security, Maintenance, and Other Services				
VAT, Taxes Other than VAT				
Expenses (Ins., Supplies, Transport, Legal, etc.)				
Capital Equip. Amortization or Accrual				
Total Expenses				
IV. PROFIT AND LOSS				
Income/Loss Before Taxes				
Income Tax @ XX%				
Net Income/Loss on Operations				
Cumulative Profit/Loss				
V. CASH FLOW				
"Revenue" Not from Ops (Donors, capital, etc.)				
Cumulative Cash Position: Ops + Non-Ops Rev.				

solve a problem like a massive virus infestation, that center might be charged for use of that service. In the row for services revenues, the number is a predicted average revenue per center, multiplied by the number of active members for that month (from the data block above.)

- **Expenses for Management And Operations of Network or Franchise:** The headquarters of the network or franchise also has a cost of operations, which is reflected in these rows; the predicted costs are entered for each month, and thus can reflect the increased demand for service based on the growth in membership base, or assumed economies of scale, or short-term initiatives or marketing efforts.
- **Profit and Loss:** The pre-tax and post-tax profits are calculated in this block; in cases where the operating organization is an NGO, it might be exempt from income taxes, depending on the national tax policy. The final row shows the cumulative position in terms of profit or loss; it would be expected to be negative during the early phases, as the membership base is built and the revenues start to climb.
- **Cash Flow:** The network organization or franchiser faces the same risks as the individual centers in terms of needing to start out with enough cash on hand to cover the expenses during the start-up period. In the case of NGO-run networks, this would likely come from donor agency or government resources; in the case of commercial franchises, it would come from the capital contribution of the investors. The cumulative cash position row allows one to estimate whether there will always be enough cash on hand to cover predicted expenses. This can be an issue if volume is either much lower or much higher than anticipated—in the case of lower volume, the cash has to last longer while the membership base grows, while in the case of higher volume, the need to expend money to support new members occurs before the new members start generating significant revenues (and hence contributions), so too rapid growth can also be a serious danger in terms of cash flow.

The operation of a national center or franchise can provide a tremendous amount of support to fledgling businesses and has the potential to make many marginal operations sustainable. The value to operators of belonging comes in many forms. Some are fairly intangible, such as brand recognition and consumer confidence in the familiar, some come from operating at a scale that permits real economies to emerge, some are the result of achieving a new pathway to influence national policy on connectivity and e-Government, and some are from the innovative products that the network can develop for the operator (such as packaged VoIP services) that would be beyond the technical capacity of the operator to imagine or develop solo. As we pointed out in the chapter on networks, the future will probably bring a much higher reliance on larger-scale organizational networks, to the benefit of all.

9.7. BUILDING NETWORKS AND CAPACITY (CHAPTER 7)

The natural culmination of careful micro-level planning is that one addresses the issue of how to turn it from a group of telecenters into a movement. The relevant questions related to that include:

- What are the existing telecenter networks or telecenter-related partnerships in your country? Are there "membership" requirements or other barriers to membership? Would you consider becoming a member if you were not already? If there are no such networks, would you consider leading efforts to establish one?
- Are you aware of any training materials developed specifically for telecenters in your country? In local languages? Are these materials available and free if used for noncommercial purposes? Do you have training materials you could share with others?
- In the context of a scale-up initiative, what existing training institutions in your country could be called on to assist with the training of telecenter managers and support personnel?
- [*Add your own questions and/or reflections.*]

9.8. FROM ORGANIC TO PROGRAMMATIC APPROACHES (CHAPTER 8)

The discussion in Chapter 8 dealt with characterizing different national progressions toward equitable, shared access for the underserved as either organic or programmatic, that is, either evolving naturally from the collective efforts of independent groups that shared similar goals, or coming into being through centrally planned and executed efforts at the national level. These two descriptions were recognized as merely being points on a continuum, because in every real-life case, there will be a mix of the two. It is nonetheless interesting to ask which end of the continuum dominates in any given country, because the analysis can highlight the opportunities and risks inherent in the existing situations.

The principal message is that there is a vital and difficult role for governments to play, regardless of whether they try to accelerate things directly by involving themselves in day-to-day implementation. Their most important role is facilitative, to clear the path of obstacles and permit the process to unfold. Those obstacles take many forms, from outmoded regulations to allowing predatory monopolies to misguided import duties to corrupt officials to underinvesting in infrastructure to no end of other impediments. Clearing these obstacles can be a bigger, faster contribution than direct funds or allocations from a universal service fund can be. A nation that has involved government in building a productive telecenter ecosystem will find a powerful partner in that government.

Thus, it is valuable to ask the questions below once again, to understand the ways government's involvement might be fostered by judicious moves by the interested local community.

- Where does your country stand on the organic-to-programmatic continuum? If it is still undefined, what approach do you see as most effective and/or feasible in your country?
- How can you contribute to articulation and implementation of that approach in your country? What critical bottlenecks need to be addressed?
- Where can you turn for outside advice and analysis about what has worked in similar situations? Organizations such AED and telecentre.org can often help with this.
- [*Add your own questions and/or reflections.*]

Every country must find its own path to the goal, but in the end, it is everyone's objective: that all citizens should be able to participate in the full fabric of modern life, and not be left behind for lack of opportunity to learn to use information technology, and to use it to better their lives.

ENDNOTES

1 Heeks, 2005.

2 Ibid.

3 Parkinson, 2005.

4 Ibid., Ch. 4.

5 See, for example, the detailed cost analysis of various telecenter scenarios developed by Winrock International and the Telecommons Development Group (2002).

6 The project in question is the Kyrgyzstan eCenter Project, funded by USAID and implemented by the Academy for Educational Development under the dot-ORG Project. A general description of the project can be found at http://www.dot-com-alliance.org/activities/activitydetails.php?activity_id=110. The specific spreadsheets are part of a planning document that is not publicly available. However, the specifics of those plans would not be relevant to another project in any case; each situation will require its own combination of cost and profit centers to suit its service mix and institutional context.

Chapter 10:
Conclusion—Learning, Looking Ahead, and Keeping an Eye on the Ball

10.1. THE LEARNING IMPERATIVE

While it is true that we have learned a lot about telecenters in the past decade, it may still be the tip of the iceberg, while what we have yet to learn is under water, unexplored. Learning is an ongoing, dynamic process. The world around us is changing, and new technologies are emerging continuously, bringing new opportunities and changing the structure of markets. Therefore, we must continuously analyze our environment to make the most of opportunities while moving toward our goals.

We are now in a stage where our experiences with pilot telecenters and initial scale-up initiatives have started to yield significant lessons, many of which have emerged from failures rather than from successes. There are few exemplary models readily available for replication and scaling up, yet we continue to believe strongly in the potential benefits of shared-access facilities for social and economic development. Our knowledge of "how to scale" is still limited. We hope this book has provided some useful insights, yet we cannot claim to know all the answers. However, we can highlight key knowledge and asset gaps that need to be addressed in the coming years to support scale-up initiatives. Some of these are not new gaps, just gaps that have yet to be filled:

- Solutions for the challenges faced in scaling up, such as tools or guidelines for analysis of rural ICT ecosystems, selection of sites, and selection of local entrepreneurs/telecenter managers
- Cost-effective methodologies for scaling up capacity building at all levels
- Easy-to-implement, high-value services and applications that can be offered locally to drive telecenter use and impact
- Appropriate business models that address scale and sustainability
- Flexible, effective network strategies that provide telecenters with support, learning opportunities, and access to services
- Cost-effective approaches for development and delivery of locally relevant services and content

- Cost-effective technologies for connectivity and power in remote areas
- Effectiveness of different government approaches in different contexts

Learning systems require appropriate monitoring and evaluation frameworks. These have often been lacking in the context of pilots, but they continue to be essential in the context of scale-up activities.

10.2. LOOKING AHEAD

Telecenter deployments are taking place around the world in a very dynamic environment, which presents opportunities and challenges. Business models are constantly evolving to enable provision of a broader set of services in a more sustainable manner, and technological advances are expanding the range of options available for deployment of telecenters. Having more options is certainly an advantage, but it also presents decision-making challenges.

There is good reason for optimism. In many cases, the solutions employed to date have been the best (or only) choice for a solitary telecenter, but are suboptimal on a larger scale. This has been particularly true for rural connectivity, where there are only a few possible solutions, all of them very cost ineffective. Acting collectively at scale, rural communities can have very affordable communications and connectivity, if the national processes for infrastructure investment are handled thoughtfully. The same is true of applications that serve the common people—no single center can afford to generate much appropriate content, but once the market is aggregated and many of those individuals have access, the cost/benefit ratio becomes very attractive.

Beyond the issue of new deployment, "established" telecenters need to keep an eye on the horizon. Many of those established in the late 1990s and early 2000s now need to replace their equipment. They may also need to rethink their connectivity solutions or even their modes of operation. Established telecenters need not stick to what they started as. They need to think creatively about how they can continue to serve the needs of communities while staying on firm financial footing.

10.3. KEEPING AN EYE ON THE BALL

It may be challenging to look ahead and keep an eye on the ball at the same time, but that is part of the challenge of working in a very dynamic environment. Keeping an eye on the ball refers to paying attention to what one is doing at all times; in our case, this might best be translated as staying true to our values. There is a danger that the flurry of large-scale telecenter deployment activities in years to come will focus attention on

implementation issues—achieving quantitative scale-up—and that these will overshadow other substantive issues related to scaling-up effects. We should also avoid scaling up too fast, without proper planning, capacity building, and engagement of local communities. Much of the growth of IT use and penetration will happen regardless of what we do; we must be aware and agile enough to ensure that commercially driven growth contributes to our goals, rather than distracting from them.

We must keep a close eye on whether these deployments truly provide high-value services. If they do, their chances of sustainability are greatly enhanced, and the likelihood that they will have significant effects on social and economic development is greatly enhanced as well.

We need to focus on scale and sustainability more than ever to ensure that adequate services, information, and resources are provided to underserved communities of the world to accelerate socioeconomic development.

APPENDICES

Appendix A:
Glossary

Access Gap
The access gap or true access gap refers to people and places that remain beyond the reach of the market due to inadequate income or geographic isolation.

CDMA
Short for code division multiple access, a transmission technique used in digital wireless technology.

Development Sustainability
The continuation of benefits after major assistance from the donor has ended. Ensuring that development projects are sustainable can reduce the likelihood of their collapsing after external funding has ended; it also reduces the financial cost of development projects and subsequent social problems, such as stakeholders' dependence on external donors and their resources. All development assistance, apart from temporary emergency and humanitarian relief efforts, should be designed and implemented with the aim of achieving sustainable benefits. Retrieved from http://en.wikipedia.org/wiki/Sustainability#Development_sustainability; For a discussion more specific to telecenters, see Stoll, 2004.

Digital Divide
The gap between those with regular, effective access to digital technologies and those without it—in other words, those who are able to use technology to their own benefit and those who are not. Retrieved from http://en.wikipedia.org/wiki/Digital_divide

e-Government
The use of information and communication technologies (ICTs) to improve the activities of public sector organizations.

eLiteracy/e-literacy
Generally, e-Literacy is seen as encompassing both ICT literacy and information literacy, combined with whatever other literacies are relevant to a particular education context.

e-Readiness
The state or quality of being ready for electronic technology, such as the Internet.

ICT
Information and communication technologies.

ICT4D
Information and communication technologies for development.

Infomediary
A person who works at the interface between an ICT tool and rural or disadvantaged end users who are often illiterate or lack other skills to use ICT tools or seek information on their own.

Infomobilization—Social Mobilization for Effective ICT Use
The methodology for infomobilization is based on sociotechnical systems theory, which claims that separate efforts to optimize the technical system and the social system will lead to suboptimal results. The information system and its context must be studied, understood, and managed together. Infomobilization applies these theories to rural communities in developing countries. In infomobilization, the focus is on concurrent processes of technological and social change and on the joint optimization of human and technical processes within communities; Harris, Roger. Infomobilization: Understanding and making use of the relationship between ICTs and development. Retrieved from http://rogharris.org/understandingtherelationship.pdf

Interconnection
"Interconnection refers to the arrangements under which service providers connect their equipment, networks, and services to each other, in order to allow their customers to access services and networks of other service providers" (dot-GOV, 2005).

Internet Backbone
"The Internet backbone refers to the main 'trunk' connections of the Internet. It is made up of a large collection of interconnected commercial, government, academic and other high-capacity data routes and routers that carry data across the countries, continents and oceans of the world" (http://en.wikipedia.org/wiki/Internet_backbone).

Leapfrogging
A theory of development in which developing countries skip inferior, less efficient, more expensive, or more polluting technologies and industries and move directly to more advanced ones. A frequent example is countries that move directly from having no telephones to having cellular phones, skipping the stage of landline telephones altogether. Retrieved from http://en.wikipedia.org/wiki/Leapfrogging

Licenses
"A telecommunications license authorizes an entity to provide telecommunications service or operate telecommunications facilities. Licenses also generally define the terms and conditions of such authorization, and describe the major rights and obligations of a telecommunications operator" (http://cbdd.wsu.edu/kewlcontent/cdoutput/TR503/page20.htm).

Market Efficiency Gap

"The market efficiency gap is the difference between what markets actually achieve under current conditions and what they could achieve. The gap could be bridged if some regulatory barriers were removed and more market-oriented policies and regulations that create incentives for operators and a level playing field for new entrants were applied" ("Funding and implementing universal access," 2005).

Micro-telco

"A micro-telco is small-scale telecom operators that combine local entrepreneurship, innovative business models, and low-cost technologies to offer ICT services in areas of little interest to traditional operators" (The Microtelco Opportunity—Evidence from Latin America, n.d.).

Millennium Development Goals

The eight Millennium Development Goals (MDGs) range from halving extreme poverty to halting the spread of HIV/AIDS and providing universal primary education, all by 2015. The MDGs form a blueprint agreed to by all of the world's countries and leading development institutions (see UN Millennium Development Goals' web site for additional information: http://www.un.org/millenniumgoals/).

Network Effect

A characteristic that causes a good or service to have value to a potential customer depends on the number of customers already owning that good or using that service. One consequence of a network effect is that the purchase of a good by one individual indirectly benefits others who own the good, for example, by purchasing a telephone, a person makes other telephones more useful. Retrieved from http://en.wikipedia.org/wiki/Network_effect.

Replicability

The ease with which an activity, project, or program can be copied or repeated in a different location and/or at a different time. Replicability does not necessarily imply scaling up an activity.

Scalability

The ease with which an activity, project, or program can be scaled up (i.e., expanded in one or more dimensions).

Scaling Up

Scaling up leads to more quality benefits for more people over a wider geographic area more quickly, more equitably, and more lastingly.

Uvin and Miller (1996) identify four types of scaling up:

- Quantitative: A program or organization expands its size by increasing its membership base or constituency through an increase in geographic area or budgets.
- Functional: A community-based program or a grassroots organization expands the number and the type of its activities, for example, from agricultural production to health, nutrition, credit, training, literacy, etc.
- Political: The organization moves beyond service delivery toward empowerment and change in structural causes of underdevelopment. This usually involves active political involvement and the development of relations with the state.
- Organizational: Community-based program or grassroots organizations increase their organizational strength to improve the effectiveness, efficiency, and sustainability of their activities. This is accomplished through diversifying fund sources, increasing the level of self-financing/income generation, assuring enactment of public legislation earmarking entitlements within the annual budgets for the program, creating external links with other organizations, or improving internal management capacity of staff.

Shared-Access Centers/Shared-Access Facilities

"Shared access centres, sometimes referred to as access points, are resources available to either all or a significant segment of the public. They provide direct access to ICTs and related value-added services. Common examples are public telephones, cybercafes, télécentres, computer training centres, and computer secretarial services and business centres" (Parkinson, 2005).

Social Entrepreneurship

The work of a social entrepreneur, someone who recognizes a social problem and uses entrepreneurial principles to organize, create, and manage a venture to bring about social change. Whereas business entrepreneurs typically measure performance in profit and return, social entrepreneurs assess their success in terms of the impact they have on society, and they often work through nonprofits and citizen groups. Retrieved from http://en.wikipedia.org/wiki/Social_entrepreneurship

Social Franchising

"Typical MicroFranchises are very small businesses that seek to maximize profit and return on investment. A social franchise, on the other hand, will likely never be profitable for both the franchisee and the franchisor concurrently. A social franchise seeks to accomplish the most good for the greatest number of people and almost always requires a third party funding source to underwrite at least a portion of its operating costs" (Magleby, 2005).

Telecentre/telecenter

A public place where people can access computers, the Internet, and other technologies, and that helps people to gather information and communicate with others at the same time as they develop digital skills. While each telecenter is different, the common focus is on using technology to support community and social development—reducing isolation, bridging the digital divide, promoting health issues, creating economic opportunities, reaching out to youths. Telecenters exist in almost every country on the planet, although they sometimes go by different names (e.g., village knowledge centers, infocenters, community technology centers, community multimedia centers, or school-based telecenters). Retrieved from http://en.wikipedia.org/wiki/Telecentre

Telecenter Ecosystem

A business ecosystem is the network of buyers, suppliers, and makers of related products or services plus the socioeconomic environment, including the institutional and regulatory framework. Applied to telecenters, this concept refers to local telecenters, the enterprises developing services, investors, and networks providing support, as well as the socioeconomic environment and policy and regulatory framework within which telecenters emerge and evolve.

Tipping Point

Tipping point, or angle of repose, is a sociological term that refers to that dramatic moment when something unique becomes common. The term was subsequently applied to the popular acceptance of new technologies and more recently popularized by Malcolm Caldwell's *The Tipping Point: How Small Things Can Make a Big Difference*. Adapted from http://en.wikipedia.org/wiki/Tipping_Point

Total Cost of Ownership

A financial estimate designed to help consumers and enterprise managers assess direct and indirect costs related to the purchase of any capital investment, such as (but not limited to) computer software or hardware. A TCO assessment ideally offers a final statement reflecting not only the cost of purchase but all aspects of the further use and maintenance of the equipment, device, or system considered as well. Retrieved from http://en.wikipedia.org/wiki/Total_cost_of_ownership

Universal Access

"Universal access is a common policy goal in which 100 per cent of the population is able to make use of a publicly available resource, whether it be basic schooling, health centres, or in this instance, ICTs. Universal access to ICTs is defined by some benchmark that changes from country to country and over time. For example, South Africa defined universal access as the population within 30 minutes of a public phone, while Uganda defined it as a public telephone at every subcounty or community with a population of 5,000 or more. Once targets are reached, the benchmarks can be raised… Rapid technology change also requires that these definitions be regularly reviewed" (Parkinson, 2005).

Universal Service
"Universal service is a common policy goal whereby 100 per cent of the population is able to receive, by reasonable request and at reasonable cost, a specific service on an individual or household basis. Traditionally, in the real world of ICTs, the target has been universal telephone service… This definition has expanded in many countries to include value-added phone service such as messaging and voice mail as well as data transmission and Internet capacity. In countries with low average incomes and very low tele-densities, universal service is not normally an immediate short-term policy goal, but may remain as a long-term goal" (Parkinson, 2005).

VSAT
Short for very small aperture terminal, an earthbound station used in satellite communications of data, voice, and video signals, excluding broadcast television. A VSAT consists of two parts: a transceiver that is placed outdoors in direct line of sight to the satellite, and a device that is placed indoors to interface the transceiver with the end user's communications device, such as a PC. Retrieved from http://isp.webopedia.com/TERM/V/VSAT.html

VoIP
Short for voice over Internet protocol, a technology for transmitting ordinary telephone calls over the Internet using packet-linked routes; also called IP telephony. Retrieved from http://www.boxtelematics.com/glossary.html

WiFi
Short for wireless fidelity, a term used for a set of wireless standards for local coverage, also known as 802.11.

WiMax
A wireless broadband standard that does not require line of sight, also known as 802.16.

World Summit on the Information Society
Held in two phases: The first, hosted by the Government of Switzerland, took place in Geneva, December 10–12, 2003; the second, hosted by the Government of Tunisia, took place in Tunis, November 16–18, 2005. Outcomes of the first phase: Geneva Declaration of Principles and Geneva Plan of Action. Both documents can be accessed at http://www.itu.int/wsis/documents/doc_multi.asp?lang=en&id=1161|1160

Outcomes of the second phase: Tunis Commitment and Tunis Agenda for the Information Society. Both documents can be accessed online at http://www.itu.int/wsis/documents/doc_multi.asp?lang=en&id=2266|2267

Appendix B:
List of Case Studies

Case Name	Country	Region
Mission 2007	India	Asia
e-Sri Lanka	Sri Lanka	Asia
UgaBYTES	Uganda	Africa
Telecenter Family	Sri Lanka	Asia
IT Clubs	Egypt	Africa
CDI	Brazil	Latin America
Micro-telcos	Peru	Latin America
Gyandoot	India	Asia
CICs	Rwanda	Africa
Telecottages	Hungary	Europe
DakNet	India & Cambodia	Asia
n-Logue	India	Asia
MK Connects	Macedonia	Europe
e-Choupal	India	Asia
D.Net	Bangladesh	Asia
Mali CLICs	Mali	Africa
e-Centers (Kyrg.)	Kyrgyzstan	Central Asia
Drishtee	India	Asia
MSSRF Village Knowledge Centers	India	Asia
Akshaya	India	Asia
Nemmadi	India	Asia

Appendix C:
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The AED Information Technology Applications Center (ITAC) is a leader in applying information and communication technology (ICT) to accelerate development. From the early period when radio and television were important new technologies through the era of worldwide broadband connectivity, AED has been at the forefront of helping developing countries participate in the benefits of ICT. ITAC develops solutions that help people leverage the most appropriate mix of technologies to meet their goals.

Microsoft® is a global technology leader committed to innovation and broadening digital inclusion through its Unlimited Potential program, which enhances technology skills of underserved young people and adults through community telecentres. Microsoft's community investment efforts are focused on increasing digital inclusion and bringing the benefits of technology and technology skills to 250 million underserved people worldwide by 2010.

telecentre.org is a collaboration of telecentres, networks, innovators, social investors, and other interested groups. It is built on the belief that locally driven technology can empower individuals and communities. Based at Canada's International Development Research Centre (IDRC), telecentre.org invests in activities that directly benefit grassroots telecentres and that bolster the telecentre movement globally.

A social enterprise should first be able to sustain itself—only then can it help build capacity for others. The theme of sustainability & scalability, seen throughout the book, sets a context for every stakeholder to measure the impact of any kind of ICT intervention. And the Telecenters will sustain and scale when they focus on Education, Health Care and Livelihood Opportunities in Rural Areas.

Dr. ASHOK JHUNJHUNWALA, Professor,
Indian Institute of Technology Madras, Chennai

This fascinating volume underscores the diversity of approaches to addressing digital social and economic disadvantage. The book illustrates just how pervasive and differentiated, yet with compellingly common purpose, the telecenter movement has grown to become. Grameen did it with local lending and mobile phones. Telecentres are the next in line!!! A must read!

RICHARD FUCHS, Director, ICT for Development,
International Development Research Centre

AED, Microsoft, and telecentre.org have developed a thoughtful, comprehensive, and truly *useful* guide to the world of telecenters. Their making-it-your-own practical orientation to this work sets it apart. In addition, they demolish the notion of telecenter as an isolated and reified technological system. Instead they develop a *telecenter ecosystem*—a plexus of technologies, policies, institutions, and social networks. And all of this is in the service of their most critical goal, moving the telecenter out of the age of pilot-project and into an era of *sustainable and scalable* interventions with real development outcomes.

MICHAEL BEST, Ph.D., Assistant Professor,
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