Book

Public ICT center for rural development : inclusiveness, sustainability, and impact

PUBLIC ICT CENTER FOR RURAL DEVELOPMENT

INCLUSIVENESS, SUSTAINABILITY, AND IMPACT

ASIAN DEVELOPMENT BANK

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Abstract

Cybercafés are self-sustaining and common in urban areas. In most countries, the information and communication technology (ICT) penetration frontier lies in rural areas, precisely where commercial venues are unviable. Cybercafés have served as a model behind government efforts to set up one form or another of ICT centers to try to bring the benefits of ICT to rural communities. This report discusses why ICT centers remain popular with governments and rural people, and why it is difficult to serve rural areas. Effective public support practices are identified, based on a review of the record of experience, with special reference to two case studies: a government-run initiative in the Philippines and a public–private partnership in Sri Lanka.

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Executive Summary

Cybercafés arise as small urban businesses but are not financially viable in rural areas. Telecenters are a governmental response, modeled after cybercafés, to try to bring the benefits of computers and the internet to underserved rural communities. Worldwide, cybercafés are far more numerous than telecenters. There are some urban telecenters, but most are rural.

Telecenters are commonly associated with the provision of physical access to equipment but, ultimately, their objective is to bring the benefits of computers and the internet to underserved rural communities through shared facilities. This usually involves much more than physical access.

There is considerable evidence that shared public access to computers and the internet, whether through cybercafés or telecenters, have had significant positive impacts on users. Telecenters, however, are out of fashion. The reasons for this include the significant challenges that rural initiatives face, the poor record of overly ambitious programs that have tried to reach deep into rural areas that have little potential demand, the disappointment when unrealistic expectations regarding self-sustainability fail to materialize, and the revolution in access that mobile phones have propelled.

We use the terms telecenter and information and communication technology (ICT) center interchangeably, but, as we look forward, the latter term is preferred; not as a radical conceptual departure, but to acknowledge that changes in approach are necessary. Fifteen years ago, the primary role of telecenters and cybercafés was to facilitate communication. Since access through mobiles is becoming increasingly affordable, the demand for computer and internet use through public venues has been falling. Today, it would hardly make sense to set up a telecenter exclusively dedicated to providing access to computers or the internet. It would also be reckless to ignore the lessons of experience.

This report reviews the experience of rural ICT center programs with three objectives in mind: to better understand the challenges that rural initiatives must overcome; to show why, notwithstanding these challenges, ICT centers remain popular; and to identify design features of successful programs that help further rural development.

A frequent objective of state-sponsored rural telecenter programs has been the phasing out of subsidies and eventual achievement of sustainability. In practice, rural telecenters seldom achieve financial self-sustainability. Rural sustainability is challenging because

of sponsors' decision to locate telecenters in rural communities. Cybercafés and related private ICT businesses cannot serve these areas on commercial terms because they face four constraints. Two are supply-driven: (i) high connectivity costs and (ii) high costs of equipment and service maintenance; while the other two are demand-driven and arise because of two features of rural environments: (iii) limited computer literacy, and (iv) low population density. Program features result from choices about the structure of funding and incentives, center location, and the services offered. They either ease or worsen the rural challenge.

The inability of the private sector to serve rural areas has made public assistance and funding indispensable. Some initiatives are orchestrated and run by the government, but different public–private partnerships have been tried. To prepare this report, we conducted two case studies: a government-run initiative in the Philippines, and a public–private partnership in Sri Lanka. This first hand evidence is complemented with findings from the literature.

The first community e-centers (CeCs) in the Philippines were launched in October 2004 and by 2011 there were a total of 550. CeC establishment has been sponsored by the national government. Operations are run and supported by local government units (LGUs). The long-term target is the establishment of a center in each of the country's 42,000 *barangays* (villages). There is unfortunately little information about what has happened to many of the CeCs established.

In searching for showcase centers, we visited 12 CeCs, 6 in southern Luzon, and 6 in Western Visayas. Five of the centers visited can be considered showcase. Although CeCs are not meant to be self-sustaining, these successful centers have made a positive impact on the population, especially imparting digital literacy training and developing a blended learning remedial education program to help out-of-school youth. These successful centers were located in relatively large towns. Since they are run by large municipalities they are generally well resourced.

The $83 million e-Sri Lanka Development Project launched in 2004 included a $7.4 million ICT center component. Implementation was completed on 31 December 2013. More than 10 years have passed and many of the centers created, which are known as *nenasalas* (meaning "wisdom outlets" in Sinhala), have been open for several years, presenting a unique opportunity to assess what happens as ICT centers mature.

A comprehensive monitoring and evaluation survey conducted in 2014–2015 surveyed 884 centers, of which 336 were found closed and 584 were still operating. This report draws on this data with a special focus on 752 centers of the four most common types established (religious, enterprise, community-based organizations, and public library) in four locations (remote, rural, semiurban, and urban). Special attention is given to centers set up between 2003 and 2011 because these show what happens with the passing of time. This is perhaps the most comprehensive data set ever assembled on a significant rural ICT center initiative.

A summary of recommendations directed at governments and donors considering supporting rural ICT center programs follows.

Sustainability

The objective of rural ICT center programs is to introduce a variety of services, in the expectation that the rural population learns to use ICT tools and starts using them like modern societies everywhere do today. This does not require that an ICT center established by the program exist forever. The program's aim should be for the centers it sponsors to generate long-lasting benefits while they are open.

Should Rural ICT Center Programs be Supported?

ICT centers are dear to governments and to the people they serve. They are seen as harbingers of modernity and progress. Sri Lanka's *nenasala* (meaning "wisdom outlets" in Sinhala) program has shown it is possible to implement a rural ICT center program with efficacy, and to make an impact in rural people's lives by enhancing digital inclusion. International donors can make a contribution supporting these worthy aspirations, as the World Bank did with the e-Sri Lanka project.

Risks

The main risks are insufficient service demand, proclivity for decisions to become politicized, and rapid technological change.

Rural ICT center programs must achieve a delicate balance. Subsidized centers should not compete with urban cybercafés. They are justifiable in underserved villages that are not too small, i.e., which have a large enough pool of potential customers. Achieving this balance can be challenging.

The dream of blanketing a country with ICT centers is a common political aspiration. In Sri Lanka, the President decided to increase the target number of *nenasalas* from 200 to 1,000, and the evidence suggests that the program paid dearly in terms of high closure rates and wasted resources.

With the rapid spread of mobile phones, the demand for access to communications has drastically fallen, affecting such services as fax and voice over internet protocol (VOIP). Concentrating on services that can be frequently upgraded, such as skills development in the Philippines and Sri Lanka, makes ICT center programs less susceptible to technological obsolescence.

Center Type

Sri Lanka's experience with four center types suggests each has positive and negative features.

- Enterprise centers were the most resilient. They had the largest number of visitors and the lowest closure rates. Only a few were established in 2003–2011 and even fewer were located in rural areas, so it is not clear whether they would have fared as well in large numbers to serve rural communities.
- ICT centers run by community-based organizations in Sri Lanka were more resilient than religious centers, but less so than entrepreneurial centers. A significant number of nongovernment organization centers served rural communities.
- ICT centers in libraries are resilient, e.g., in Chile and in Sri Lanka. Because state funding is usually secure, financial incentives may be lacking and special efforts may be necessary to expand outreach and enhance impact.
- Religious centers fared poorly. In principle, these centers should have done better. They had infrastructure, a service vocation, and a suitable locale. Their poor performance may have been due to overly ambitious program targets, which fell primarily on religious centers to fulfill.

Location

Serving all rural people may be a lofty and even popular objective, but grand schemes that propose to blanket a country with ICT centers with little regard for potential demand should be avoided. Choosing to set up ICT centers in remote locations or small villages courts disappointment and failure.

The number of people that will use a given ICT center regularly is circumscribed to a relatively small catchment radius of around 3 kilometers, with variations depending on population density and transportation facilities. For program planning purposes, a minimum-sized village is needed to ensure there is sufficient potential demand for the centers. Future rural ICT center programs are unlikely to be very large, simply because rural areas generally have only a limited number of suitably sized towns.

Services

Access to computers and the internet should not be the exclusive or even primary function of ICT centers. Nevertheless, access should be provided so that novice users can practice their skills; be a supplementary source of income for the centers; be a complementary service for agencies that already provide a public service, such as post offices and libraries; and to foster gender-balanced environments that can serve as a model for urban cybercafés.

Training in ICT skills is a potentially high impact intervention that can empower disenfranchised peoples. Curious interest in acquiring ICT skills does not become willingness to pay for training, particularly among rural people, because of information asymmetries—nonusers seldom know the benefits they might derive. Encouragement and the opportunity to try out the tools are required. Government intervention is justified on efficiency and equity grounds.

Service aggregation should be pursued. Each center should provide a range of remedial education courses, along with other services that are important for rural populations; namely, e-government services, basic ICT skills training, and access to computers and the internet.

The need for English language training is patent in India, the Philippines, Sri Lanka, and other Asian countries that want to expand their information technology business outsourcing sector. Training apps like Duolingo are available to self-learners. What is missing is a program to help youngsters get started and accompanies them through the early stages of English language training. This form of remedial education is worth pursuing as part of a rural ICT center initiative.

To use ICT centers to deliver government services is sensible, but has limitations. ICT center programs cannot provide for process reengineering, which is usually needed to deliver government services online. Further, it is doubtful that an ICT center can achieve financial self-sustainability solely on e-government service fees.

Presently, the most effective way to improve agricultural markets appears to be to expand mobile phone coverage. Rural ICT centers can however be useful as training venues where farmers can communicate with other farmers; and traders, using e-mail and social media, learn how to search for information, and learn how to learn on their own using ICT.

Service Fees

Fees do not determine whether a center will have impact or not, but fees affect incentives. Programs that assign high priority to self-sustainability should charge for services. Programs that do not charge fees should specify beforehand where the funds to maintain the centers would come from. Nonfee centers should also implement an aggressive outreach program. Otherwise, there is a risk that the ICT centers set up and maintained by government end up serving only a few users.

Time-Limited Subsidies

Malaysia's public–private partnership approach to ICT center management, using 5-year contracts to run and staff the centers, limits the extent and duration of subsidies. This model can be applied elsewhere to service financially weak rural communities.

Gender Balance

There are differences in gender balance by venue type. Cybercafés often cater to young men's demand for gaming and pornography, creating a hostile environment for women. Simple design decisions, e.g., locating terminals so that they are visible to operator and other users, avoiding partitions between workstations, can help governments promote gender balance in ICT centers and cybercafés.

Digital Inclusion and the Future of Rural ICT Centers

Rural ICT centers can help achieve the ambitious agenda set out by the Sustainable Development Goals. To do so, they must be seen as technology hubs, as places where rural young people can learn ICT skills and learn to learn on their own, and as catalysts for digital inclusion in rural areas. Their role is to amplify citizen access to a variety of digital services, most importantly to skills that enable young people to get rewarding jobs and participate in the process of innovation that ICT makes possible.

Abbreviations

ADB	Asian Development Bank
ALS	alternative learning system—Philippines
ATI	Agricultural Training Institute—Philippines
BPO	business process outsourcing
CAD	computer-aided design
CBO	community-based organization—Sri Lanka
CeC	community e-center—Philippines
CICT	Commission on Information and Communication Technology—Philippines
CNNIC	China Internet Network Information Center – People's Republic of China
CSC	common service center—India
DepEd	Department of Education – Philippines
DIBAM	Directorate of Libraries, Archives and Museums—Chile
DILG	Department of the Interior and Local Government—Philippines
DOLE	Department of Labor and Employment—Philippines
DOST	Department of Science and Technology—Philippines
DOST-ICTO	Information and Communications Technology Office of the Department of Science and Technology (formerly, Department of Science and Technology of the Commission on Information and Communications Technology, DOST-ICTO; presently, Department of Information and Communication Technology, DICT)—Philippines
eGov4MD	eGovernance for Municipal Development in the Philippines Project
FITS	Farmers Information and Technology Services—Philippines
FLEMMS	Functional Literacy, Education and Mass Media Survey—Philippines
FRIENDS	Fast Reliable Instant Efficient Network for Disbursement of Services
IBPAP	IT and Business Processing Association of the Philippines—Philippines
ICTA	Information and Communication Technology Agency of Sri Lanka
ICT4D	Information Technology for Development

IFLA	International Federation of Library Associations
IIT	Indian Institute of Information Technology—India
INEI	National Institute of Statistics and Informatics—Peru
ISP	internet service provider
IT-BPO	information technology business process outsourcing
IT-BPM	information technology and business processing management
ITC	India Tobacco Company
KEC9	Ninth Knowledge Exchange Conference—Philippines
KISSAN	Karshakam Information Systems Services and Networking—India
KSITM	Kerala State Information Technology Mission—India
LGU	local government unit
LHS	left-hand side
M&E	monitoring and evaluation
MCMC	Malaysian Communications and Multimedia Commission
NCC	National Computer Center—Philippines
NCR	National Capital Region—Philippines
PCAARRD	Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development
PhilCeCNet	Philippine Community e-Center Network
PI1M	Pusat Internet 1-Malaysia
PPP	public–private partnership
PRC	People's Republic of China
PSA	Philippines Statistics Authority
Pusat Internet	Internet Center—Malaysia
PWD	person with disability
RHS	right-hand side
SARI	Sustainable Access in Rural India Project—India
Subtel	Subsecretaría de Telecomunicaciones de Chile
Tech4ED	Technology for Economic Development Program—Philippines
TESDA	Technical Education and Skills Development Authority—Philippines
TVET	technical and vocational education and training
UDC	union digital center
VOIP	voice over internet protocol
VSAT	very small aperture terminal (satellite communications technology)

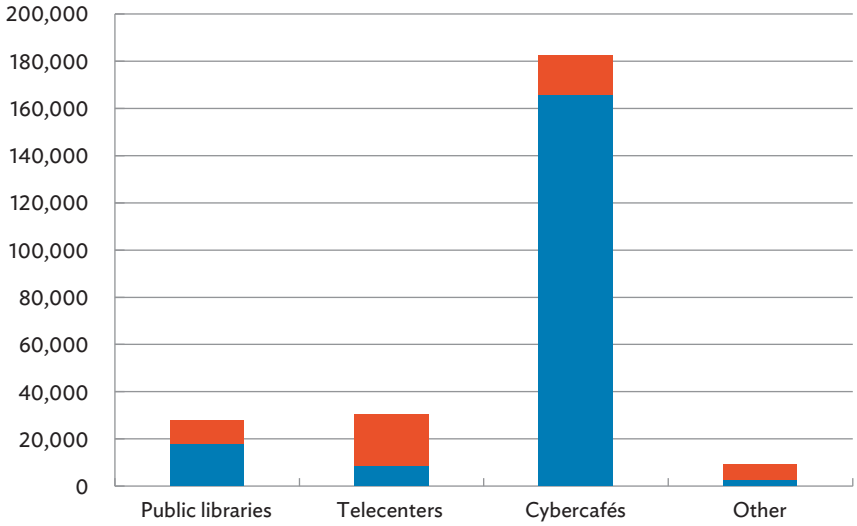
Glossary

Nenasala	A Sinhala word meaning "wisdom outlets," referring to Sri Lanka's telecenters
OSY	Out-of-school youth in the Philippines aged 15–24 who are not attending school, have not completed college or a postsecondary course, and are not employed
Sangguniang Bayan	Legislative branch of municipal government in the Philippines

Introduction

Cybercafés and computer training centers arise as small businesses in urban areas, but are not financially viable in rural areas. In most countries, the information and communication technology (ICT) penetration frontier lies in rural areas, precisely where commercial venues are unviable. Cybercafés have served as a model behind government efforts to set up rural telecenters, in the expectation that these would eventually become self-sustaining. Given the potential of ICT to provide advanced services, some nongovernment organizations and agencies with a broad urban–rural mandate (e.g., libraries, post offices) have also established public shared access venues in urban areas.[1]

Figure 1: Distribution of Public Access Venues in 25 Landscape Study Countries, by Venue Type



	Public libraries	Telecenters	Cybercafés	Other
Total	27,783	30,549	182,552	9,551
%	11.1%	12.2%	72.9%	3.8%
Rural	9,925	21,867	16,733	6,719
Urban	17,858	8,682	165,819	2,832

Source: Gomez. 2012.

[1] This section is drawn in part, with permission, from Proenza (2015, chapter 13).

Data is hard to come by, particularly for cybercafés, which in most countries are not counted. Figure 1 gives an overview based on data for 25 countries. The overwhelming dominance of cybercafés stands out. Only in 7 of 25 countries are there fewer cybercafés than libraries and telecenters combined.[2]

Worldwide, there is considerable evidence showing that public shared access helps users achieve personal objectives such as learning, communicating with family, enhancing work skills and job prospects, and entertaining themselves (Bar et al. 2013, Proenza 2015). Through public shared access, users can expand their social networks and build up social capital. Public shared access makes it easier for grassroots organizations to develop specific capacities, such as interacting with external agents (e.g., to get funding and assistance and market products). Not all impacts are positive: overuse can affect school performance and personal life spheres, e.g., internet addiction.

Rural telecenters, however, have run out of fashion. The reasons for this include the significant challenges that rural service presents, the poor record of overly ambitious programs that have tried to reach deep into rural areas with little potential demand, the disappointment when unrealistic expectations regarding self-sustainability fail to materialize, and the revolution in access that mobile phones have propelled.

Fifteen years ago, the role of telecenters and cybercafés was to facilitate communication. Malaysia's celebrated eBario telecenter brought communication and increased development opportunities to the Kalabit, a previously isolated ethnic minority (Yap 2010). Because individual access to the internet, from home or smart phones, is generally preferred to shared access, especially for communication purposes, and since access through mobiles is becoming increasingly affordable, the demand for computer and internet use through public venues has been falling.

In this report, the terms telecenter and ICT center are used interchangeably. As we look forward, however, the latter term is preferred; not as a radical conceptual departure, but to acknowledge that changes in approach are necessary. Today, it would hardly make sense to set up a telecenter exclusively dedicated to providing access to computers or the internet. It would also be reckless to ignore the lessons of experience with telecenter programs.

The report has three objectives: first, to better understand the challenges that rural ICT center initiatives must overcome; second, to show why ICT centers remain popular; and third, to examine design features that can help sponsors plan and implement successful rural ICT center initiatives.

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[2] The 25 Landscape study countries (Gomez 2012) are, for Latin America: Argentina, Brazil, Costa Rica, Colombia, Dominican Republic, Ecuador, Honduras, Peru; for Asia: Bangladesh, Georgia, Indonesia, Kazakhstan, the Kyrgyz Republic, Malaysia, Mongolia, Nepal, the Philippines, Sri Lanka; for Africa: Namibia, South Africa, Uganda; and for the Middle East: Algeria, Egypt, Turkey.

The seven countries with more telecenters and libraries than cybercafés are Bangladesh, Colombia, Kazakhstan, Namibia, South Africa, and Sri Lanka. The reasons why, in some countries, the number of donors or publicly sponsored centers exceeds the number of cybercafés varies. However, two variables are critical: digital literacy in the population, and existence of a vigorous donor or government-sponsored public shared access program. In Sri Lanka, for example, the 640 ***nenasala***s installed with government sponsorship and the World Bank financial assistance largely account for the relatively greater number of telecenters appearing in the Landscape study. With limited digital literacy prior to the ***nenasala*** program, there was very little demand for services to spur the emergence of self-sustaining cybercafés.

PART I
A Framework for Understanding the Rural ICT Center Challenge

A Common Objective

All rural ICT center programs share the same objective even if articulated differently. First, the focus is on rural areas.[3] Second, they rely on the shared use of facilities, which is perceived to be less costly than individual use. Third, these programs seek to increase the access of rural people to the benefits of information and communication technology (ICT), mainly computers and the internet. Programs sometimes emphasize access to ICT, but decision makers will agree that what matters are the benefits that ICT use brings about. Finally, benefits are expected to be durable, long-lasting. A succinct statement of this objective follows.

> To increase access of rural people to enduring benefits of ICT through the shared use of center facilities.

Sustainability, Resilience, and Impact

An ICT center is operationally sustainable if its revenues exceed recurrent costs. It is fully sustainable if its revenues also enable the replacement of equipment to cover breakdowns and obsolescence. The source of revenue is irrelevant. A center may be sustained by user fees or by budgetary allocations from governments or donors. Self-sustaining ICT centers are usually preferred because government and donor funding tends to be fickle. Once self-sustainability becomes part of the agenda, users are seen not just as beneficiaries but also as customers.

ICT centers set up through state or donor funding do not have to live forever. Cybercafés thrive in urban areas, but are not all individually sustainable. Some fail, while others thrive. It is the system that is sustained, as long as there is demand for the service.

Resilience is a reflection of past performance. A center may be considered resilient if it has remained in operation for several years, e.g., after the 4-year standard duration of computer equipment. Sustainability is not readily measurable because it involves a future usually

[3] Countries differ in the way the term "rural" is defined. This report uses a common indicator, population density, with rural denoting sparsely populated areas. However, there are significant differences between countries. For example, Bangladeshi rural areas are more density populated than most other countries (http://unstats.un.org/unsd/demographic/sconcerns/densurb/densurbmethods.htm#B)

undefined long-term. In contrast, resilience is observable. A 4+-year old center is resilient if it is still operational; otherwise, it is not.

A resilient center must have achieved operational sustainability for a while; or, if it relies on institutional funding to cover expenses, has convinced administrators controlling the purse that the services it provides are worthwhile.

To have impact, an ICT center need not be sustainable. What matters is whether it generates long-lasting benefits while it is open. Many users are initiated in the use of the technology at a cybercafé or ICT center and, subsequently, purchase their own computer and connect to the net from home. As home use has become ubiquitous, many cybercafés have closed. This does not mean, however, that they did not fulfill a valuable social function while they were open.

Sustainability, resilience, and impact are closely linked. For an ICT center to yield sustainable benefits, it must first have been resilient. If people do not get value from cybercafés (impact) they will not sponsor them, thus affecting resilience and sustainability. Governments and donors are willing to subsidize ICT centers provided they generate long-lasting benefits, especially if the centers are popular with constituents.

Resilience does not assure impact. A center can remain open as long as it has institutional support, even if no users ever visit the center. Nevertheless, resilience is indispensable. Before it can have impact and generate sustainable benefits, a center must first operate and provide services for a period of time.

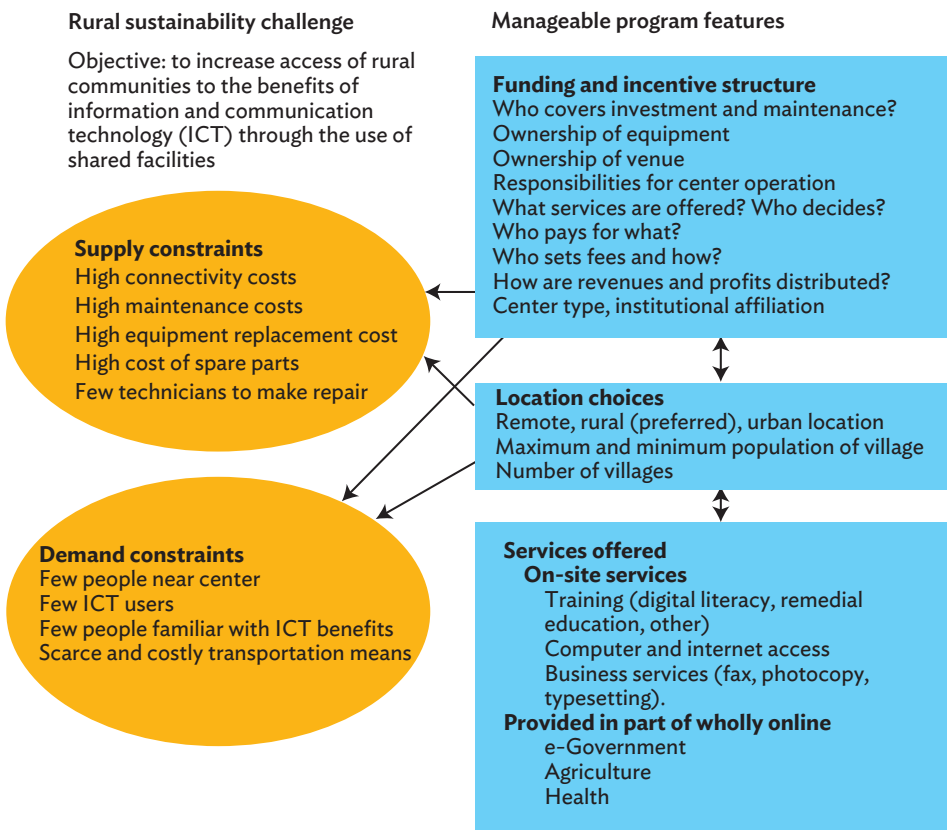
The Rural ICT Center Sustainability Challenge

A common objective of state sponsored rural ICT center programs is the phasing out of subsidies and eventual achievement of sustainability. In practice, rural ICT centers seldom achieve financial self-sustainability (Proenza and Dewapura 2004; Proenza 2001, 2004, 2008, 2015; Toyama et al. 2005; Kuriyan and Toyama 2007; and Gurstein 2011).

Why is self-sustainability so difficult to achieve in rural areas?

The rural challenge arises because of the decision by sponsors to locate ICT centers in rural communities. Cybercafés and related private ICT businesses cannot serve these areas on commercial terms because they face four constraints: two are supply-driven and two are demand-driven. The rural challenge and the constraints that give rise to the challenge are depicted on the left hand of Figure 2.

Figure 2: Rural Telecenter Sustainability Challenge and Program Features



ICT = information and communication technology.
Source: Asian Development Bank.

High Costs of Service Supply

Supply-side constraints include high connectivity costs, and high costs of equipment and service maintenance.

Connectivity costs are generally high in rural areas. To bring connectivity to the many small, sparsely distributed rural communities of the Bolivian, Colombian, Ecuadorean, Nepalese, and Peruvian highlands, it has been common to use very small aperture terminal (VSAT) satellite communications technology at a cost of $250 per month or more (2008 data). In Chile, the cost of connecting 4% of BiblioRedes libraries using VSAT (i.e., those situated in rural areas) exceeded $220 per month in 2008. Servicing 200 Sri Lanka *nenasalas* cost $370 per month in 2008 (Proenza 2008). Such high costs can only be met with a subsidy, or, as has started to happen, with the advent of new low-cost connectivity technology.

Equipment maintenance costs are high in rural areas, where few, if any, local personnel are skilled in computer repair or are in a position to address connectivity problems.

The Sustainable Access in Rural India (SARI) Project, supported by a consortium of government, donors, and academia, achieved connectivity costs of $15 per month per kiosk, but failure to provide reliable service was a major factor in the closure of the SARI Project's 78 kiosks (Best and Kumar 2008). In Colombia, the main problems cited by operators of Compartel telecenters (Centro de Estudios sobre Desarrollo Económico 2007) were connectivity (64%), equipment breakdowns (58%), and energy failures (51%).

Insufficient Demand

Lack of demand often challenges the viability and impact of rural ICT centers.

- In India, kiosks were rarely used by anyone other than the designated operator (Kumar 2004, 2009; Veeraraghavan, Yasodhar, and Toyama 2009). Toyama et al. (2005) report there were fewer than five customers a day using n-logue kiosks. According to the Indian Institute of Management (2002) and Cecchini and Raina (2004), Gyandoot telekiosks only had 1–4 users per day.
- In Pakistan, Mahmood's (2005) review of three rural telecenters led him to conclude that users are unaware of the benefits of technology, and reports that in one of these centers, despite some initial enthusiasm, only four or five users a day were recorded 3 months after inception.
- In Colombia, 51% of the 922 rural telecenters surveyed had less than 10 customers a day (Centro de Estudios sobre Desarrollo Económico 2007).

Two features of rural environments lead to insufficient ICT center service demand: limited computer literacy, and low population density.

ICT center use is sensitive to distance (Table 1). Few people become regular customers of a center if it is far from their home or workplace. The problem is compounded by infrequent and unreliable rural transportation means. In sparsely populated rural areas, only a few people can travel to and become regular users of an ICT center.

The practical value of ICT can only be fully grasped after a person sits in front of a computer and experiences its power by connecting with friends, typing a letter, or watching a video. In those rural areas where hardly anyone has ever used a computer or the internet, it is hard for potential users to appreciate their value (Ernberg 1997 and 1998).

Network effects compound the problem. When only one person has access to a phone or the internet, he or she has no one to communicate or socialize with. As the number of peers using ICT grows, a prospective user will hear from friends and will become open to trying it out. It was far more difficult to promote internet use in Sri Lanka when the project started in 2004, when the country's internet penetration was only 1.4%, than in 2014 when it had reached 25.8%.

Wherever fees are charged, lack of demand limits revenues. A strong demand makes it easier to address equipment breakdowns. Even in centers that rely on institutional funding and not on service fees, if there is no demand, computers and personnel lie idle to the disappointment of staff and administrators. If the situation persists, the staff leaves and the center ends up closing.

Table 1: Proportion of Men and Women (%) Traveling to Cybercafés (km), Selected Countries, Various Years

Jordan, 2010	Male	Female	
< 1 km	44	31	
1–2 km	31	39	
2–5 km	20	21	
> 5 km	6	9	
People's Republic of China, 2010	**Urban Male**	**Urban Female**	**Rural Users**
< 1 km	84.7	85.3	75.8
1–2 km	7.0	7.1	10.5
>2 km	8.3	7.6	13.7
Peru, 2000	**Male**	**Female**	
< 1 km	45	42	
1–5 km	36	36	
> 5 km	20	22	
Sri Lanka, 2010	**All Users**		
< 1 km	59		
1–2 km	10		
2–5 km	15		
> 5 km	15		

km = kilometer.
Sources: Proenza. 2015. Sri Lanka data is from Skill International. 2010. p. 40.

Program Features

The right-hand side (RHS) of Figure 2 shows program features that either ease or worsen the rural challenge. These features result from choices made about the structure of funding and incentives, center location, and the services offered.

Funding and Incentives

Unlike cybercafés, rural ICT centers do not arise spontaneously. Their establishment requires investment to set up the centers. Keeping them open often also requires funding. Decisions about funding are usually made jointly with decisions about incentives that affect the behavior of agents involved in execution, e.g., who pays for the equipment, who owns it and under what terms; who provides the venue and who owns it; who makes decisions about center operations; who pays for connectivity, utilities, and staff; how is center staff selected; what service fees should be charged, how much, and how. Choice of center type, for example, can help keep costs in check, as in the case of a library, a temple, or a post office—institutions that usually already have infrastructure and staff that can be drawn on to run operations.

Location Choices

Location decisions determine the significance of demand and supply constraints. An ICT center located in a remote village will usually have few people (lower potential demand) and geographical features that make it expensive to maintain equipment and provide connectivity. Urbanized areas have more people and affordable and convenient means of transportation, broadening the radius from which a center can draw customers. Supply and connectivity services are commonly available, making it cheaper to maintain and repair equipment.

Some ICT centers are located in semiurban or urban areas, but a frequent requirement is that they be set up far away from existing cybercafés, to avoid giving program-sponsored centers an unfair (subsidized) competitive advantage. Library centers are an exception in that, by tradition and policy, they serve both rural and urban communities.

Rural communities are the primary targets of ICT center programs. Initiatives are commonly launched in the expectation that, after an initial period of seed funding, the centers will become financially self-sustainable (Kiran 2014, 45). The implicit assumption is that, by making it easier to acquire computer skills, rural communities will appreciate the value of ICT and, in time, a market for ICT services will develop.

The demand for services depends on the number of people, especially young people, who live, work, or study in the vicinity of an ICT center; the density of this population (i.e., distance to be traveled); the reach and expense of local transportation; and the extent to which these people are keyed up to learn and use computers.

Village size is critical. To create a rural market for ICT services, there must be a sufficiently large pool of potential customers that the center can tap. Start-up program subsidies can help the operator begin to create this market, but if the pool of customers is too small, these efforts will be wasted.

ICT Center Services

The services provided on-site and the content that is developed in parallel or in coordination with the center will not alter the number of potential users near a center, e.g., they will not change village size. What center services can do is attract nearby potential users, provided they are well served. This is how they can stimulate demand.

Links between Program Features and Constraints

The arrows in Figure 2 indicate how decisions about program features magnify or mitigate supply and demand constraints.

Choice of location affects supply (e.g., service costs) as well as demand constraints (market size). A location can make it easier (semiurban) or more difficult (remote) for an ICT center to thrive.

A program's choice of the village size that an ICT center is to serve determines market potential directly.

The relationship between choices about location and center services runs both ways. Location determines the user-customer profile and, in turn, the services offered can make it worthwhile for a larger number of villagers to use the center.

PART II
Program Types and Evidence Used

Three types of ICT center programs may be distinguished, depending on the extent of engagement of the public and private sectors: private for profit initiatives, government-run programs, and public–private partnerships (PPPs).

This report draws on the experience of two case studies: a government-run initiative in the Philippines and a PPP in Sri Lanka. This first-hand evidence is complemented with literature reviews and the evidence from other programs. The interest is in rural service, but urban cybercafés and corporate attempts at rural service are useful points of comparison.[4]

A rural ICT center must fulfill functions that markets would ordinarily take care of, but cannot do so because of the rural challenge. Network orchestrators (a term first used and described by Mukerji 2013) take the lead organizing rural ICT center programs. They marshal funding and establish the incentive structure that affects participants entrusted with carrying out the following functions:

(i) Arrange the supply of connectivity and equipment maintenance to overcome high costs, i.e., supply constraints (Figure 2, left-hand side [LHS]).

(ii) Set up the centers and determine center type, who will do what, and what user fees to charge (Figure 2, first item, right-hand side [RHS]).

(iii) Choose the site's location, e.g., urban, rural, or a mix (Figure 2, second item RHS). This determines the digital literacy and other features of ICT center customers. The rural challenge can be made daunting by working in remote small villages, or mitigated by working in large rural communities.

(iv) Provide on-site services to users-customers (e.g., training, computer access) and develop applications such as e-government, agriculture, e-health, and online courses (Figure 2, third item, RHS).

Table 2 builds on the work of Mukerji (2013), who classified rural telecenters in India depending on the type of network orchestrator and who owned the centers. Table 2 specifies key roles and functions that a center must fulfill, and identifies some of the private and public sector agents that carry out these functions.

[4] The evidence on rural telecenters is scant and scattered. Sponsors prepare reports shortly after launch reflecting the initial optimism. Programs are seldom monitored or evaluated, and are soon forgotten after they fail, leaving behind no record of the experience. Fortunately, a few research studies have recorded what happened and, with varying degrees of reliability, what worked and what did not. Sey and Fellows (2009) have a comprehensive review of the public access literature. Mukerji (2013) has an extensive review of rural telecenters in India.

Table 2: ICT Centers—Typical Functions and Agents Involved

Roles and Functions		Typical Agents	
		Private Sector	Public Sector
Network orchestrator	Organizes service, marshalls funds, sets location and incentives	Market forces in urban areas, corporation, private institution	National or regional government agency; international donor
Technical support	Supplies connectivity, equipment, and repairs	Small entrepreneur, corporation, private contractor	National, regional, or local government staff
Venue owner	Provides site and has control over center and facilities	Small entrepreneur, corporation, NGO, local community, private institution (e.g., church)	Government agency, local government unit
Center operator	Manages day-to-day operations	Staff of small entrepreneur, corporation, NGO, or private institution; community volunteers	Staff of national or regional agency or of local government unit
User service providers	Specialized agents, topic trainers, content developers	Staff of entrepreneur, corporation, NGO or private institution	Staff of national, regional, and local government agencies
User or customer	Uses ICT directly or through infomediary	Unaware of ICT, aware but digitally illiterate, expert users	

ICT = information and communication technology, NGO = nongovernment organization.
Source: Author's representation.

In urban areas, the functions listed in Table 2 are the domain of the private sector. Market forces orchestrate the rise of urban cybercafés, i.e., private suppliers meet service demand. In rural areas, however, attempts to run ICT centers on commercial terms have not been successful, hence the need for the public sector to intervene. Table 2 lists two types of agents—public and private—that are engaged. Public–private partnerships recognize the indispensable role of public assistance, but rely on private sector agents to realize some of the functions listed in Table 2 with flexibility and to keep costs and subsidies in check. Depending on local conditions, PPPs use a mix of public and private sector agents to carry out the functions needed to serve rural areas.

The following section begins with a review of how urban cybercafés function, then discusses three private ventures that sought to serve rural communities but failed. Next, two government driven-initiatives are discussed. This part's last section examines five PPPs that entrusted implementation to a mix of public and private agents.

Table 3 shows institutional arrangements used by the main programs discussed, and Table 4 presents basic features of these programs.

Table 3: Institutional Arrangements of Sample Rural ICT Center Programs

Program	Network Orchestrator	Technical Support	Venue Owner	Center Operator	User Service Provider	User-Customer
India – n-logue or SARI Chiraag kiosks	Corporation franchise launched by IIT Madras	Corporate staff	Small entrepreneurs run and operate kiosks		Content developers working with, or spin-off from IIT Madras	Rural residents, most with little awareness of ICT
India – e-Choupal	ITC	ITC staff	Small entrepreneur houses center, ITC owns equipment	Small entrepreneurs (*sanchalak*) run kiosks	ITC	Rural residents, with little awareness, hardly use ICT
India—Kerala State Government: e-Kendras	KSITM	KSITM	Small entrepreneur owns and operates centers		Onsite: small entrepreneur, Offsite: KSITM	Mostly rural with little awareness of ICT
Malaysia—Pusat Internet 1 Malaysia: internet centers	National agency – Malaysian Communications and Multimedia Commission (MCMC) awards contracts for companies to implement their projects using Telecom Fund	Companies run groups of centers in their project	Communities make site available	Company staff operate centers	On-site: company staff, government develops e-gov content	Most rural residents in high-income country are aware of ICT
Bangladesh—A2I Initiative: union digital centers	National government	Small entrepreneurs (*Uddakta*) do repairs	LGU – room in Union Panishad	Small entrepreneur (*Uddakta*): 1 male, 1 female selected locally	On-site: *Uddakta*, government develops e-gov content	Rural residents with little awareness of ICT
Sri Lanka-*nenasalas*	National government agency – ICTA	Hired contractors support groups of centers	Center types: Small business, CBO Library, Religious		On-site: Operator, government develops e-gov content	Rural residents with little awareness of ICT
Philippines—Community eCenters (CeC) and Technology for Economic Development Program (Tech4Ed) centers	National government	LGU staff	LGU	LGU staff	On-site: LGU staff, government develops e-gov content	Rural residents in large municipalities mostly aware but not ICT-proficient
Chile BiblioRedes: digital libraries	National government agency – DIBAM	DIBAM	DIBAM	DIBAM librarians	DIBAM librarians, DIBAM-national digital literacy training staff	Mix: Over 50% of population is rural in 30% of centers

CBO = community-based organization; DIBAM = Directorate of Librarians, Archives and Museums; ICT = information and communication technology; ICTA = Information and Communications Technology Agency of Sri Lanka;
IIT Madras = Indian Institute of Technology Madras; ITC = India Tobacco Company; KSITM = Kerala State Information Technology Mission; LGU = local government unit; MCMC = Malaysian Communications and Multimedia Commission.

Note: Rows with darker shades denote greater private sector engagement. Government programs run with limited private sector input appear with no shading.

Sources: India n-logue: Kumar and Jhunjunwala. 2002; Jhunjunwala, Narasinham, and Ramachandran. 2004; Jhunjunwala, Ramachandran, and Bandyopadhyay. 2004; Gurumurthy, Singh, and Kasinathan. 2005a; Jhunjunwala and Aiyar. 2007; Best and Kumar. 2008.
India e-Choupal: Kumar. 2004; Dutt. 2010; Mukerji. 2013.
India Kerala State e-Government/e-Kendras: Pal et al. 2007; Mukerji. 2013; Kiran. 2014; Rahul and Krishnan. 2015.
Malaysia – Pusat Internet 1 Malaysia internet centers: MCMC. 2013 and 2014; personal communication at internet center at Inobong, Kota Kinabalu, Malaysia, on 28 May 2015.
Bangladesh – A2I Initiative: Union digital centers: Ernst and Young. 2015; Faroqui. 2015; http://www.a2i.pmo.gov.bd/
Philippines CeC or Tech4ED centers: Personal communication with center managers during field visits and discussions with government officials in 2015.
Chile BiblioRedes digital libraries: V. Salas, O. Yacometti, and A. Bustos. 2005; Subtel. 2005 and 2005b; Ministerio de Hacienda (de Chile). 2003.

Table 4: Basic Features of Select Rural ICT Center Programs

Program	Launch Date	Network Orchestrator	Business Model	Number of PCs per Center	Number of Centers Established	Number of Operational Centers
India – n-logue: SARI Chiraag kiosks	2001 (circa)	University – IIT Madras	Commercial franchise	1	1,000	Program closed
India – e-Choupal	2000	Private company	Corporate	1	6,500 (2008)	No data
India – Kerala State Government: e-Kendras	2002	KSITM	Private entrepreneurs own e-Kendras	5+	630	225 (end of 2005)
Malaysia – Pusat Internet 1 Malaysia: internet centers	2013	National government	5-year projects managed by firms hired under public–private partnership	10	381	no data.
Bangladesh – A2I Initiative: union digital centers	2009	National government	Center managed by two entrepreneurs hired by local government	2	4,547	4,492
Sri Lanka—*nenasala*s	2004	National government	Applicants are awarded start-up grants to operate centers	3	1,000	548
Philippines – Community eCenters (CeC) and Technology for Economic Development Program (Tech4Ed) centers	2004	National government	Local government units manage centers	3–4	550	316
Chile BiblioRedes: digital libraries	2002	National government	Center managed by librarian	2–7	285	284 (2016)

IIT Madras = Indian Institute of Technology Madras; KSITM = Kerala State Information Technology Mission.

Note: Darker shades denote greater involvement of private sector. Government-run programs appear with no shading.

Sources: India n-logue: Kumar and Jhunjunwala. 2002; Jhunjunwala, Narasinham, and Ramachandran. 2004; Jhunjunwala, Ramachandran, and Bandyopadhyay. 2004; Gurumurthy, Singh, and Kasinathan. 2005a; Jhunjunwala and Aiyar. 2007; Best and Kumar. 2008.

India e-Choupal: Kumar. 2004; Dutt. 2010; Mukerji. 2013.

India Kerala State e-Government/e-Kendras: Pal et al. 2007; Mukerji. 2013; Kiran. 2014; Rahul and Krishnan. 2015.

Malaysia – Pusat Internet 1 Malaysia internet centers: MCMC. 2013 and 2014; personal communication at internet center at Inobong, Kota Kinabalu, Malaysia, on 28 May 2015

Bangladesh – A2I Initiative: Union digital centers: Ernst and Young. 2015; Faroqui. 2015; http://www.a2i.pmo.gov.bd/

Philippines CeC or Tech4ED centers: Personal communication with center managers during field visits and discussions with government officials in 2015.

Chile BiblioRedes digital libraries: V. Salas, O. Yacometti, and A. Bustos. 2005; Subtel. 2005 and 2005b; Ministerio de Hacienda (de Chile). 2003.

Private for Profit Initiatives

Cybercafés

Interaction between market agents gives rise to urban cybercafés and a supporting network of commercial suppliers of connectivity, equipment, and repairs. Private businesspersons invest and establish the centers and run them, sometimes using hired staff. Customers use the facilities as long as the value they get justifies what they pay for it. Urban customers tend to be sophisticated. They are aware of the technology and its benefits. Those who are not digitally literate get trained by friends or in courses organized by cybercafé operators. Supply and demand forces determine how long each cybercafé remains open.

S. Kumars

In 1999, S. Kumars sought to connect India's small towns and villages, through a network of 1-computer kiosks using VSAT technology. The company proposed to install 50,000 kiosks using a franchise model. Such a large network would enable scale economies, and make the VSAT technology affordable. Their model included a comprehensive service package for franchisees that included connectivity, equipment, credit, and e-commerce. Unfortunately, implementation was harder than anticipated. Out of a total 53,000 franchise applicants in the first quarter of 2000, only 1,270 franchisees and 240 business associates paid the required investment. Ultimately, many franchisees lost their money and the business never got off the ground (Chatterjee 2001, Moneycontrol 2005).

e-Choupals

Beginning in 2000, the India Tobacco Company (ITC) established e-Choupals. Its objective was to set up a way to purchase product from farmers bypassing government's marketing system. The e-Choupals had one computer connected to the internet using either a dial-up connection or VSAT technology. They were located in the house of farmer leaders, known as *sanchalak* (Hindi for director). All *sanchalaks* are male (Kumar 2004). ITC paid for the investment and the *sanchalak* covered the electricity and phone bill. The *sanchalaks* earned a commission for the product purchased by the company at the e-Choupal (Mukerji 2013). They would get information from the intranet and post ITC prices in front of the e-Choupal and at nearby public markets (*mandils*). The e-Choupal soybean marketing system was quite profitable for ITC (Kumar 2004), and by 2007, 6,500 had been established (Dutt 2010). In principle, neighboring farmers could use the e-Choupals to collect information and access ICT services, but in practice farmers only used them to get information about soybean prices (or other commodities depending on the region), and to sell their produce to ITC. In a few e-Choupals, farmers sent their children to attend computer literacy courses (Mukerji 2013).

n-logue

n-logue was started by academic staff of the Electrical Engineering Department of the Indian Institute of Technology Madras (IIT Madras), with help from private donors and, in the case of the SARI project, in partnership with the Massachusetts Institute of Technology's Media Lab. n-logue established an extensive network of 1-computer kiosks, *chiraag* (lamp), using a two-tiered and at times three-tiered franchise model to serve rural communities on a for-profit basis. To lower costs, other companies spawned from IIT Madras developed a low-bandwidth low-cost connectivity option (CorDECT technology), and applications to expand the usefulness of the low bandwidth provided.[5] Unfortunately, many kiosks were unsustainable and n-logue ran out of steam and folded in 2012.

Government-Run Programs

Chile's BiblioRedes

Chile's BiblioRedes exemplifies a library ICT center program run by a national government agency, the Directorate of Libraries, Archives and Museums (DIBAM).[6] Chile's BiblioRedes (www.biblioredes.cl) is a showcase $10 million project of the Bill and Melinda Gates Foundation. BiblioRedes provided ICT services in 285 public libraries, of which about 33% were predominantly rural (Salas et al. 2005). Use of BiblioRedes' centers is completely free with the government subsidizing all costs. Centers are not self-sustainable, but the project is considered successful because of its impact on users (Roman 2005, Roman and Guerrero 2005). Of the 285 centers established by the project, only one was closed because another agency installed another center nearby. BiblioRedes has expanded with government funding and it now has 422 library centers.[7]

Philippines Community e-Centers Case Study

The first community e-centers (CeCs) were established in October 2004 under the Jumpstarting Electronic Governance in Local Government Units Project (Camba 2004, Diaz de Rivera 2008), and the target was to set up 100 multipurpose CeCs (Saga 2007). A second CeC program executed in 2006–2008 established another 260 CeCs. A third-round project established an additional 177 CeCs in 2010–2012. All three programs were financed by the e-Government Fund.[8] Local government units (LGUs) house, manage, and run these centers.

According to the CeC Strategic Roadmap for 2011–2016, there were 1,416 ICT centers in 2011 established by 14 different entities. Five initiatives accounted for 94% of these, the most important being the CeCs, of which there were 550 in 2011, i.e., nearly 40%. Practically all these CeCs received an initial endowment of four computers and a printer.

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5 Details of n-logue's approach and experience are available in Kumar and Jhunjunwala 2002; Jhunjunwala, Narasinham, and Ramachandran 2004; Jhunjunwala, Ramachandran, and Bandyopadhyay 2004; Gurumurthy, Singh, and Kasinathan 2005a; Jhunjunwala and Aiyar 2007; and Best and Kumar 2008.

6 DIBAM is the Spanish acronym for Dirección de Bibliotecas, Archivos y Museos.

7 Personal exchange with Biblioredes project director, Alberto Gil.

8 The Philippines created the e-Government Fund in 2003 to finance major strategic ICT projects. By 2012, a total of P8 billion ($170 million at 2015 exchange rate) had been allocated to more than 70 projects (Disini Law Office 2015).

Three other noteworthy initiatives in the Philippines are

(i) eSkwela, a pilot project that developed the eSkwela software drawing on paper-based modules developed by the Bureau of Alternative Learning System, and established 95 eSkwela CeCs where out-of-school youth (OSY) learned alternative learning systems (ALS) materials using eSkwela software (Tan et al. 2011);

(ii) centers developed between 2008 and 2010 by the Technical Education and Skills Development Authority (TESDA) to deliver technical and vocational skills training. The 85 TESDA centers are for the exclusive use of students enrolled in TESDA programs (Ruma 2015); and

(iii) 473 Farmers Information and Technology Services (FITS) centers.

In 2013, the Information and Communications Technology Office of the Department of Science and Technology (ICTO-DOST) was restructured,[9] reducing staff levels and the pace of national government funding for CeC infrastructure (Newsbytes 2013). In 2016, the CeC program was given a new name, the Technology for Economic Development (Tech4ED) Program, and a new approach was adopted. The Tech4ED program encouraged the LGUs to invest themselves in center infrastructure (at least three computers in 20 square meters or more), and refocused national resources to developing online services through the Tech4ED portal. The long-term target remains the establishment of a center in each of the country's 42,000 barangays.

Twelve CeCs were visited, six in Southern Luzon (10–12 August, 2015), and six in Western Visayas (8–12 September 2015). Ten of the 12 centers visited were dependencies of the municipal government. Staff of the ALS of the Department of Education (DepEd) ran the other two.

Centers of excellence preidentified by the Philippine CeC Network (PhilCeCNet, a government sponsored nongovernment organization) and DOST-ICTO were visited. But, in practice, only five of the centers visited may be considered showcases (Tables 5a and 5b). These had more computers, longer operating hours, and fewer maintenance problems.

Four of the five showcase centers were in the most populous of the 12 municipalities visited (Table 6). Carmona (75,000 people in 2010) and Malvar (45,000) are first and second income class municipalities, and have large populations that are 100% and 52% urban, respectively. Mauban is predominantly rural (4%), but is a first income class municipality with a large population (61,000). Tayabas City, the most populous municipality visited (91,400 people), is a sixth income class city and is only 9% urban. By virtue of their large populations and budgets, these municipalities have a significant capacity to subsidize CeCs.

The populations of nonshowcase centers visited, in Liliw (33,850); Guimbal (32,300); President Roxas (28,500); Balete (27,200); and Luisiana (20,150) are comparatively small and predominantly rural (≥76%). Mina breaks the mold. It is a showcase center located in a predominantly rural (94%), fifth income class municipality, and has a small population (21,800).

In most countries, the full-time dedication of a manager is considered indispensable. In four of the five showcase centers visited in the Philippines, the center manager worked only part-time for the center, but had important positions in LGU administration (Tables 5a and 5b). The role of the manager as facilitator of funding and assuring LGU support is more important than running day-to-day operations.

The choice of municipal governments as center managers implied a prudent choice of location. All the municipalities visited are in relatively large towns. All of them had small cybercafés operating. Some Filipino CeCs are located in barangays, the lowest level of local government, and equivalent to villages in other countries, but these barangay centers get backing and funding from the national government and the corresponding municipal government.

Locating CeCs in relatively large towns meant lower pressure from supply-driven constraints (Figure 2, top of LHS). All 12 centers visited had internet connectivity. Computer breakdowns were usually repaired in-house by the IT department of the LGU that serviced all computers of the municipality.

It was demand-driven constraints that motivated the program, i.e., low digital literacy in provincial municipalities. In 2010, internet access was 75% in Metro Manila, but only 17% in the 17.4 million households elsewhere in the Philippines.[9]

[9] There is no reliable data on digital literacy in the Philippines. We use data from the 2010 census of population to derive a sample-based estimate of households with and without Internet access by region.

Table 5a: Philippines—Select Features of CeC or Tech4ED Centers Visited in Southern Luzon

	Malvar	Mauban	Tayabas City	Luisiana	Liliw	Carmona
Managing agency	LGU	LGU	LGU	DepEd	DepEd	LGU
Year of establishment	2010	2011	2006	2012	n.a.	2006
User workstations – total	**46**	**20**	**21**	**1**	**4**	**48**
Main center	16	20	17	1		15
Mobile center (bus)	12				4	
Satellite center 1	10		4			10
Satellite center 2	4					6
Satellite center 3	4					6
Satellite center 4						5
Satellite centers 5 and 6						3 each
Staff						
Manager						
Dedication to center	Part-time	Part-time	Full-time	Full-time	Part-time	Part-time
Education level	Tertiary	Tertiary	Tertiary	Tertiary	Tertiary	Tertiary
Gender	F	F	M	F	F	M
Customer service staff						
Number	7	6	1	1	1	6
of which female	2	4	0	1	1	2
Fees						
Computer use	P10/hour	P10/hour	Free	Free	Free	Free
Other services	Free	Yes	Free	Free	Free	Free
Equipment maintenance	IT staff – CeC and LGU	IT staff – CeC and LGU	IT staff – CeC and LGU	2 PCs have been broken for 3-yrs	Mayor's IT staff	IT staff – CeC and LGU
Working hour						
Monday-Friday	7 a.m.–5 pm	8 a.m.–9 p.m.	8–12 / 1-5	Tuesdays and Thursday 8 a.m.–5 p.m.	8 a.m.–11:30/ 1:30 p.m.–5 p.m.	8 a.m.–5 p.m.
Saturday		8 a.m.–9 p.m.	closed	closed	closed	closed
Sunday		8 a.m.–9 p.m.	closed	closed	closed	9 a.m.–3 p.m.

CeC = community e-center, DepEd = Department of Education, F = female, IT = information technology, LGU = local government unit, M = male, PC = personal computer, Tech4ED = Technology for Economic Development Program.

Source: Author's field visits and discussions with government officials and center managers.

Table 5b: Philippines—Select Features of CeC or Tech4ED Centers Visited in Western Visayas

	President Roxas	Barotac Viejo	Guimbal	Mina	Balete	Banga
Managing agency	LGU	LGU	LGU	LGU	LGU	LGU (FITS)
Year of establishment	2013	2008	2013	2011		2004
User workstations	6	1	5	27	4	11
Main center	6	1	5	27	4	5
Satellite center 1						3
Satellite center 2						3
Staff						
Manager						
Dedication to center	Part-time	Negligible	Negligible	40%	Part-time	Full-time
Education level	Tertiary			Tertiary		
Gender	F			F	F	F
Customer service staff						
Number	1			3		
of which female						
Fees						
For computer use	Free	Free	NA	For a fee	Free	NA
For other services	For a fee			For a fee	For a fee	
Equipment maintenance	IT staff – CeC and LGU	2 computers broken, only 1 works	IT staff – CeC and LGU	IT staff – CeC and LGU	IT staff – CeC and LGU	IT staff – CeC and LGU
Working hours						
Monday–Friday	8 a.m.–5 p.m.	8 a.m.–5 p.m. (1 PC+ library services)	Not open to the public	8 a.m.–5 p.m. except Wednesday for maintenance	8 a.m.–11 a.m., 1–4 pm	8 a.m.–5 p.m.
Saturday				closed	closed	closed
Sunday				closed	closed	9 a.m.–3 p.m.

CeC = Community eCenter, F = female, FITS = Farmers Information and Technology Services, IT = information technology, LGU = local government unit, M = male, NA = not applicable, PC = personal computer.

Source: Author's field visits and discussions with government officials and center managers.

Table 6: Philippines—Basic Features of the Municipalities where Centers Visited are Located

Region IVA-Calabarzon						
Municipality	Carmona	Mauban	Malvar	Liliw	Luisiana	Tayabas City
Province	Cavite	Quezon	Batangas	Laguna	Laguna	Quezon
Income class	1st	1st	2nd	4th	4th	6th
Number of barangays	14	40	15	33	23	66
Number of urban barangays	14	2	7	7	1	8
Population	74,986	61,141	45,952	33,851	20,148	91,428
Urban population	74,986	2,217	23,994	8,728	413	7,969
% urban population	100	4	52	26	2	9
Region VI Western Visayas						
Municipality	President Roxas	Barotac Viejo	Guimbal	Mina	Balete	Banga
Province	Capiz	Iloilo	Iloilo	Iloilo	Aklan	Aklan
Income class	4th	3rd	4th	5th	4th	3rd
Number of barangays	22	26	33	22	10	30
Number of urban barangays	1	0	11	1	1	1
Population	28,561	41,470	32,325	21,785	27,197	38,063
Urban population	6,719	0	7,810	1,388	830	2,469
% of urban population	24	0	24	6	3	6

Source: Philippine Statistics Authority. 2010.

Public–Private Partnerships

Chile's Experience with Reverse Auctions

In 2002, Chile's telecommunications development agency, Subsecretaria de Telecomunicaciones de Chile (Subtel), used a reverse subsidy auction to fund a rural telecenter program. Private as well as public entities could compete for subsidy awards, which were granted to bidders who agreed to run the centers for 5 years and offered to do so for the lowest subsidy amount. Three years later, only 20 of the 209 telecenters adjudicated to the private sector were running. A few public agencies had won awards, but, with their greater power to subsidize, they gradually took over some centers initially adjudicated to private firms. By 2005, two universities, two public agencies, and one nongovernment organization were running more centers (137) than the 84 they had been adjudicated (Subtel 2005a and 2005b), Ministerio de Hacienda 2003) (Table 7).

Table 7: Chile—Rural Telecenters Sponsored in 2002 Using Reverse Auctions, by Type of Institution Winning Bids and Status on 26 December 2005

Adjudicated	Adjudicated and Authorized			Status in 2005		
	First Auction	Second Auction	Total 2002	Operating	Establishment Under Way	Total Ongoing
Universities						
Universidad de la Frontera	12	9	21	21		21
Universidad de Concepción	15		15	15		15
Central government agencies						0
Instituto Nacional de la Juventud		17	17	48	11	59
Dirección de Bibliotecas, Archivos y Museos (DIBAM)			0	10	2	12
Nongovernment organizations and foundations						0
Corporación Maule Activa	20	11	31	30		30
Subtotal, public agencies and nongovernment organizations	47	37	84	124	13	137
Private enterprise						
Megasat	12	5	17	12		12
Sociedad comercial Borques y Flores	25	32	57			0
CCT		32	32			0
Sociedad Consultora Quantitativa		5	5	2		2
Sociedad Comercial Lorenzo Miranda Yañez y Cia.		28	28			0
Ing. y computación visión Pc. Limitada		61	61			0
Sociedad Educn San Francisco		9	9	6		6
Subtotal private firms	37	172	209	20	0	20
Total telecenters	84	209	293	144	13	157

DIBAM = Directorate of Libraries, Archives and Museums.
Source: Subsecretaría de Telecomunicaciones de Chile.

Akshaya

Akshaya began in Malappuram district in 2002, and was eventually extended to other parts of Kerala province. Malappuram is India's most densely populated district. It has 32 million people and is predominantly rural. Many of its people work in Gulf countries. Proponents saw in the project an opportunity to expand communications between migrants and their families (Mukerji 2013).

Akshaya's network orchestrator was the Kerala State Information Technology Mission (KSITM), a state government agency founded in 1999. KSITM was the project's driving force. It provided investment resources, recruited small entrepreneurs to run the telecenters, arranged loans to help them get going, planned the ICT services to be provided,

and developed content (Kiran 2014). The Gram Panchayat—India's local government unit roughly equivalent to a district in other countries—chose the entrepreneurs that would operate the telecenters. These had to offer the services developed by the government and keep the telecenters open for at least 3 years (Kiran 2014).

The plan was for every Malappuram resident to live within 2–3 kilometers away from an e-Kendra, so that each center would serve about 1,000–1,200 families. In all, 630 centers branded e-Kendras participated. Most were newly established, but about 160 were existing cybercafés and training centers (Pal et al. 2006). The Asian Development Bank (ADB) funded 400 centers through the Modernizing Government and Fiscal Reform in Kerala Program (ADB 2007). In 2003–2004, Akshaya implemented a digital literacy campaign in Malappuram. Delays in achieving connectivity and limited e-governance content resulted in low telecenter use and, by 2005, only 225 e-Kendras were still standing (Kiran 2014). By March 2009, the state had spent 117.8 million rupees ($2.5 million at 2016 exchange rate) in the provincial project (Rahul and Krishnan 2015). The program continues under the national government and the centers are now known as Common Service Centers.

Pusa Internet 1 Malaysia

Malaysia has over 2,000 rural ICT centers (Dahalin et al. 2013). A recent initiative, Pusat Internet 1 Malaysia (PI1M) Program,[10] is orchestrated by the Malaysian Communications and Multimedia Commission (MCMC) and funded by Malaysia's Universal Service Fund. Malaysia's PI1M centers are run by private enterprise under PPPs. Licensed telecommunication operators tender to run a center or group of centers. As of December 2013, 424 PI1M centers had been established (MCMC 2013 and 2014). Contracts to operate the centers have a limited duration of 5 years, i.e., subsidies have a limited time span.

Bangladesh's Union Digital Centers

Bangladesh's Union Digital Center program started as a pilot in 2009 in 30 union *parishad*. Union *parishad* are the smallest unit of local government in Bangladesh. The program expanded rapidly and presently reaches all of the country's 4,547 union *parishad*. The union *parishad* provides the space to house the facilities and pays for utilities. Two entrepreneurs, one female and one male, operate each center. A local advisory council, headed by the union *parishad* chairperson, supervises them. The program is run from the Prime Minister's Office, and national government support includes the provision of the start-up equipment and the development of content with government services. These services generate revenues to compensate the entrepreneurs (Bangladesh, Prime Minister's Office).

Sri Lanka's *Nenasala* Case Study

The $83 million e-Sri Lanka Development Project launched in 2004 included a $7.4 million telecenter component. Project implementation was completed on 31 December 2013 (World Bank 2015). The Information and Communication Technology Agency of Sri Lanka (ICTA), was created to implement the project. The ICTA is a private company owned by

[10] Pusat Internet means Internet center in Malay.

the state, but, unencumbered by bureaucratic requirements, can work across sectors and recruit talent at competitive salaries (Hanna 2007 and 2008).

e-Sri Lanka was monitored regularly and periodically evaluated. Four staff members monitored the whole project, including the telecenter component. ICTA has issued reviews of the performance of the *nenasala* program, the most important being those by Skill International (2010), Green Tech (2013), and ICTA's Monitoring and Evaluation Unit Situation Analysis report (ICTA 2015).

The ICTA 2015 report is based on a comprehensive survey conducted in 2014–2015 over a 10-month period. It covers 884 of the 1,005 centers established in 2004–2015. Of these, 336 were found closed and 548 were still operating.[11] This monitoring and evaluation (M&E) survey has generated what is perhaps the most comprehensive data set ever assembled on a significant ICT center initiative. The present case study is based primarily on unpublished data made available to the study team, courtesy of the Information and Communication Technology Agency of Sri Lanka (ICTA 2015a). This database has been complemented with a prior unpublished telecenter inventory (ICTA 2008), and with population data for each village or Grama Niladhari Division, which is available from Department of Census and Statistics 2012.[12]

To avoid subsidizing centers that might compete unfairly with existing cybercafés, the appraisal document proposed to target rural communities with fewer than 5,000 people. To ensure that a minimum pool of potential users could be found near each center, the communities had to have at least 2,000 people (Proenza 2004, Kora 2004). The number of Sri Lankan villages with 2,000–5,000 people is about 1,000. The 200-center target (World Bank 2004) acknowledged that not all of the 1,000 villages of the recommended size would meet other conditions, such as reliable electricity, viable connectivity, and availability of a suitable locale.

ICTA followed a technical approach to site and operator selection. Every application would go through a systematic four-step vetting process: (i) application, (ii) interview, (iii) site inspection, and (iv) training. ICTA would get letters from organizations interested in establishing a *nenasala*, and the agency would ask the interested parties to fill out an application. The completed form was a first filter in the selection process. Applicants would then go through a second filter, an interview, during which they were informed of what was required of them, and ICTA staff assessed their capacity and interest. Next, the proposed site was inspected to make sure it was suitable, i.e., that it had proper roofing and wiring, its front entrance was visible to the public, lighting was adequate, and the venue met minimal physical conditions to assure user comfort. Applicants were put through a final filter during

[11] There were 143 centers in ICTA 2015 without information regarding establishment date. A previous 2008 ICTA inventory was used to complement the 2015 database by adding the launch date of 110 centers. The process left 43 centers without establishment date information. Thirty-three of these were of the four common types in the four main locations. The proportion of these centers that are now closed is high, 79%. Since most centers presently without launch date were probably set up between 2009 and 2012, the number of centers established during this period and the corresponding closure rates are probably underestimated.

[12] The analysis also benefits from familiarity with the Sri Lanka experience by the consultant who prepared this report. As a member of the World Bank project appraisal team (World Bank 2004), he was responsible for the design of the telecenter component, and subsequently participated in five implementation support missions (Proenza and Dewapura 2004, Proenza 2004 and 2008).

the initial training, at which time the behavior and attitude of the potential operators was observed and a final selection was made.

Mahinda Rajapaksa was Prime Minister of Sri Lanka in 2004–2005, and President in 2006–2015. ICTA had a high profile, and was made a dependency of the Prime Minister's Office in 2004, and of the Office of the President in 2006 (Shadrach 2012, 73).

The first centers founded were run by entrepreneurs, but early in 2006, President Rajapaksa gave the ICT centers a new name, *nenasala*, which in Sinhala means wisdom outlets, raised the target number of centers from 200 to 1,000 (Shadrach 2012, 37), and encouraged the establishment of centers in temples. Temples were a good *nenasala* venue because of their service orientation and strong links to the majority Sinhala population. Whereas rural areas often lack a suitable building with electricity to house the *nenasalas*, temple centers usually have an adequate building with a library, and a community or training center. Their facilities attract visitors and are located in a prominent part of the village.

There were also political reasons behind these changes. President Rajapaksa cultivated close ties with the Buddhist clergy, who are influential among the Sinhala population and constitute a powerful force in Sri Lanka's electoral politics (DeVotta 2016). He made the *nenasala* program part of his election platform, Mahinda Chintana (Rajapaksa 2010), and inaugurated many *nenasalas*.

World Bank staff felt the new targets were overly ambitious, but eventually went along (Shadrach 2012, 75-76). An ICTA staff remembers the immediate effect of these changes:

> *Nenasala* became one of the election prizes so to speak, and every monk and temple was writing to him to get a *nenasala* without understanding the long-term commitment they must undergo.

In all, about half of the *nenasalas* set up in 2003–2015 were founded in religious centers, mostly in temples, but some in mosques, *kovils* (temples), and churches (Table 8). The program also helped install 285 centers in community-based organizations, 83 in libraries, and 46 run by entrepreneurs. Beside these four common type centers, another 59 were set up in various institutions, but these are not shown in Table 8.

The Information and Communication Technology Agency of Sri Lanka classified center location as remote, rural, semiurban and urban. Implicit in these categories is the relative ability of centers in these locations to address both, demand and supply constraints. Nearly two thirds of common type *nenasala*s were installed in rural areas, the rest in remote (9%), semi-urban (15%) and urban (7%) areas (Table 8).

Table 8: Sri Lanka—Distribution of *Nenasala*s Established by Type and Location

Center Type	Location										All Locations	
	Remote		Rural		Semiurban		Urban		Not identified			
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Religious	41	56%	277	51%	50	42%	19	34%	24	60%	411	50%
		10%		67%		12%		5%				100%
CBO	30	41%	194	36%	35	30%	14	25%	12	30%	285	35%
		11%		68%		12%		5%				100%
Enterprise	0	0%	21	4%	10	8%	11	20%	4	10%	46	6%
		0%		46%		22%		24%				100%
Libraries	2	3%	46	9%	23	19%	12	21%	0	0%	83	10%
		2%		55%		28%		14%				100%
Common type	73	100%	538	100%	118	100%	56	100%	40	100%	825	100%
		9%		65%		14%		7%				100%

CBO = community-based organization.

Note: This table excludes 59 centers established by the *nenasala* program in security camps (17), hospitals (19), government offices (10), army rehabilitation centers (3), and universities (3). These centers are few and serve institutions with idiosyncratic mandates. The lessons that can be learned from their experience have no general applicability elsewhere.

Sources: ICTA. 2008; ICTA. 2015a; Department of Census and Statistics 2012.

PART III
User-Customer Profile

Rural ICT center programs aim to serve people of all ages and gender, and the poorest of the poor. This is seldom achieved. Children and young adult middle class users are most drawn to ICT centers.[13]

Where ICT centers are expected to achieve self-sustainability, the target group is also a program's potential customer base. To understand the rural ICT center challenge and to assess impact and sustainability, it is essential to know the user-customer target group.

Age

Public shared access users are young. Chile has a comparatively high number of elderly users, i.e., 7.3% older than 50; but those younger than 25 represent 56% of all Chilean users (Table 9). This is a high number, considering that the under-25 cohort accounts for only 39% of Chile's population (Proenza 2015).

Table 9: Public Shared Access Users by Age in Bangladesh, Brazil, Chile, Ghana, and the Philippines

Bangladesh		Brazil	Chile	Ghana	Philippines
Up to 19	27.8	49.0	33.7	31.3	59.7
20–24	32.1	23.2	22.3	35.1	25.2
25–50	38.6	26.0	36.7	32.6	14.7
Over 50	2.6	1.8	7.3	1.0	0.4
Total	100.0	100.0	100.0	100.0	100.0

Note: Includes users of telecenters, cybercafés, and library centers.
Source: Sciadas, Lyons, Rothschild, and Sey. 2012.

Users of rural ICT centers are also young; those aged 25 or less account for 67% of Malaysia's rural information center users, and of 75% of Sri Lanka's *nenasala* users (Table 10).

[13] Parts of this section are drawn, with permission, from Proenza (2015).

Table 10: Age and Gender of Rural ICT Center Users in Malaysia and Sri Lanka (%)

	Male	Female	Total
Malaysia – Rural Information Center users			
≤17	4	11	15
18–24	12	30	42
25–50	18	20	37
> 50	3	2	5
Total	**37**	**63**	**100**
Sri Lanka – *Nenasala* Uuers			
<11	1	1	2
12–25	29	47	76
>26	7	15	22
Total	37	63	100

Source: Proenza. 2015, 381.

Gender

Figure 3 depicts the proportion of women and men among cybercafé users in 25 countries.[14] With two exceptions (Mongolia and Moldavia), survey after survey point to a gender imbalance in cybercafés—an imbalance that is quite acute in some countries in Asia and the Middle East.[15]

Other venue types seem more gender-inclusive. In the Philippines, inappropriate environments restrict women's access to cybercafés, but there is no evidence of the same occurring in the telecenters run by local governments (APC 2010).

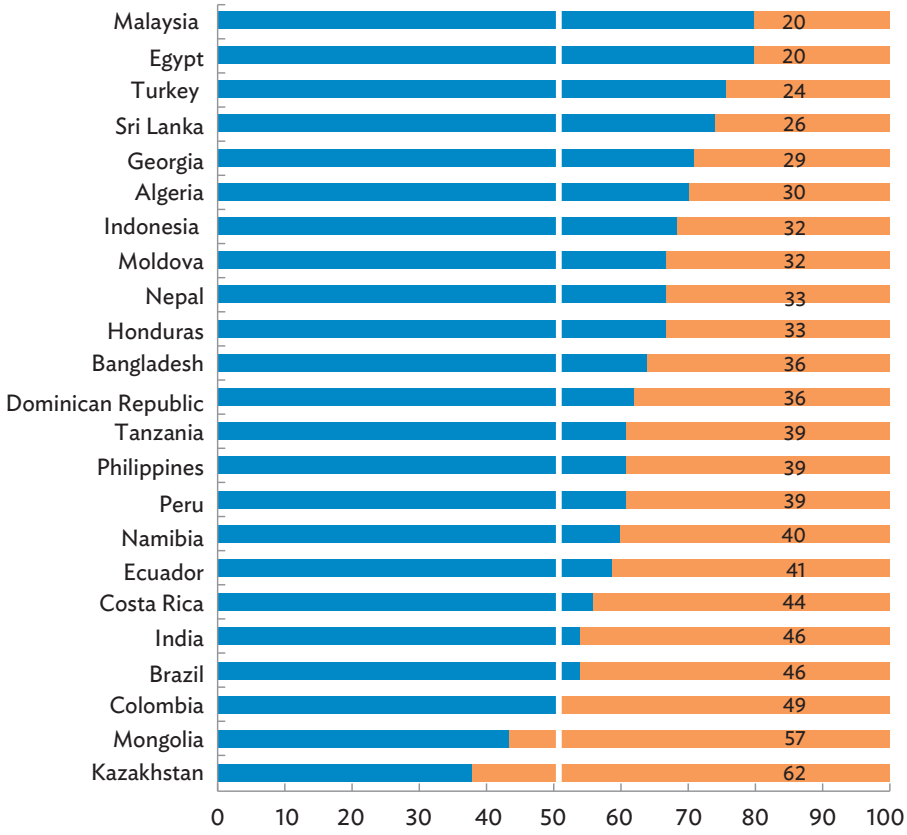
In Malaysia and Sri Lanka, the evidence also suggests there is greater gender inclusiveness in telecenters than in cybercafés. About 63% of Malaysian rural information center users surveyed in 2015 by Aziah Aliah et al. were women. In Sri Lanka, Skill International (2010) also found a high proportion of women users in the *nenasala*s.[16] Once we turn to cybercafés, gender disparities become evident. The number of female cybercafé users was only 20% in Malaysia (Shah Alam and Abdullah 2009) and 26% in Sri Lanka (Gomez 2009).

[14] Figure 3 is from Proenza (2015, 382). Most of these estimates, not all, are from the Landscape study (Gomez 2009). The estimates for Tanzania and Indonesia are from Furuholt, Kristiansen, and Wahid (2008); Malaysia from Shah Alam and Abdullah (2009); India from Haseloff (2005); and Turkey from Eskicumali (2010). Each estimate is associated with the country from which the sample was drawn, but practically all estimates are based on local surveys drawn from a few sample venues.

[15] The Global Impact Study did not estimate the distribution of users by gender. It sought instead to sample an equal number of male and female users of public shared access venues of all types. This objective was not achieved in Bangladesh and Brazil precisely because of the underlying gender imbalance. The proportion of women users of public shared access for each user sample was 23.7% in Bangladesh, 24.6% in Ghana, 38.7% in Brazil, 45.7% in Chile, and 44.6% in the Philippines (Sciadas et al. 2012).

[16] The Sri Lanka findings were somewhat contradicted by a subsequent survey of the country's telecenter users (GreenTech (2013), which only had 38% female respondents.

Figure 3: Gender Distribution of Users in Select Urban Cybercafés (%)



Sources: Tanzania and Indonesia from Furuholt, Kristiansen, and Wahid (2007); Turkey from Esquicumali (2010); Malaysia from Sham and Abdullah (2009); India from Haseloff (2005). All other countries are from Gomez (2009).

Gender imbalance appears to be widespread, except in libraries. Aggregating over 25 countries, the Landscape study estimated the number of women as a proportion of all users as 51% for libraries, 43% for telecenters, and 39% for cybercafés (Gomez 2009).

Rural–Urban Divide

In practically all countries, the penetration frontier, both for mobiles and the internet, lies in rural areas. Table 11 shows internet penetration in six quite dissimilar countries. In all five, internet access is far more limited in rural than urban areas. This urban/rural divide is commonplace worldwide.

The challenge is formidable in predominantly rural countries; i.e., Sri Lanka (82%), Rwanda (71%), India (67%), Myanmar (66%), Thailand (50%), and the People's Republic of China (PRC) (44% rural). Use of computers and internet is also challenged where adult literacy

rates are low, as happens in Rwanda (71%), India (72%), Bangladesh (61%), and Ghana (77%) and Cameroon (71%).[17]

Table 11: Income, Population, and Internet Penetration in Brazil, Chile, the People's Republic of China, India, Malaysia, and Peru

	Per Capita Income ($ PPP)	Population		% Internet Users		
		Million	% Rural	Urban	Rural	Overall
Brazil	15,020	208	14	54	22	50
Chile	21,979	18	10	65	40	62
People's Republic of China	14,160	1,371	44	64	32	50
India	6,020	1,311	67	32	7	15
Malaysia	26,140	30	25	67	33	66
Peru	11,960	31	21	66 (Lima)	11	46

PPP = purchasing power parity.

Sources: Per capita income and population: World Bank database (2015); internet penetration: Brazil (Henriques 2016); Chile (Rivera, Lima, and Castillo 2014); the People's Republic of China (CNNIC 2016); Malaysia (MCMC 2015); and Peru (INEI 2016).

Low internet penetration makes ICT skills training indispensable, but expanding digital literacy is complicated by other rural–urban differences, such as in purchasing power, and in the ability to read and write. The PRC's increasing income inequality is largely accounted for by differences in purchasing power (Xie and Zhou 2014). In 2005, the literacy of India's urban population was estimated at 82%, and only 54% in rural areas (Subramanian and Arivanandan 2009).

Occupation and Income

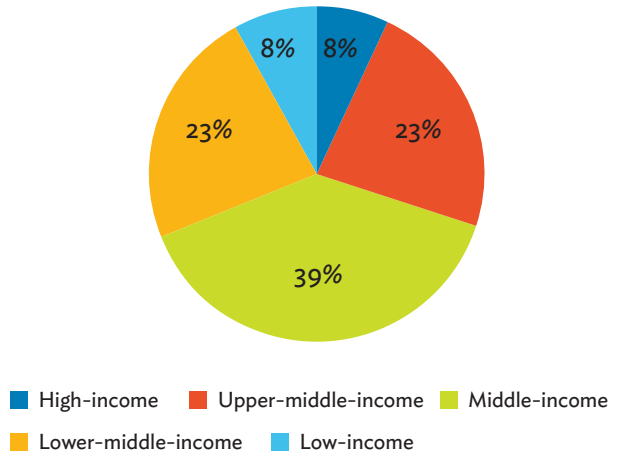
Students account for 35% of Filipino public shared access users, 39% in Brazil, 42% in Chile, 51% in Bangladesh, and in Ghana (Sciadas et al. 2012); and make up 48% of Proenza's (2015) cybercafé user samples in Jordan and the PRC. Nonstudent users are mostly working people (42% in the PRC, 30% in Jordan) or self-employed (8% in the PRC, 16% in Jordan). Only a few users are unemployed or retired (2% in the PRC, 6% in Jordan).

The World Bank (2012) estimates that (in 2005) 36% of the PRC's population and 3.5% of Jordan's population (in 2006) earned less than $2 per day. It is fair to say that very few, if any, users interviewed by Proenza (2015), in either the PRC or Jordan, fall below this international poverty line.

In 2007, the distribution of Lima's internet users by socioeconomic class was 7% from A, 23% from B, 39% from C, 23% from D, and 8% from E (Figure 4a). Lima's high-income groups (A and B) have more options for connecting to the internet (Figure 4b). For them,

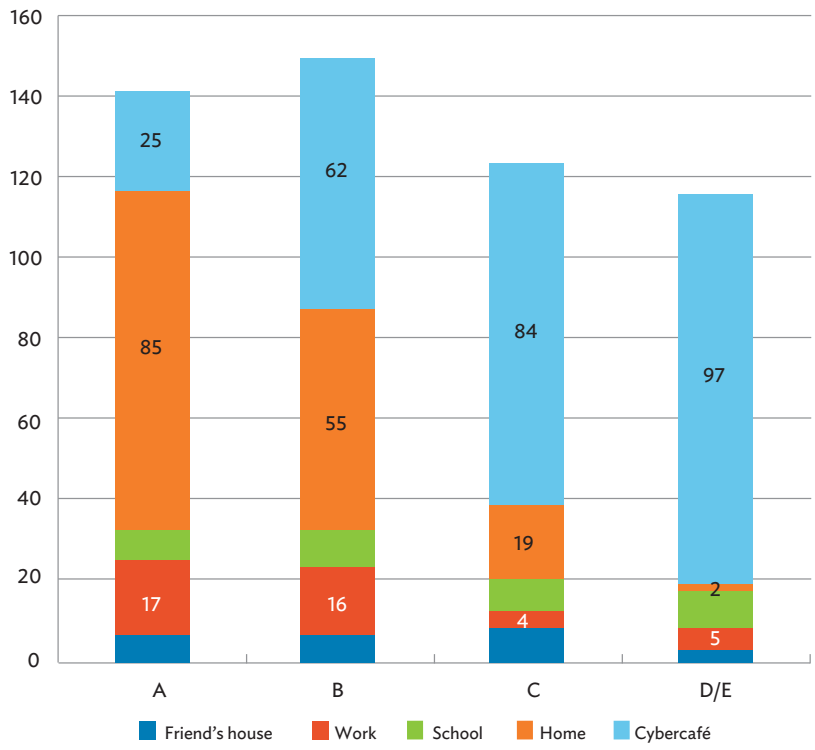
[17] The data presented is for 2015, from the World Bank Database (http://data.worldbank.org/), accessed on 16 May 2017.

Figure 4a: Peru—Distribution of Lima's Internet Users by Socioeconomic Group, 2017 (%)



Source: Apoyo. 2007.

Figure 4b: Places of Access Used by Different Economic Groups—Lima, Peru, 2007 (%)



Note: Socioeconomic categories: A = high income, B = upper-middle-income, C = middle-income, D = lower-middle-income, E = low-income.

Source: Apoyo. 2007.

using the cybercafé is a matter of convenience. For the 31% of D and E users, using a cybercafé is more a matter of necessity.

As in urban areas, most rural ICT center users are middle-class. Kuriyan, Ray, and Toyama (2008, 101) found that "the poor are not the primary customers of ICT kiosks except for a one-time, subsidized Akshaya course." In Sri Lanka, 71% of the 1,260 *nenasala* users interviewed by GreenTech in 2013 identified themselves as middle-class, and 24% as low-income.

User Profiles Drive ICT Center Service Offer

User profiles condition the services that a center provides. An urban cybercafé in a vacation spot can run a profitable business catering to tourists who want access to connectivity and occasional office services. The potential clients of rural ICT centers usually know little about the technology, and the national and local context condition service possibilities.

Most Latin American countries are predominantly urban and, as of June 2016, internet penetration is 61%. Rural people in Latin America, even if they have not used the technology, have often heard from urban friends and relatives about its usefulness. As soon as a rural resident begins to use the internet, he or she can immediately benefit from Spanish language content and communicate with millions of internet users in Latin America and Spain, and even with those in Brazil and Portugal.[18] Latin American users of shared access venues get hands-on experiences with ICT during training and immediately afterward.

In countries with very high digital literacy like India and Bangladesh, the possibilities for direct use by ICT center patrons are not immediate. In India, in addition to having few digitally literate rural people, many languages are spoken and many people are unable to read and write. This limits content availability as well as the number of people that a new user can interact with. This, in part, explains why network orchestrators in South Asia have prioritized the creation of online content and services that can be of value to users and bring government services to citizens and enhance governance, and that can be delivered in ways that are less interactive and less demanding of users. In these challenging contexts, the role of the operator as infomediary is significant, and it is common for ICT centers to consist of simple one or two computer kiosks.

[18] As of June 2016, the 277.1 million Spanish language users of the internet ranked third among all internet users. The first two languages by number of users were English at 948.6 million, and Chinese at 751.9 million. Next in line, after Spanish, were Arabic, Portuguese, Japanese, Malaysian, Russian, French, and German. Spanish and Portuguese are close enough languages so that speakers from the either language sphere can interact with each other. http://www.internetworldstats.com/stats.htm

PART IV
ICT Center Services

The distinction between on-site services and those produced off-site is that the latter involve content development that is often blended with on-site activities.[19]

On-Site Services

Communications: Effect of Mobile and Home Use on ICT Center Demand

The relationship between mobile phone use and internet and cybercafé use may be appreciated from Peru's experience. For many years, Peru has had a high density of urban *cabinas públicas*, the local name for cybercafés. In 2002, 71% of Lima's internet users accessed from *cabinas* and only 8% from home. In 2002, *cabinas* were essentially the only way to connect to the internet. At the time, about 13% of Lima's *cabina* users visited these venues to make calls using voice over internet protocol (VOIP), and 40% had done so previously. Mobile phone use rose between 2007 and 2013, from 40% to 81%. Home internet connections also increased, from 5% in 2007 to about 26% in 2013.

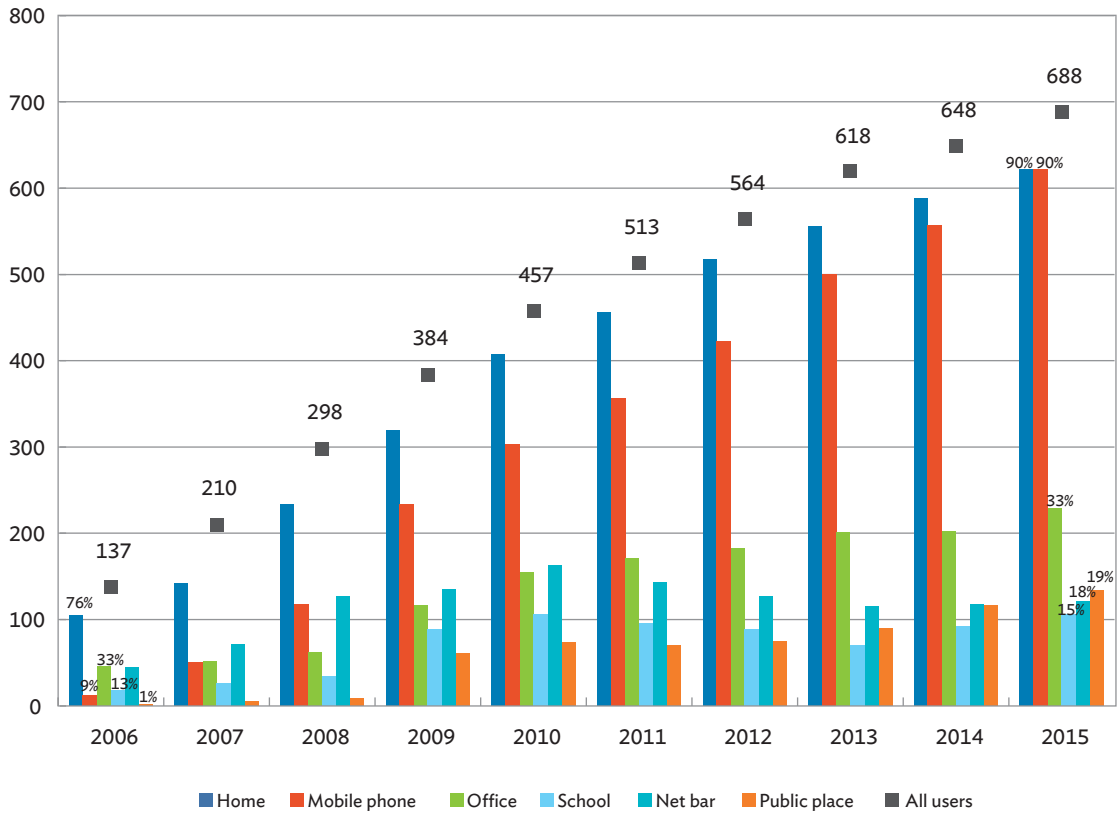
As alternative individualized means of communication became more widely available, VOIP use in *cabinas* subsided, to the point that it is no longer recorded in surveys. The number of households with at least one person using *cabinas* has declined, from 42% in 2007 to 38% in 2013, but the sum across users for the five access options (home, work, school, cybercafé, and elsewhere) has increased from 110% in 2007 to 125% in 2013. In sum, as internet use has expanded, user options have increased, and Peru's access patterns have diversified.

Something similar has happened in the PRC. Between 2006 and 2015, individualized forms of access, i.e., from home or using mobiles, grew in tandem with overall internet use (Figure 5).

The number of Chinese connecting from mobiles was 9% of all internet users in 2006, but by 2015 it had grown to 90%, essentially on par with home use. The number of people who accessed from the office also grew during this period, but as a proportion of internet users, remained at roughly 33%. Access from internet cafés (called net bars in the PRC) grew numerically and in relative terms until about 2010 when it started to decline. The number of people connecting from public places (i.e., mostly library centers) was insignificant in 2006, but grew to 133 million or about 19% of all internet users in 2015 (Figure 5).

[19] The discussion on onsite services partly draws, with permission, on Proenza (2015).

Figure 5: People's Republic of China—Millions of Internet Users by Year and Access Mode; and Frequency of Mode Use, 2006 and 2015



Note: This figure was constructed using data from China Internet Network Information Center reports (2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, and 2016), which are published in January based on surveys conducted in December of the previous year.

Source: Author's estimates.

Diversification in access mode over time in the PRC may be appreciated, as in Peru, by adding the percentage of users across the country's six access options. The total was 164% in 2006 compared with 266% in 2013.[20]

Demand factors have been pulling cybercafés in two directions. The popularity of the internet has increased interest among potential users who have not yet tried the technology, increasing demand and enabling cybercafés to deepen their reach to serve

[20] The sum of the percentages that each access mode is used in any given year will exceed 100 and gives a rough indication of the extent to which users access the internet using more than one mode. In 2013, very few mobiles in Peru had the capability to connect to the internet; only 17% of Peru's mobiles were smartphones (Oleaga 2014). In contrast, internet access has been a central feature of mobiles in the PRC and internet access through mobiles was already being tracked in national statistics in 2006. This is why percentages were added for five access options in Peru and for six options in the PRC. Mobile access was considered for the PRC, but not for Peru. This is also why adding the percentages of various internet access modes is much higher in the PRC than in Peru.

smaller towns. Meanwhile, the proliferation of mobile phones, combined with increasing home access, has weakened urban demand to the point that many cybercafés have had to shut down.[21]

Access for communication purposes has lost importance as a rural ICT center service, in part because cybercafés now increasingly service smaller towns, and also because the demand for communication services is now largely satisfied by mobiles. Kiran (2014) notes how use of Kerala telecenters to communicate with migrant family members has dwindled with the advent of mobiles.

Basic Information and Communication Technology Skills Training

Between 2002 and 2004, two digital literacy campaigns were implemented, one in Chile by BiblioRedes and the other one by the Akshaya project in India (Table 12).

BiblioRedes' 14-hour digital literacy program targeted users of its network of 365 libraries and 17 regional training laboratories. Libraries receive funding for regular operations by municipalities and by Chile's national government. The Bill and Melinda Gates Foundation awarded a $10 million grant to the BiblioRedes project to equip each library with 2–7 computers and impart ICT skills training. To implement the digital literacy campaign, BiblioRedes installed 17 roving units, each with 11 laptops that moved from one library to the other to impart the training. Trainees could use the computers during the class or practice on their own afterward. Trainees were taught computer basics (how to use the mouse and the keyboard), and skills to use word processing software, the internet, and e-mail. A total of 120,000 people received digital literacy training, and an additional 21,000 participated in more advanced training modules.

The 15-hour long e-literacy Akshaya program in Malappuram, India focused on increasing awareness as opposed to giving users hands-on experience with computers. The program targeted at least one member of every family in Malappuram. Because internet connectivity was not yet available, KSITM developed a 15-hour digital literacy training CD. ICT awareness increased, but few trainees learned to use or became regular users of the technology. Training took place in the 635 Ahskaya e-centers. After the initial digital literacy phase, subsidies were discontinued and many of the newly created e-centers shut down (Pal et al. 2006, Pal 2007). By end of 2005, only 415 e-centers were still operating (Kiran 2007). Fewer than 6% of the "e-literates" were able to use the computer for any application, and most trainees could only turn the computer on and off.

[21] A decline in cybercafés was reported in the United States as far back as 1998 and has since been in the news worldwide. See BBC (2012), Daily Independent (2014), Hargrave (2004), Hudin (2009), Jou (2013), Larson (2012), Marriott (1998), Mishkin (2013), Sharma (2016), and Valencia (2010).

Table 12: Digital Literacy Training in BiblioRedes, Chile; and Akshaya, India

	BiblioRedes, Chile	Akshaya–Malappuram, Kerala, India
Income per capita[a]	$5,870	US$ 390
Adult literacy rate	96%	87%
Implementation period	2002–2004	April 2002–March 2004
Investment	$19.8 million[d]	$6.6 million[e]
Training sites		
Municipal libraries	365	
Preexisting e-centers (cybercafés)		160
New e-centers		475
Computers per center	2–7	5–6
Connectivity costs per center[b]	$208 (average)	U$20
e-literacy training[c]		600,000 / 152,361
Target	114,595	600,000
Achieved	121,262 (+21,029 in advanced skills)	152,361[f]

[a] For Chile, World Bank (2006); for Malappuram, Pal et al. (2007).
[b] Includes $1.4 million for e-Literacy campaign from local government; $1.4 million from state government to establish connectivity and develop content; and $3.75 million from entrepreneurs to set up kiosks.
[c] Pal (2007) found that only 29.7% of households participated in the program. Of participating households, 14.5% only attended the first hour of the course. The 152,361 figure is 29.7% of 600,000 (178,200) minus 14.5% of that amount.
[d] In Chile, these costs are paid by municipal governments. Actual cost varies depending on viability of technological options. In Kerala, costs are paid by center operators to Tulip, the wireless provider.
[e] Kerala training was e-awareness; in Chile, computer and internet literacy.
[f] Includes $10 million donation from Bill and Melinda Gates Foundation.
Sources: Ashkaya: Pal (2007); Pal et al. (2006); Pal and Kiran (2005); IIT (2005); Gurumurthy, Singh, and Kasinathan (2005), Mishra et al. (2005). BiblioRedes: de la Maza and Abbagliati (2004), Román and Guerrero (2005); Salas et al. (2005).

Cost per trainee was higher in Chile, about $208 compared to $20 in Malappuram. BiblioRedes probably had greater impact on users than Akshaya's awareness campaign. Chile's BiblioRedes digital literacy training was implemented in a more auspicious setting. Over two-thirds of BiblioRedes ICT centers serve urban areas, and Chile is a predominantly urban country with high per capita income and high internet penetration rate.

Subsequent to the initial digital literacy campaign, KSITM planned a broad variety of services to be offered by telecenters. In practice, all revenues collected by Akshaya telecenters in 2004 were from training activities and, even in 2012, income from training provided about 85% of telecenter revenues (Kiran 2014, 158).

In the Philippines, most of the 12 centers visited provide access to computers and the internet, but their most common service is ICT training. Access is provided only when computers are not being used for training.

The five showcase centers visited impart digital literacy training relying on Intel's Easy Steps, with variations from one center to another. Digital literacy training in Malvar takes 20 days. Carmona Center's training is longer because they want trainees to become sufficiently proficient in ICT skills to be able to get a job, and this requires 2 months of training. Their cumulative number of trainees is smaller than that for other centers, a reflection of the longer duration of their course (Table 13). Table 14 shows typical digital literacy beneficiaries.

Table 13: Philippines—Digital Literacy Training in Select Showcase Community e-Centers

Center	Duration	Number of Trainees
Malvar	20 days/trainee (20 hrs)	3,275 (since 2010)
Tayabas City	4 days/trainee	812 (2014–2015)
Mauban	4 days/trainee (40 hrs)	978 (2011–2014)
Mina	2–3 days/trainee (16 hrs)	2,197 (since 2011)
Carmona	2 months (120–150 hrs)	1,086 (since 2006)

hrs = hours.

Source: Personal communication with community e-center managers.

Table 14: Philippines—Common Types of Digital Literacy Trainees

Tayabas City Center	Carmona Center
Department of Education personnel	College graduates and students
Teachers	Public elementary school teachers
Out-of-school youth and adults	Out-of-school youth and adults
Barangay health workers	Housewives
Barangay nutrition scholars	Senior citizens
Persons with disabilities	Persons with disabilities
Barangay captains	Barangay captains and staff
Sangguniang Bayan members	Entrepreneurs
Local boxing team (10 men)	Private company employees

Sources: Personal communication with community e-center managers.

To expand outreach, Malvar's air-conditioned bus equipped with 12 laptops, visits distant barangays to provide training following a regular schedule (Figure 6). Digital literacy training using the mobile unit is shorter. The Malvar bus stays in one place for 10 consecutive days to impart 1 hour of training per student for a total of 10 hours. The focus of this abridged digital literacy training is on Word processing.

Figure 6: Philippines—Malvar Community eCenter on Wheels

Source: Malvar Community eCenter.

In Sri Lanka, computer training was the most widespread service, offered by 87% of all open centers (Table 15). Next in importance were printing (54%), photocopying (53%), and typesetting (50%). The remaining services were provided by less than 50% of open centers.[22]

Table 15: Sri Lanka—Number of Operating, Sufficient, and Insufficient Centers Providing Various Services

	Operating Centers		Sufficient Centers		Insufficient Centers	
	Number	%	Number	%	Number	%
Computer training	414	87	217	89	173	85
Printing	255	54	177	73	78	38
Photocopy	250	53	156	64	91	45
Typesetting	237	50	176	72	61	30
E-mail	227	48	161	66	64	31
Internet	220	46	154	63	64	31
Scanning	179	38	143	59	36	18
VOIP or Skype	148	31	117	48	30	15
Stationery sale	55	12	49	20	6	3
Other computer-based	50	11	38	16	11	5
Other	46	10	32	13	13	6
Fax	43	9	37	15	6	3

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[22] Wattegama (2008) reports on a nonrepresentative sample of operators with average monthly income of about $200. Consistent with our findings (Table 11), their main source of income was education and training (43%); followed by fax, photocopy, and printing (21%); and internet (16%).

Table 15 *continued*

	Operating Centers		Sufficient Centers		Insufficient Centers	
	Number	%	Number	%	Number	%
Local telephone calls	17	4	15	6	2	1
International telephone calls	7	1	7	3	0	0
Number of respondents	474	100	244	100	204	100

VOIP = voice over internet protocol.

Note: Sufficient centers were earning sufficient income to cover recurrent expenses. Operators of insufficient centers felt they were unable to do so.

Sources: ICTA. 2008; ICTA. 2015a; Department of Census and Statistics 2012.

Office Services

Office services like photocopying, scanning, and typesetting are seldom the highest revenue earners or the most widely used. Office services are appreciated by users as well as by center operators who earn a significant if secondary source of revenue from them.

Other Services

BiblioRedes' main services are digital literacy and advanced ICT skills training, and access to computers and the internet. BiblioRedes also developed an application that enabled users to develop and publish their own web page (http://www.biblioredes.cl/contenidos-locales).

Achieving financial sustainability was central to n-logue's efforts to develop services that could be sold. The range of services offered included digital literacy training and computer use, and innovative services such as photo studio, consultation with experts, astrological horoscopes, and the ability to upload and browse personal profiles to facilitate marital matches.

Services Using Content Produced Off-site

As the demand for communication through telecenters has declined, two other services have gained prominence: the provision of access to government services; and remedial education for out-of-school, unemployed, and job-seeking youth. There have also been efforts to provide agriculture and health services through telecenters, but these have not been as widespread or successful.

These initiatives have involved offsite development of content to be accessed by users and often blended with on-site telecenter activities.

e-Government

Bangladeshi customers visit the union digital centers (UDCs) to get services from one of the two entrepreneurs, each operating a computer. Table 16 shows the services offered in 19 UDCs surveyed in Jessore according to Ernst & Young (2015). The most common are

government-to-citizen services such as obtaining a birth certificate; or a printout of a land record, exam results, and school registration; and payment of electricity bill. Many UDCs also offer office services like printing, scanning, photocopying, and passport photos.

Table 16: Bangladesh—Services Offered by Sample of 19 Union Digital Centers in Jessore

Service	UDCs Offering Service		Center Revenues (Taka)	
	Number	%	Sum Over All UDCs	Average per Center
Government-to-citizen services				
Jonmo Nibondhon (birth certificate)	17	89	63,550	3,972
Nakal Abedan (land record printout)	15	79	20,295	1,450
Registration for exam/school	12	63	13,950	1,395
Palli Bidyut (electricity bill payment)	11	58	8,140	1,163
Office services				
Photocopying	14	74	77,500	5,962
Passport photos	11	58	17,070	1,552
Projector rental for events	11	58	10,895	1,090
Printing	8	42	9,300	1,329
Scanning	3	16	10,600	5,300
Laminating	2	11	220	110
Mobile servicing	2	11	37,500	18,750
Bkash money transfer	3	16	13,050	4,350
Telemedicine	2	11	400	200
Data card selling	1	5	10,000	10,000
Online or mobile money transfer	1	5	240	240
Cybercafé-type Services				
E-mail	12	63	11,350	1,032
Video chat	7	37	1,850	308
ICT Skills Training				
Computer courses (3–6 months) with certificate	6	32	50,245	8,374
Computer courses (3–6 months) no certificate	3	16	7,050	2,350

UDC = union digital center; ICT = information and communication technology.
Source: Ernst & Young. 2015.

Insufficient income is a problem affecting UDCs (Faroqui 2015). The program is new, and it is early to say whether it will overcome this predicament. Government services have been prioritized by the Access to Information (a2i) Program and are offered widely. Computer training was offered in only 9 of the 19 UDCs surveyed in Jessore, but UDCs providing training earned an average of 8,374 taka when certification was provided, and

2,350 taka when it was not.[23] These amounts are significant compared with e-government services. If adopted widely, computer training could become an important revenue-generating service for UDC entrepreneurs.

A prime objective of the Akshaya project was to deliver e-government services to citizens. The government was to make entitlement certificates readily available online, help with the processing of applications, provide health and telemedicine and agricultural extension services, and create a mechanism for channeling citizens' grievances. According to Kiran (2014), as of October 2012, none of the e-Kendras were able to provide any of these services. The one successful e-government application implemented was FRIENDS (Fast Reliable Instant Efficient Network for Disbursement of Services), a system that, in principle, allowed citizens to make a broad range of payments to the government using the center as a single payment window, but that in practice, only enabled the payment of utilities and university fees (Kiran 2014, 163).

To make government services available online, it is often necessary to reengineer processes and effect difficult-to-implement changes in administrative culture. The Bhoomi project in Karnataka is considered to be one of the most successful e-governance projects in India. Few remember that the Bhoomi initiative failed twice, in 1991 and in 1996, before successfully computerizing land records in 1999 (Prakash and De 2007). ICT centers can serve as the front end of government service, as a customer window. But they cannot offer e-government services before the corresponding backend work has been completed.

Sri Lanka has prioritized reengineering of e-government services. Tackling the backend caused problems and delays (Galpaya 2015), but is beginning to pay off. About 35% of users have used the *nenasalas* to access e-government services (GreenTech 2013). Sri Lanka leaped in the United Nations ranking of nations by government content from 81st place in 2004 to 37th–38th place in 2014 (Table 17).

Table 17: Online Government Content—United Nations Indexes and Rankings of Select Countries, 2004 and 2014

	2004		2014	
	Index	Ranking	Index	Ranking
France	0.541	36	1.000	1
Singapore	0.969	3	0.9921	2
Republic of Korea	0.946	4	0.9764	3
United States	1.000	1	0.9449	4–6
Chile	0.884	6	0.8189	16
Malaysia	0.490	46	0.6772	33
Sri Lanka	0.270	81	0.6535	37–38
Peru	0.517	41	0.6299	41

continued on next page

[23] Approximately $107 for training with certificate and $30 without.

Table 17 *continued*

	2004		2014	
	Index	Ranking	Index	Ranking
People's Republic of China	0.405	54–55	0.6063	47–48
Brazil	0.637	24	0.5984	49–50
India	0.568	31	0.5433	57–58
Philippines	0.591	27	0.4083	67–68
Bangladesh	0.081	147	0.3465	98–99–100

Note: Rankings presented here are from the Web Measure Index (United Nations 2004) and Online Service Index (United Nations 2014). The indexes are not comparable, but rankings probably are since both surveys covered 191 countries.

Sources: United Nations. 2004; United Nations. 2014.

Remedial Education

In the Philippines, the alternative learning system (ALS) of the Department of Education (DepEd) gives OSY a chance to complete their primary or secondary education during a 9-month period of instruction that culminates in a final exam. eSkwela is a software platform developed to support the ALS.

During our visits, the most effective implementation of eSkwela was found in the CeC run by the Malvar LGU, not in the two eSkwela centers that are run by the DepEd. In Malvar, a DepEd teacher uses eSkwela to simultaneously train 16 students (Figure 7).

Liliw has only four computers and eSkwela was used, but its reach is limited. The Liliw ALS teachers have identified 20 students who know how to use computers and could, therefore, benefit from using the software. They take turns, four at a time, to use eSkwela in a bus with no air-conditioning.

Teachers for alternative learning systems in Barotac Viejo do not work in a center equipped with computers, but have found a resourceful way to circumvent this shortcoming. The four ALS teachers have laptops, but students do not have access to computers. The eSkwela software is preloaded on the teachers' laptops, and ALS teachers project eSkwela content on a screen as a support to instruction.

There was no third party evaluation of eSkwela, but the project terminal report makes a convincing case that the software has been effective (Tan 2011). At the end of the pilot project in 2011, out of a total 283 paper-based modules used by the ALS, 134 eSkwela modules had been produced by the Commission on Information and Communication Technology (CICT) and certified by the DepEd. The original intent was for the eSkwela software to be made available for online use by anyone, but the end of the CICT pilot coincided with changes in administration and the waning of support for the initiative.

During site visits, teachers and students exposed to eSkwela felt the software was quite helpful. Students valued the structured learning of the ALS program and eSkwela content added variety to the written ALS modules.

Figure 7: Alternative Learning System Training in Malvar Community eCenter using eSkwela Software

Source: Malvar Community eCenter.

English Language Training

In the past decade, the information and communication technology business processing management (IT-BPM) industry has become the Philippines' most dynamic sector. Between 2006 and 2004, the Philippines economy grew at an annual rate equivalent to 5.4% per year. During the same period, the IT-BPM sector grew at about 20% per year, in terms of revenue as well as employment. Today, there are over 1,000 IT-BPM companies in the Philippines. Over 1 million Filipinos work for the industry, and IT and Business Processing Association of the Philippines officials expect that another 160,000 jobs will be created in 2015 (Mercado 2015a).

The IT-BPM industry has started to move to the provinces. Accenture in partnership with Visaya Knowledge Process Outsourcing has established a first rural business process outsourcing (BPO) site in Tanjay City, a fourth class municipality with a population of 79,000. The venture employs 300 people. Working in the provinces reduces industry's labor, technology, recruitment, and operations costs. It is seen by industry as part of their corporate social responsibility (Valenzuela 2015).

English is essential for most IT-BPM industry jobs. Over 90% of the work is done for English-speaking countries. The bulk of industry jobs (83% in 2012) are in call centers (PSA 2014a) where the use of English is indispensable. Out of 100 applications received by the industry, only seven are hired, and an important obstacle is limited English fluency (Mercado 2015a).

Speaking to a gathering of CeC managers in Bacolod on 18 August 2015 (KEC 10), Butch Valenzuela, chief executive officer of Visaya Knowledge Process Outsourcing, explained the challenge for the ICT center community:

> ...Our people are not set in their minds to talk in English, converse in English, ... to be able to strike a complete conversation in English is a problem across the board. If you are able to devise ways by which you could train people to be able to converse naturally, the word is actually, naturally, it would go a long way.

Youngsters are aware of opportunities in the information technology business process outsourcing (IT-BPO) industry and of the importance of English language fluency. All students interviewed during our visits were eager to learn English. We asked Jameson Francisco, a 17-year old Filipino student of Balete Community College: Why do you want to study English? His response: *Makaahon sa hirap* (to overcome poverty).

Aware of the opportunities that the English language opens for youngsters, the Tech4ED portal includes an English language-training program. TESDA also provides English language training courses for Filipinos hired to work overseas.

Agriculture

Some telecenter initiatives have developed marketing information systems (de Silva 2004). These experiences had limited reach because few farmers used telecenters, and because of the high cost of gathering marketing information in a timely fashion.

In Kerala, the Karshakam Information Systems Services and Networking (KISSAN) project developed by the Kerala State Information Technology Mission (KSITM) sought to expand the availability of agriculture information using various means, including the web, television programs, a call center through which the Department of Agriculture staff answered farmer queries, and 10 kiosks run by the agricultural extension service. KISSAN included a marketing module to allow farmers to trade goods and services, but, for lack of use, this application was abandoned (Kiran 2014).

Akshaya e-Kendras were expected to facilitate access to the KISSAN web portal. Kiran 2014 argues that the kind of intermediation that agricultural professionals working in the 10 specialized KISSAN kiosks could make, was unavailable in the Akshaya kiosks, and that this led to low use by Akshaya center users.

n-logue in Madras also offered consultation with an agriculture or veterinary expert on specific days of the week (Figure 8).

In the Philippines, Farmers Information and Technology Services (FITS) centers may have strengthened the ability of extension agents to get information and help farmers. The Agriculture Training Institute supports extension staff and farmers through online courses (http://e-extension.gov.ph/elearning/).

Figure 8: Farmer Videoconferencing with Agricultural Expert, 2005

Source: n-logue.

Health

n-logue had a program of video-consultation with eye doctors in the Aravind Eye Hospital (Jhunjunwala, Ramachandran, and Bandyopadhyay 2004).

In the Philippines, the Mauban center provides private consultation via Skype between cancer patients and an oncologist from the Asian Hospital in Manila. As of mid-2015, 30 had used this service free of charge.

PART V
Rural ICT Center Sustainability, Resilience, and Impact

As time passes, a center's equipment gets old, breakdowns occur, staff leave, and institutional priorities change. Ordinary operation problems become unbearable if a center has not developed a user base.

To understand sustainability and resilience, it is useful to look at the financial performance and closure rates of ICT centers that have been in operation for a while. The experience of our two case studies is examined, but the information available is more complete for Sri Lanka.

Financial Self-Sustainability

Most telecenter programs have had sustainability as an objective. Seldom is this objective defined with precision as to how long the telecenters are expected to remain open.

Philippines

Many Filipino CeCs charge for ancillary services like photocopying, and also a nominal fee (e.g., P7–P10/hour) for use of computers and the internet. All centers regard training as a public service that should be provided free of charge, and all CeCs ultimately rely on public budgetary allocations to pay for expenses not covered by revenues.

Two CeCs, Mina and Mauban, were keen on achieving financial self-sustainability.

Mina center's main expenditure item is photocopying (30% of expenses), but the income earned from this service is more than double the expenses (Table 18). The second and third most important expenditures are salaries (29%) and digital literacy training (24%). From inception in 2011 to end-2014, the loss or implicit subsidy associated with center services amount to only P158,917 (about $3,500).

Table 18: Philippines—Mina Center Revenue and Expense, July 2011–December 2014

CeC Activities	Revenues	Expenditures	Financial Balance
Computer literacy training		233,742	(233,742)
Computer rentals	123,498	107,892	15,606
Photocopying	624,534	292,788	331,746
Printing	11,918	4,793	7,125
Scan	800		800
CD burning	2,082		2,082
Fax	1,070		1,070
Rental of venue	10,200	8,124	2,076
Rental of equipment	18,560	7,822	10,738
ID lamination	710		710
Salaries		284,076	(284,076)
Travel expenses		13,052	(13,052)
Other miscellaneous expenses	28,950	28,950	0
Total	822,322	981,238	(158,917)

CD = compact disc, CeC = community e-center, ID = identification.
Note: The document prepared by Mina Municipality includes a "monetized 1,950 for computer literacy training.
Source: Personal communication with community e-center management staff.

The Mauban center is open to the public 7 days a week. From 2014 to mid-2015, the income earned from rental of computer or internet use at P10/hour, made up about 60% of its revenue (Table 19). The remaining income is derived from entrepreneurial activities such as printing and selling certificates and identification cards. The municipality covers connectivity and electricity costs. Other costs not included in Table 19 are staff salaries and the implicit rental cost of using the venue provided by the municipality.

Table 19: Mauban Center—Revenue and Expense, January 2014–June 2015 (pesos)

Expenses	Amount
Office supplies and materials	139,400
Computer parts and repair	77,291
Printer parts, repair, and replacement	13,313
Other repairs (air conditioning, light bulb, pump, and fans)	10,414
Teambuilding (e.g., rental of cabana)	10,471
PhilCeCNet membership and KEC9	34,650
Renewal of e-learning village website	7,200
Expenditures on income-generating materials	
Supplies for printing vaccination certificates	5,700
ID case and lace for PKM IDs	26,000
Printing household ID stickers for CBMS	5,068
Supplies for printing invitations	21,600
	351,107

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Table 19 *continued*

Income	Amount
Daily sales 2014, January-June 2015 (90% computer time)	303,168
Vaccination certificate	14,750
PKM ID	40,500
CBMS (ID and HH ID stickers)	15,890
Daycare ID	35,035
QTA (souvenir)	50,000
CBMS (HH ID stickers)	35,000
Total income	**494,343**
Income minus expenses considered	**143,237**

CBMS = community-based monitoring system, HH = households, ID = identification, KEC9 = Ninth Knowledge Exchange Conference, PhilCeCNet = Philippine Community eCenter Network, PKM = Pambansang Kaisahan ng mga Magbubukid.

Source: Personal communication with community e-center management staff.

Sri Lanka

The Information and Communication Technology Agency of Sri Lanka encouraged centers to charge service fees. A 2008 survey of 392 *nenasalas* found that all enterprise centers charged service fees, as did about 97% of community-based organization centers and over 90% of religious centers.

More than 10 years have passed since the Sri Lanka project started. Many *nenasalas* have been open for several years. Data from the 2014–2015 M&E survey on centers set up between 2003 and 2011 provide a unique opportunity to assess what happens as centers mature.

The 2014–2015 M&E survey asked center managers if revenues were "sufficient to maintain services and operation."[24] Responses are available from 188 common type *nenasalas* installed in mature centers (i.e., installed in 2003–2011) that were still open in 2014–2015 (Table 20).

The challenge posed by remote and rural locations is evident. Self-sufficiency is achieved by 40% of remote centers, 59% of rural, 72% of semiurban, and 95% urban. Considering all locations jointly, religious centers are at a disadvantage with a sufficiency rate of 53%, compared with 64% for CBO centers, 91% for enterprise centers, and 90% for centers in libraries (Table 20).

[24] The three possible responses given by the questionnaire were: satisfactory sufficient, fairly sufficient, and not sufficient. Here we combine observations that gave the first two responses (i.e., satisfactory sufficient and fairly sufficient) into a single response labeled "sufficient." This is because it would be difficult for operators to distinguish between these two answers. It would be especially hard for religious and library centers (and maybe also community-based organization centers) that often rely on sources other than service revenues to cover expenses. On the other hand, an operator's response to whether center revenues are sufficient or not sufficient to cover expenses and keep services going is credible and easy to grasp.

The disadvantage of religious centers relative to other center types, and of rural as opposed to semiurbanized areas, is palpable. In rural areas, the sufficiency rate of mature religious centers is 44%, compared with 64% for CBO centers, 92% for enterprise centers, and 100% for library centers. In semiurban areas, sufficiency rates are 67% for religious centers, 78% for CBO centers, 75% for enterprise, and 72% for library centers (Table 20).[25]

Table 20: Sri Lanka—Operating Centers Installed in 2003–2011, by Type, Location, and Income Status

	Religious		CBO		Enterprise		Library		All Four	
	Number	%	Number	%	Number	%	Number	%	Number	%
Remote										
Sufficient	1	50	3	38					4	40
Not sufficient	1	50	5	63					6	60
Subtotal	2	100	8	100					10	100
Rural										
Sufficient	22	44	25	64	13	92	3	100	63	59
Not sufficient	29	56	15	36	1	8			45	41
Subtotal	51	100	40	100	14	100	3	100	108	100
Semiurban										
Sufficient	12	67	13	78	6	75	1	50	33	72
Not sufficient	6	33	4	22	2	25	1	50	13	28
Subtotal	18	100	17	100	8	100	2	100	46	100
Urban										
Sufficient	5	100	4	75	9	100	5	100	23	95
Not sufficient	0	0	1	25					1	5
Subtotal	5	100	5	100	9	100	5	100	24	100
All Locations										
Sufficient	40	53	45	64	29	91	9	90	123	65
Not sufficient	36	47	25	36	3	9	1	10	65	35
Total	**76**	**100**	**70**	**100**	**32**	**100**	**9**	**100**	**188**	**100**

CBO = community-based organization.
Sources: ICTA. 2008; ICTA. 2015a; Department of Census and Statistics 2012.

[25] The few observations available for 2003–2011 in centers found in remote or urban environments do not allow for meaningful comparisons.

Resilience

Philippines

Little is known about most of the CeCs established and what has happened over the years. During the early stages of the CeC program, some form of monitoring was done, but a significant reduction in staff curtailed DOST-ICTO ability to monitor progress. The opportunity to learn and improve appears to have been lost. In May 2014, DOST-ICTO carried out a mapping exercise to ascertain the status of CECs. A total of 469 centers established prior to March–May 2013 were identified. Of these, an estimated 316 (67%) were still functioning.

The five showcase centers visited (Malvar, Tayabas City, Mauban, and Carmona in Southern Luzon; and Mina in Western Visayas) have used their computers and facilities in innovative ways. They maintain the equipment in working order. They have imparted digital literacy training to a significant number of people, and provide a variety of other training and service activities, some quite innovative.

Showcase centers have used LGU resources to expand. The main centers in Carmona, Malvar, Mauban, Tayabas City, and Mina have 48, 46, 20, 21, and 27 computers, respectively. Some showcase centers have established satellite centers in their barangays. Carmona has seven satellite centers, Tayabas City has one, and Malvar has three plus a mobile unit (Table 5a). All five showcase centers have received awards (e.g., from PhilCeCNet, Telecentre.org) for outstanding performance. The amount spent on connectivity in these sites was higher than in the other centers. Only one showcase center, Mina, used low bandwidth.

The five Filipino showcase center managers were asked to rate six possible determinants of success on a 5–1 scale. Local government support was unanimously given the highest rating (5). Proximity to schools was very important (5) for three center managers, but less so for Mauban (4) and Mina (3). Tayabas City manager rated the population of the municipality at 5, and this factor was also important for the other four showcase managers who gave it a rating of 4. Other factors considered, i.e., the existence of nearby ICT work opportunities, support from the national government, and support from private businesses, were rated differently, depending on each center's experience.

Sri Lanka

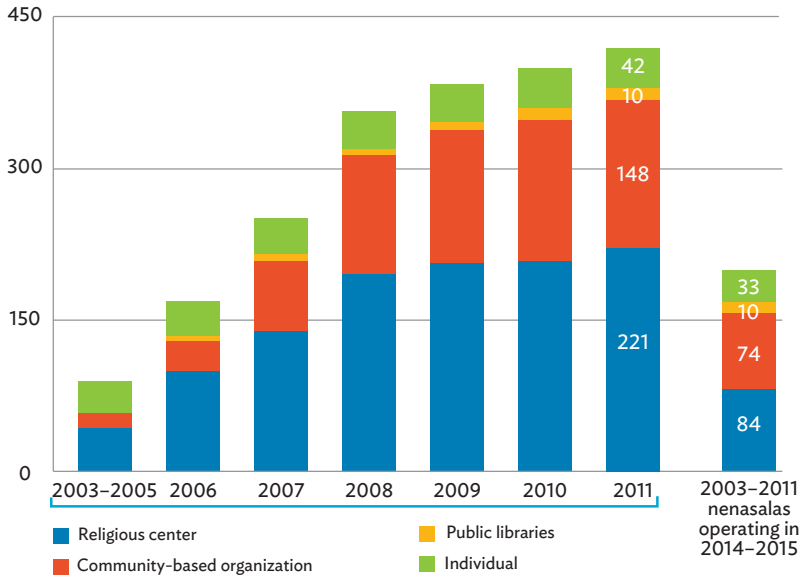
Centers established in 2012–2015 are not helpful because their low closure rates in 2014–2015 reflect their young age, not their ability to overcome operational challenges. Their equipment is fairly new and, until recently, these centers were getting an ICTA start-up grant. Their operators are probably optimistic about viability. They have faced few challenges during their short lifespans and accordingly exhibit low closure rates. Of the 331 centers launched in 2012–2015, only 41 (12%) had closed by the time of the survey. In contrast, 220 (52%) of the 421 centers set up in 2003–2011 were closed. The 421 centers established in 2003–2011 are more useful. They help gauge the effect that the passage of time has on resilience (Table 21).

Table 21: Sri Lanka: Operating and Closed Centers as a Proportion of Installed in 2003–2011, by Type and Location

	Religious		CBO		Enterprise		Library		Common Types	
	Number	%	Number	%	Number	%	Number	%	Number	%
Remote	23		15						38	
Operating	2	9	8	53					10	26
Closed	21	91	7	47					28	74
Rural	167		106		21		3		297	
Operating	56	34	43	41	15	71	3	100	117	39
Closed	111	66	63	59	6	29	0	0	180	61
Semiurban	23		21		10		2		56	
Operating	19	83	17	81	9	90	2	100	47	84
Closed	4	17	4	19	1	10	0	0	9	16
Urban	9		6		10		5		30	
Operating	7	78	6	100	9	90	5	100	27	90
Closed	2	22	0	0	1	10	0	0	3	10
Four locations	222		148		41		10		421	
Operating	84	38	74	50	33	80	10	100	201	48
Closed	138	62	74	50	8	20	0	0	220	52

CBO = community-based organization
Sources: Data from ICTA 2008, 2015a, Department of Census and Statistics 2012.

Figure 9: Cumulative Number of *Nenasalas* Established in 2003–2011, and Number Still Operating in 2014–2015



Note: The seven leftmost columns depict the cumulative number of nenasalas established in 2003–2011, by year of establishment and stacked as if none had closed. The rightmost column shows the number of nenasalas established between 2003 and 2011 that were still operational in 2014–2015.
Source: Author estimates using data from ICTA 2008, ICTA 2015a, and Department of Census and Statistics 2012.

The evolution of Sri Lanka's centers cannot be traced over time because it is not known when centers shut down. Figure 9 illustrates the effect of closures. It shows how the number of centers set up in 2003–2011 would stack up if none had closed, alongside a column with the number still operating in 2014–2015.

Effect of Location and Population on Resilience

In the Philippines, the size of a municipality conditions the demand for ICT center services and, since LGUs manage the centers, LGU size also determines the municipality's willingness and financial capability to fulfill this demand. Municipalities with large populations have larger budgets. Fifty percent of the internal revenue allotment from the national government to LGUs is based on population (National Statistical Coordination Board 2001). Large municipalities also have a deeper tax base, and the average income class of municipalities is higher in larger municipalities (Table 22).

Table 22: Philippines: Distribution of Municipalities by Population, Urban Population, and Income Class

Size of Municipality (population)	Number of Municipalities	Average Income Class	Population		Urban Population	
			Number (million)	%	Number (million)	%
≤20,000	429	4.6	5.5	6	0.9	16
>20,000, ≤40,000	583	3.4	17.0	18	3.4	20
>40,000, ≤60,000	263	2.1	12.9	16	3.3	26
>60,000, ≤80,000	134	1.4	9.3	10	2.4	26
>80,000, ≤100,000	64	1.8	5.7	6	2.1	37
> 100,000	147	1.7	30,1	33	21.4	71
Total (not NCR)	1620	3.1	80.5	87	33.5	42
Metro Manila (NCR)	31	1	11.8	13	11.8	100
Philippines	1,651	3.1	92.3	100	45.4	49

NCR = National Capital Region.
Source: Philippine Statistics Authority. 2010.

Considering all Sri Lankan centers installed in 2003–2015, those in remote and rural areas exhibit higher closure rates (Table 23). Among centers in 2003–2011, of the 38 centers established in remote areas, only 10 (26%) were still open in 2014–2015. In 2003–2011, rural centers fared better: 39% were open. The 86 urbanized centers in 2003–2011 were the most resilient: 74 (86%) were open.

Table 23: Sri Lanka—Number of Centers and Closure Rates of Mature *Nenasalas*, by Population and Location, 2003–2011

Location	Population of Grama Niladhari Division						All Grama Niladhari Sizes	
	≤ 2,000		2,001 ≤ 5,000		> 5,000			
	Number	%	Number	%	Number	%	Number	%
Remote	32	84	6	16	0	0	38	100
Closed	25	89	3	11	0	0	28	100
%	78		50				7	
Rural	203	73	71	26	4	1	278	100
Closed	135	80	33	20	1	1	169	100
%	67		46		25		6	
Urbanized	32	44	34	47	7	10	73	100
Closed	8	67	3	25	1	8	12	100
%	25		9		14		16	
4 locations	267	69	111	29	11	3	389	100
Closed	168	80	39	19	2	1	209	100
%	63		35		18		54	

Note: The Urbanized location row groups together *nenasalas* installed in urban as well as in semiurban areas. The "4 locations" category groups together nenasalas installed in remote, rural, semi-urban, and urban areas.

Sources: ICTA. 2008 and 2015a; Department of Census and Statistics. 2012.

Supply-side constraints (Figure 2, left-hand side [LHS]) partly account for the effect of location on resilience. The proportion of open centers having internet connectivity issues was 30% in remote areas, 25% in rural centers, and 4% in urbanized areas.

Demand constraints were also at play (Figure 2, LHS). Closure rates in 2003–2011 *nenasalas* were high in remote (74%) and rural (61%) areas and low in urbanized areas (16%). Within each location, closure rates decrease as village size increases, i.e., as potential market size rises. For instance, the closure rate of centers in villages with fewer than 2,000 people was 67%, but only 46% in towns with 2,000–5,000 people, and 25% in larger towns (Table 23).

The relationship between population and resilience is not linear. It is doubtful that resilience would be much higher in towns with over 5,000 people, or that small villages with less than 2,000 people will exhibit increasingly higher closure rates as village size decreases. This may be appreciated in Table 24. *Nenasala* closure rates in villages between 1,500 and 2,000 people was 60%, and only slightly higher, 65%, in smaller towns. For very small village sizes, most centers will have insufficient demand, and having a smaller market does not make much difference. At the other end, villages with more than 5,000 people do not

assure a center will have a higher pool of customers. Many people in larger towns will be out of the *nenasala*'s reach, simply because many of them will live far from the center.

Fixing the target village size at appraisal at between 2,000 and 5,000 people was admittedly a conjecture. In hindsight, this turned out to be a reasonable benchmark. Mature centers (established in 2003–2011) in villages of this size had a closure rate of 35%, compared to 63% for centers in smaller villages (Table 24).

Table 24: Sri Lanka—Mature Common Type *Nenasalas* in Four Locations

Distribution	Number Established	Closed % Number Closed		Remote/Rural	
		Number	%	Number	%
≤ 1,000	104	68	65	97	93
1,001 to ≤ 2,000	163	100	61	138	85
1,001 to ≤ 1,500	83	52	63	71	86
1,501 to ≤ 2,000	80	48	60	67	84
2,001 to ≤3,000	82	29	35	57	70
3,001 to ≤4,000	16	5	31	12	75
4,001 to ≤5,000	13	5	38	8	62
> 5,000	11	2	18	4	36

Note: Only *nenasalas* with village population data are considered.
Sources: ICTA. 2008 and 2015a; Department of Census and Statistics. 2012.

Resilience and Center Type in Sri Lanka

All 10 mature library centers were still open in 2014–2015. Thirty-three of the 41 mature enterprise centers (80%) were also resilient. Many more religious and CBO centers were founded in 2003–2011, but these did not fare as well. Only 38% of religious centers and 50% of CBO centers were open in 2014–2015 (Table 21).

The advantage of mature enterprise and library centers is partly due to their auspicious location. Nearly 50% of the 41 mature enterprise centers and 7 of the 10 mature library centers were founded in urbanized areas. But these center types also performed well in less-favorable locations. Of the 24 enterprise and library centers installed in rural communities, 18 (75%) were still open in 2014–2015. In contrast, the survival rate in rural areas of religious centers was 34% and of CBO centers 41% (Table 21).

Program Overreach in Sri Lanka?

The World Bank's 2004 appraisal document proposed to locate 200 telecenters in villages with 2,000–5,000 people. The 2006 change in targets from 200 to 1,000 was substantial. Did this change have an effect on center resilience?

The highest rates of closure were registered among centers established in 2006 (48%), 2007 (51%), and 2008 (66%). This was after targets changed, and a time when the highest number of centers were founded.

Perhaps the change in targets led to a relaxation of grant award selection criteria, particularly for religious and CBO centers. The first religious *nenasalas* were typically founded in large national shrines visited by people from all over Sri Lanka. There are only a few such sites. Once centers in large temples have been established, ICTA could only set up new ones in smaller temples that had a modest pool of potential customers and limited resources. Likewise, the first CBOs chosen to manage *nenasalas* would tend to be the more capable ones.

As for enterprise centers, which were few (Table 25a), nothing similar happened as they were expected to seek commercial viability (Table 25b). They would propose venues with a large pool of prospective customers and most chose urbanized areas, and the few in rural communities would establish their center near a school or a tourist area.

There is also little evidence of overreach in the case of library centers. Although Sri Lanka has over 1,000 libraries (Wanasundera 2012), only 10 *nenasalas* were set up in libraries in 2003–2011 (Table 25a). Libraries became important late in the program: 68 were launched in 2012–2015 (Table 25a).[26] The few library *nenasalas* established in 2003–2011 exhibit low closure rates (Table 25b), mainly because most were located in auspicious urbanized environments.

The original target of 200 centers in villages with 2,000-5,000 people was not reached. Only 111 mature and 74 young centers of the four common types are of that size.[27] Once the higher target was adopted, there was no reason to confine site selection to the original village size range. It was easier to concentrate implementation in one geographically contiguous area at a time. It would have been costlier to search for villages of the right size in a wider area.

[26] The reason why few libraries were established in the early stages of the program appears to have been politically motivated. Back in 2008, while working as World Bank consultant, Francisco J. Proenza proposed establishing *nenasalas* in public libraries, but was told this was not advisable because public library administration was under the control of the opposition party.

[27] The estimate of 111 centers in villages between 2,000 and 5,000 people is shown in Table 16 for common type centers founded in 2003–2011. The number of young (2012–2014) common type centers of this village size range was 74. The calculation for this estimate is not shown. As we could not identify the population of 102 out of the 884 centers in the monitoring and evaluation database (ICTA 2015), the number of centers in each village size category is accordingly underestimated.

Table 25a: Sri Lanka—Number of Common Centers by Type, Location, and Establishment Period

	2003–2011				2012–2015				All Dated with Location			
	Remote	Rural	Urbanized	Total	Remote	Rural	Urbanized	Total	Remote	Rural	Urbanized	Total
Religious	23	167	32	222	17	103	33	153	40	270	65	375
	5%	40%	8%	53%	5%	31%	10%	46%	5%	36%	9%	50%
Community-based organization	15	106	27	148	9	80	20	109	24	186	47	257
	4%	25%	6%	35%	3%	24%	6%	33%	3%	25%	6%	34%
Enterprise	0	21	20	41	0	0	1	1	0	21	21	42
	0%	5%	5%	10%	0%	0%	0%	0%	0%	3%	3%	6%
Libraries	0	3	7	10	2	41	25	68	2	44	32	78
	0%	1%	2%	2%	1%	12%	8%	21%	0%	6%	4%	10%
Four types	38	297	86	421	28	224	79	331	66	521	165	752
%	9%	71%	20%	100%	8%	68%	24%	100%	9%	69%	22%	100%

Note: Percentages for each location–type combination are calculated as a proportion of the total number of centers established for the period.
Sources: ICTA. 2008; ICTA. 2015a; Department of Census and Statistics. 2012.

Table 25b: Sri Lanka—Closure Rates of Common Centers by Type, Location, and Establishment Period (%)

	2003–2011				2012–2015				All Dated with Location			
	Remote	Rural	Urbanized	Total	Remote	Rural	Urbanized	Total	Remote	Rural	Urbanized	Total
Religious	87	66	19	62	12	14	12	13	58	46	15	42
Community-based organization	47	59	15	50	11	18	10	16	33	41	13	35
Enterprise		29	10	20			0	0		29	10	19
Libraries		0	0	0	50	2	8	6	50	2	6	5
Four types	71	61	14	52	14	13	10	12	48	40	12	35

Note: For each type–location–period combination, closure rates are calculated as the number of closed centers divided by the number established.
Source: Adapted from ICTA. 2015b.

Impact of Sri Lanka's *Nenasala* Program

Assessing impact requires measuring changes at the user level as well as programwide. ICTA surveys of users and operators give a good picture of user level benefits in Sri Lanka. Ascertaining program benefits is a bigger challenge.

User Perceptions

Two surveys were conducted in Sri Lanka in 2013, one of 210 operators and another one of 1,260 users of these centers. About 79% of sample centers had been in operation for at least 3 years (GreenTech 2013, 24). Ninety-eight percent (98%) of all users were very satisfied or satisfied with center services (Table 26).

The main contribution of the program has been digital literacy training, which is rated as *very high* or *high* by 84% of respondents. About 35% of users now access government services online (Table 26). Impact on income or employment has been minimal. Notable specific outcomes include an increase in the use of e-mail, Skype, and fax, and enhanced computer skills (Table 27).

Table 26: Sri Lanka—User Perceptions of Impact

Questions or Indicator	%
Level of satisfaction with *nenasala* services	
Highly satisfied	38
Satisfied	60
Less satisfied	2
What was the contribution of *nenasala* toward increasing your information and communication technology literacy?	
Very high	32.3
High	51.5
Moderate	11.9
Negligible	4.3
Total	100
	% yes
Do you use online facilities to access government information and services from *nenasala*?	35
Were you able to increase your income by using any *nenasala* services?	14
Did you or any member of your family secure employment as a result of *nenasala* training?	3
Do you use online banking and private sector facilities from *nenasala*?	2

Note: Survey of 1,260 users of 210 *nenasalas*.
Source: GreenTech. 2013. pp. 27, 29–30.

Table 27: Sri Lanka—Important Outcomes of *Nenasala* Program According to Users

		%
1	Increased use of e-mail, Skype, fax	76
2	Enhanced computer skills, e.g., Word processing	54
3	Increased use of internet for entertainment	30
4	Expanded social, political, and professional network	27
5	Increased accessing of latest education information, e.g., e-learning	21
6	Easy access to latest news and information	18
7	Increased use of online government service	15
8	Use of new information and communication technology tools to improve business, e.g., Photoshop	6
9	Making online purchase e-commerce	5
10	Adoption of new technologies obtained from internet to increase income	4
11	Use of online banking	2
12	Health information and telemedicine	1

Source: GreenTech. 2013. p. 29.

Operator Assessments

Table 28 presents the assessments of operators surveyed in 2014–2015 regarding the extent to which their *nenasalas* had achieved six program objectives. Operator responses corroborate user perceptions, leaving little doubt that the *nenasalas* expanded access to ICT (79% achieved either fully or partially) and digital literacy (74%). The impact on amplifying information on employment opportunities was notable (30%). According to operators, the program also helped expand government service delivery but not much (17%), and its impact on economic activities and access to private sector and banking was negligible.

Table 28: Sri Lanka—Operator Assessment of Achievement of *Nenasala* Program Objectives

Program Objectives	Fully		Partially		Little		Very Little		Not at All		Respondents	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Provide affordable information and communication technology service	160	40	157	39	63	16	15	4	3	1	398	100
Increase computer literacy	147	37	148	37	81	20	17	4	5	1	398	100
Enable access to government information and services	20	5	47	12	87	22	68	17	176	44	398	100
Increase economic activities	8	2	27	7	72	18	48	12	243	61	398	100
Provide access to private sector and online banking	11	3	7	2	10	3	27	7	343	86	398	100
Provide employment information	47	12	72	18	77	20	51	13	147	37	394	100

Source: ICTA. 2015a.

Impact and Closure Rates

The implicit view of sustainability is that every telecenter must live on forever. This is unrealistic because ordinary businesses fail all the time. An overall rate of closure of 52% for *nenasalas* established in 2003–2011 (Table 21) is not high when compared with the rate of small business failures in Sri Lanka and elsewhere. The United States Office of Advocacy of the Small Business Administration (2014) estimates that "about half of all new establishments survive 5 years or more and about one-third survive 10 years or more." In Sri Lanka, the business failure rate is reportedly 45% (Lussier, Bandara, and Marom 2016).

That 48% of the 2003–2011 centers were still open in 2014–2015, should be considered a success, particularly since most *nenasalas* were founded in remote and rural areas, environments that are resistant to commercial viability.

For a complete picture regarding impact, what happened to the centers that closed should be known. Many users acquire ICT equipment after using the *nenasala*. GreenTech (2013, 28) estimates that 36% of users purchase a computer after visiting a *nenasala*, 5.9% purchase a tablet PC, 3% purchase a smartphone, and 14% set up home internet connections.

Worldwide, public access venues are often a first step to home use of computers and the internet. Increased home use also often leads to the demise of cybercafés as former sponsors stay home using their own equipment instead of shared facilities (Proenza 2015). As painful as this might be for operators forced to shut down, this is a consequence of their success enabling people to learn, use, and value ICT from home or other venues.

We have no way of knowing if the *nenasala*s that closed left behind lasting benefits. Did a significant number of users learn how to use ICT while the now-closed centers were open? How long these centers were open or whether they provided valuable services while open are not known.

Some waste of resources probably occurred. It might have been avoided if fewer centers had been established, particularly in temples or CBOs in small villages, but this is easier said than done. ICTA developed a remarkably efficient methodology for establishing and supporting *nenasalas*. It had to work within guidelines set by political leaders, who fully supported the program but also set ambitious targets.

PART VI
Recommendations: ICT Centers for Rural Development

The following recommendations are founded on the record of performance of rural ICT center programs worldwide, especially in the Philippines and Sri Lanka. They are directed at governments contemplating or running rural ICT center programs, and at donors considering supporting such programs.

Should Rural ICT Center Programs be Supported?

ICT centers are valuable to governments and to the people they serve. They are seen as harbingers of modernity and progress. Sri Lanka's *nenasala* program has shown it is possible to implement a rural ICT center program with efficacy, and to make an impact in rural people's lives by enhancing digital inclusion. International donors can make a contribution in supporting these worthy aspirations, as the World Bank did with the e-Sri Lanka project.

Sustainability

Sustainability is a common concern. The concern is valid, but often cast in misguided terms. ICT center programs, by design, aim to serve a population and communities that cannot be served on a purely commercial basis, where the commercial sector cannot operate sustainably.

The objective of these programs is to introduce a service, in the expectation that the rural population learns to use ICT tools and starts using them like modern societies everywhere do today. This does not require that an ICT center established by the program exist forever. The program's aim should be for the centers it sponsors to generate long-lasting benefits while it is open. Not every center set up by Sri Lanka's program achieved this. But many did and, where they did, the *nenasalas* left long-lasting benefits among the people it affected.

Risks

The main risks are insufficient service demand, proclivity for key decisions to become politicized, and rapid technological change.

Rural ICT center programs must navigate a delicate balancing act. ICT centers should not be promoted using government subsidies in urban areas already served by commercial

ventures. They should instead be set up in underserved villages that are not too small, i.e., where there is a sufficiently large pool of potential customers in the vicinity of the center.

Finding such sites is a challenge. In Sri Lanka, it was made more onerous by the President's decision to increase the target number of *nenasalas* from 200 to 1,000. Technical considerations regarding the potential demand that could be served in small villages were disregarded. The evidence suggests the program paid dearly in terms of high closure rates and wasted resources.

The dream of blanketing a country with telecenters is not unique to Sri Lanka. It is a common political aspiration. Since 2011, the Government of the Philippines has wanted to set up CeCs in every one of its more than 42,000 barangays (DOST-ICTO 2011). The Government of Bangladesh's Access to Information (a2i) Program has set up 4,516 union information and service centers to serve practically all of the country's union *parishads* (http://www.a2i.pmo.gov.bd). The Government of India claims that there are presently 100,000 common service centers and plans to set up an additional 150,000 (https://csc.gov.in).

In 2004, when Sri Lanka's telecenter program was launched, mobile phone penetration was barely 11%. By 2014, it had reached 103%. The demand for access to communication using telecenters fell during this period, affecting such services as fax and VOIP. Sri Lanka's approach providing services that can be frequently upgraded, such as skills development, are less susceptible to technological obsolescence.

Center Type

In the Philippines, some CeCs founded with national government funding and managed by LGUs have done well. Although not meant to be self-sustainable, they have made a positive impact on the population, especially imparting digital literacy training, as well as developing a blended learning remedial education program to help OSYs. Successful centers are located in relatively large towns and are generally well resourced. There is unfortunately little information about what happened to many other centers established.

Sri Lanka experimented with four different center types, each of which has positive and negative features.

- Enterprise centers proved to be the most resilient centers. They had the largest number of visitors and the lowest closure rates. Unfortunately, only 41 were established in 2003–2011 and only 25 (61%) were located in rural areas (Table 22), so it is not clear whether they would have fared as well if they had been promoted in larger numbers to serve rural communities. Also, for-profit centers and cybercafés tend to create environments that favor young men but discourage female visitors (Proenza 2015).
- Only 10 *nenasalas* were set up in Sri Lankan libraries in 2003–2011, seven of them in urbanized environments (Table 22). These library centers proved resilient. All 10 are still operating. However, they do not seem to be having as much impact as

other center types. The average number of library center visitors (3 months prior to survey) was only 177, compared with 573 for the other center types combined. Chile's BiblioRedes centers fared better, suggesting that a concerted effort to assure impact is necessary (Salas et al. 2005, Roman and Guerrero 2005).

- CBOs ran 148 of the *nenasalas* set up in 2003–2011 (Table 22). By 2014–2015, 74 (50%) were still open. This is a reasonably successful record, considering that most of these centers had been weaned of subsidies and that over two-thirds (51) operated in inauspicious remote or rural environments.
- Religious *nenasalas* fared poorly. Of 222 religious centers founded in 2003–2011, only 84 (38%) were still open in 2014–2015 (Table 23). In principle, these centers should have done as well or better as other centers sited in service institutions like libraries. Their poor performance may have been due to overly ambitious program targets, which fell primarily on religious centers to fulfill.

Location

Serving all rural people may be a lofty and even popular objective, but grand schemes that propose to blanket a country with ICT centers with little regard for potential demand should be avoided. Choosing to set up ICT centers in remote locations or small villages courts disappointment and failure.

The number of people that will use a given ICT center regularly is circumscribed to a relatively small catchment radius of around 3 kilometers, with variations depending on population density and transportation facilities. For program planning purposes, a minimum-sized village is needed to ensure there is sufficient potential demand for the centers. Future rural ICT center programs are unlikely to be very large, simply because rural areas generally have only a limited number of suitably sized towns.

Services

Access to Computers and the Internet

Access to computers and the internet should not be the exclusive or even primary function of ICT centers. Nevertheless, access should be provided as a service, to enable novice ICT users practice their newly acquired skills, as a supplementary source of income to centers that charge fees, and as a complementary public service as is the case of ICT centers housed in post offices and libraries. Providing rural access to computers and the internet through centers that adopt hassle-free environments encourages gender balance, and can serve as models to be adopted by cybercafés.

Basic Information and Communication Technology Skills Training

The importance of expanding digital literacy for young people is widely recognized, for example, by the Organisation for Economic Co-operation and Development in a worldwide

survey of the impact of ICT in education (Organisation for Economic Co-operation and Development 2015, 15):

> As long as computers and the internet continue to have a central role in our personal and professional lives, students who have not acquired basic skills in reading, writing and navigating through a digital landscape will find themselves unable to participate fully in the economic, social, and cultural life around them.

During his presentation at KEC 10, Butch Valenzuela, president and chief executive officer of Visaya Knowledge Process Outsourcing, explained that smartphones were not enough. To work in the IT-BPO industry, basic computer skills are necessary.

Evidence of demand for ICT skills comes up again and again. Alejandro, a young cybercafé user in a low-income neighborhood of Buenos Aires, explains (Benítez Larghi et al. 2015):

> Knowing how to use a PC is always useful. For whatever job, they ask if you have computer skills, just in case. Even for a street-sweeping job they ask for computer skills. I don't know, maybe they ask about a computerized machine. . . a computerized broom.

Basic ICT skills training is a potentially high-impact intervention that can empower disenfranchised peoples. Curious interest in acquiring ICT skills does not become willingness to pay for training, particularly among older adults and rural people, because of information asymmetries. Nonusers do not always know the benefits they might derive from such skills. Some encouragement and the opportunity to try out the tools are required. This is an area where government intervention is justified on both efficiency and equity grounds.

Remedial Education

The Philippines' implementation of eSkwela shows how to combine the development of a high-quality educational content offsite with on-site training of OSY. ICT centers can be used to provide a broad range of remedial education courses.

Other arrangements are being used. TESDA centers in the Philippines, for example, are not open to the public at large. Their centers are dedicated to providing skills training to its trainees.

Service aggregation can enhance impact. As in Malvar CeC in the Philippines, the same center can provide a range of remedial education courses, along with other services that are important for rural populations; namely, e-government services, basic ICT skills training, and access to computers and the internet.

English Language Training

The need for English language training is patent, in India, the Philippines, Sri Lanka, and other Asian countries that want to expand their IT-BPO sector.

Training apps like Duolingo are available to self-learners. What seems to be missing is a program to help rural youngsters get started and accompanies them through the early stages of English language training. This form of remedial education is worth pursuing in connection with a rural ICT center initiative.

e-Government

To use ICT centers as a government service delivery platform is sensible, but there are limitations on how far such a strategy can go. First, using ICT centers does little to resolve the process reengineering usually needed to implement online services. As seen in Akshaya, and to some extent also in Sri Lanka, the government's limited ability to make the necessary changes happen can undermine such efforts. Second, a citizen may use many government services, but each service will be used only occasionally. He or she is unlikely to become a regular ICT center user based solely on e-government. And the number of citizens that will use a given ICT center regularly is circumscribed to a relatively small catchment radius. It is doubtful that an ICT center can achieve financial self-sustainability solely on e-government service fees.

Agriculture

Jensen (2007) has shown that coordination between fisherfolk and traders using mobiles lowered price variability and reduced mismatches between supply and demand that occurred prior to the expansion of mobile phone coverage along the coast of Kerala. Some experimentation with market information system applications is under way, but the evidence on their impact is inconclusive. Presently, the most effective way to improve agricultural markets appears to be to expand mobile phone coverage. Rural ICT centers can, however, be useful as training venues where farmers can learn to search for information and learn on their own.

Gender Balance

There are notable differences in gender balance by venue type. Cybercafés often cater to young men's demand for gaming and pornography, creating a hostile environment for women (Proenza 2015).

Simple design decisions can facilitate the achievement of gender balance in ICT centers and even in cybercafés. In Akshaya, computer terminals were situated so that they were visible to the operator and to other users (Mukerji 2013,77). The same strategy is used in Chile's BiblioRedes, where visitors are expected to behave in socially acceptable manners, and in Chile's Infocentros, where there are no partitions between workstations (Klein 2011).

Service Fees

Programs that assign high priority to self-sustainability should charge for services. In Sri Lanka, many center services were financially resilient precisely because they charged service fees.

Some programs are based in institutions that, by tradition and convenience, do not charge for services. The BiblioRedes program and large showcase CeCs in the Philippines have shown that this can be a high-impact approach. In these cases, it is important to specify beforehand where the funds to maintain the centers will be coming from. A strategy is also needed to stimulate demand. Otherwise, you run the risk of setting up the centers and maintaining them only to serve a few users.

Time-Limited Subsidies

Malaysia's PPP approach to ICT center management, using 5-year contracts to run and staff the centers, limits the extent and duration of subsidies. This model can be applied in other countries to service small, financially weak rural communities.

Digital Inclusion and the Future of Rural ICT Centers

Why do governments launch new rural ICT center initiatives and expand existing ones? Partly because of politics; but if they are popular with politicians it is because people like ICT centers. When they function properly, ICT centers give rural youngsters hope and access to opportunities they never had before.

Rural ICT centers can help achieve the ambitious agenda set out by the Sustainable Development Goals (Earth Institute 2016). To do so, they must be seen as technology hubs, as places where rural young people can learn ICT skills and learn how to learn on their own, and as catalysts for digital inclusion in rural areas. Their role is to amplify citizen access to a variety of digital services, most importantly to skills that enable young people to get rewarding jobs and participate in the process of innovation that ICT makes possible.

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Public ICT Center for Rural Development
Inclusiveness, Sustainability, and Impact

Cybercafés play a key role in providing internet access to developing countries. This paper examines the challenges of internet connectivity in rural and remote areas and how cybercafés now serve as a model behind government efforts to set up telecenters to extend internet connectivity to rural communities. Find out why telecenters remain popular as highlighted in two case studies: a government run initiative in the Philippines and a public–private partnership in Sri Lanka.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to a large share of the world's poor. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

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