Incorporating Predictors of Success for Telecenter Projects: A Qualitative Analysis of 17 Developing Countries

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Abstract

Telecenters have become increasingly popular over the past decade as a development tool. Although there remains a large amount of literature describing telecenter projects and providing recommendations for how new projects should proceed, there remains a paucity of data discussing why some telecenters succeed and some fail. More specifically, researchers have not set out to analyze why certain telecenters do not exhibit success indicators recommended in the literature. This research uses grounded theory to analyze telecenters in 17 countries to better understand the conditions that may lead to telecenter success or failure. Using the current literature, the research provides a condensed list of possible key predictors of success for telecenter projects to effectively reach their target populations and uses this list as a structure to present findings from the qualitative analysis. Results indicate that although the analyses seem to generally support the proposed indicators of success, the lack of consistency in data across countries make understanding success in the countries difficult. This research leads to specific questions researchers should ask to better understand how success looks in different venues and why some countries exhibit possible indicators of success while others do not.

Introduction

Over the past two decades, the use of information and communication technologies (ICT) as a development tool has increased dramatically. Of the fastest growing methods for providing ICT services to underserved communities is the telecenter, which provides free or subsidized public access to ICT services. Despite its growing popularity, unlike more "traditional" development projects there is a paucity of empirical literature that provide frameworks or toolkits for telecenter projects. By combining the lessons and recommendations that emerge from existing ICT4D and telecenter literature, this paper provides a condensed list of possible key predictors of success for telecenter projects to effectively reach their target populations. This research then uses a grounded theory method to analyze reports of telecenter environments across 17 countries to understand how those countries look in terms of the key predictors of success. The goal of this research is not to present specific instructions for how development practitioners should implement telecenter projects. Rather, it serves to provide a better conceptual foundation to understand the challenges telecenters face.

This paper is composed of four sections. Section 1 of this paper provides a review of the literature related to telecenter projects. It begins by presenting useful definitions and then discusses the history of ICT as a development tool to give context for the implementation of telecenters. The literature review then lays out some of the issues involved with monitoring and evaluating ICT and telecenter projects. Section 1 closes by providing a discussion of the current lessons learned from ICT and telecenter projects and supplying a suggested list of key predictors of success for telecenter projects. Section 2 describes the methodology for evaluating ICT4D projects across countries and provides a brief overview of the countries selected for this project.

It then describes the qualitative method used for the analysis. Section 3 discusses the findings from the qualitative analysis. Section 4 summarizes the findings in the paper and provides recommendations for further research.

1. Literature Review

Definitions

A commonly used definition of a *telecenter*[1] by researchers is from Wikipedia ("Telecentre" 2008):[2]

> A telecentre is a public place where people can access computers, the Internet, and other digital technologies that enable people to gather information, create, learn, and communicate with others while they develop essential 21st-century digital skills. While each telecentre is different, their common focus is on the use of digital technologies to support community, economic, educational, and social development—reducing isolation, bridging the digital divide, promoting health issues, creating economic opportunities, and reaching out to youth for example. Telecentres exist in almost every country, although they sometimes go by different names (e.g., village knowledge centers, infocenters, community technology centers, community multimedia centers, multipurpose community telecentres, Common/Citizen Service Centres, or school-based telecentres).

How *information and communication technology (ICT)* is defined is constantly changing as new technologies evolve and services are created. ICT can include a range of things from newspapers to landlines (Toyama et al. 2007). From a practical perspective useful to this research, the definition of ICTs used at the 2006 International Conference on Information and Communication Technologies and Development works best. Conference organizers defined ICT as "computing devices, technologies for voice and data connectivity, and the Internet, and related technologies" (Toyama et al. 2007). These devices are varied and include traditional personal computers (PCs); cheap, functionally-ubiquitous PCs (see, for example, Pontin 2005); PDAs and other miniature computing devices (Fonseca and Pal 2004), and mobile and landline phones.

[1] Throughout this paper, unless referencing a proper name or quotation, the American spelling of telecenter is used.
[2] Works that have utilized this definition include Fillip and Foote (2007). The data collected in this paper also used a research methodology that incorporated this Wikipedia definition.

ICTs and development

The telecenter has been implemented in development projects for the past two decades, most notably with a boom in the past ten years.[3] The growth of telecenter popularity has occurred as the use of information and communication technologies (ICT) as a development tool has increased in popularity with governments, NGOs, the private sector, and other entities doing development work (Fillip and Foote 2007). To better understand the role of telecenters in development, it is first important to understand the foundations behind ICT as a development tool.

Since the Internet began transforming how everything from business to academics to how personal correspondence was carried out, so did it transform the way development practitioners viewed ICT as a means of poverty alleviation (Standage 1998). By allowing information to be stored and shared more easily and cheaply, transaction costs were reduced and the promise of increased educational opportunities and the provision of health and market information gave development practitioners new visions of helping marginalized communities emerge from poverty (Cecchini and Scott 2003). Although the idea of using ICT for development is not a new one, many believed the Internet offered unprecedented "opportunities for developing countries to break out of the cycle of poverty and join the new global economy" (McNamara 2003). The promise of ICT as a means for poverty reduction was reflected in the 2001 United Nation's Human Development Report, which asserted that technological innovation is essential for

[3] Due to issues tracking the number of telecenters worldwide there are no statistics available providing current or past estimates of telecenter numbers worldwide. However, the rapid and broad growth of telecenters it is agreed upon in the literature (e.g., telecenter.org 2008, Fillip and Foote 2007).

achieving the Millennium Development Goals (UNDP 2001) and singled out ICT as one of the two primary forms of technology that can play a key role in development.[4]

Over the past decade much has been written about the positive effects ICTs can have on the world's poor. One positive outcome is increased income. Examples of how this is accomplished include providing market price information and reducing the need for middlemen (Eggleston 2002; Abraham 2006). ICTs also benefit the poor when implemented in educational settings, such as the use of multimedia applications (Brewer et al. 2005) and radio and television for literacy and math training (Kenny 2001). Healthcare is also made more affordable with ICTs (Kuriyan, Ray, and Toyama 2008) and the knowledge, practices, and attitudes of healthcare workers can be improved (Kenny 2001). By reducing the distance between remote communities and service providers, ICTs can amplify the voices of the poor and make their needs more known (Kenny 2001), thereby empowering them (Arunachalam 2002) and reducing their vulnerabilities (Kenny 2001)

ICTs are not, however, a stand-alone panacea for development. Some studies have indicated lack of government support, ill-conceived projects (Dragon 2001), and low market demand have limited the impact of ICTs on development (e.g., Dragon 2001, Proenza 2001, Heeks 2002). In addition, many ICT for development (ICT4D) projects have not been sustainable in the long-run (McNamara 2003), often because they have either not been accompanied by, or failed to generate, "the broader economic and social changes that would lead to sustainable demand for those ICT goods or services, especially relative to other demands on scarce resources" (McNamara 2003).

[4] The other form of technology singled out in the report was biotechnology.

There are various methods development practitioners use to deliver ICT, including: constructing telelcenters, kiosks, and cyber cafes (e.g., Kiri and Menon 2006); and implementing ICT devices into current infrastructure such as libraries and post offices (e.g., BMGF 2006). There have even been such innovative programs as boat-based computing centers that travel from village to village along the rivers in Bangladesh (ALA 2005) and donkey drawn electro-communication library carts in Zimbabwe (IFLA 2002). The choice of delivery system depends upon the type of project (for example, the choice between providing nurses with PDAs or endowing the public with computing facilities), the size of the project, and the assumptions by development practitioners of how people will use ICT.

Stemming from a movement in Europe in the 1980s in which community access points known as telecottages brought computer technology to the underserved (Kumar 2004), telecenters are now arguably the most common type of ICT4D project. As was defined previously, telecenters are public facilities that generally help underserved communities access information by providing access to the Internet and other communication technologies like telephones. They generally provide services at low or no cost and, unlike their private counterparts, cybercafés, telecenters all "have a common goal: to serve the community and support local development" (UNCTAD 2007).

Almost every country has telecenters and, like the diverse environments in which telecenters are built, so are the services offered and the client uses. Telecenters serve communities in the following ways and, depending on the location, can emphasize certain services more than others:

- Many telecenters, in one form or another, serve the role of a **community center**. At such venues clients not only access information using ICTs but also talk, share experiences, and engage in community activities. Telecenters can be placed in existing community centers (like libraries) or can be built as separate facilities, physically distinct from existing centers.
- Telecenters also serve as places for **accessing technology services**. These services may include printing, faxing, using the telephone, making photocopies, accessing the Internet, accounting, and word processing.
- Telecenters also serve as **training and education centers**. Many people come to telecenter trainings to gain skills that will allow them to find jobs. Courses taught at telecenters may include basic computer literacy, English, or specific software packages such as Microsoft Office. Many telecenters provide certificates to the students upon completion of the courses.
- At telecenters, people can also find **employment and business services.** People may be able to search online for jobs, obtain up-to-date prices for goods to buy and sell, pay bills, make business transactions, and obtain insurance. Physical access to these services is provided where there would otherwise be none (Toyama et al. 2004).

All of these services provide a variety of ways people can incorporate telecenters into their daily lives and depending upon the context, telecenters can provide different mixes of services (Fillip and Foote 2007).

Monitoring and Evaluating ICT4D Projects

Evaluating telecenter and other ICT4D projects is difficult as there is little agreement in the literature as to how a "successful" project looks and is defined. The contributions of ICT to

development have shown themselves to be unpredictable and difficult to measure in the long-term (Myers 2004, Ramirez 2007). Success can be measured more easily in terms of access and use, but more efficient and presumably more meaningful measures of success such as improved human capacity or income are more difficult to demonstrate with ICT. Even with simple measures of access, as was discussed in Strover et al. (2004) after conducting a large-scale study of public access venues (in which category telecenters fall) in Texas:

> The experiences of these 36 communities substantially expand the usual notion of public access, and raise the fundamental question of how to define the "success" of public access. There are no authorities on this question even though the commonplace notion of success might refer to numbers of users who visit such sites. Is success a matter of meeting overall demand, or meeting specialized demand?

Other groups have also attempted to provide methods for measuring the success of ICT venues. Cabanero-Verosa (2003) created a list of numerical indicators for communications projects, including number of communications disseminated, percentage of target audience exposed to program messages, and percentage of target audience who engage in recommended practices. Park et al. (2005) proposed indicators and questions to measure the success of social change communications. Such indicators include measuring the expansion in public and private dialogue and debate; increases in the accuracy of information people share in dialogue and debate; and support from the people centrally affected by issue(s) voicing their perspective in the debate and dialogue. These indicators, and many others in the literature, are useful only for specific types of projects and, therefore, cannot be used as a general tool to measure the success of ICT projects.

The difficulty measuring the success of telecenter and ICT4D projects has led to limited literature on methods for evaluation. It has also been argued that the actual impact of ICT on

bridging the digital divide is difficult to forecast (Fink and Kenny 2003). As such, although there have been numerous ICT projects and initiatives over the past decade geared at decreasing poverty, there remains little conclusive evidence describing "what works". As McNamara (2003) explains, the lack of rigorous knowledge providing a framework for maximizing the impact of ICT projects can be partially attributed to the lack of detailed evaluations of ICT projects, despite the proliferation of success stories. McNamara points out that although the data available about the spread of ICTs in developing countries has increased, there remains little hard evidence about the "sustained impact of these ICTs on poverty reduction and economic growth in those countries."

Furthermore, because there are so many entities (including those governmental and non-governmental) using ICTs for foster development, it is difficult to gather systematic and reliable information on the size and scope of ICT initiatives in developing countries. This stems from a large percentage of ICT spending being embedded within other projects. With these other projects located in sectors as varied as health, education, trade, private sector development, and public sector reform, it is difficult for the impact of ICT components to be studied separately from the larger projects in which they are implemented in ways that could increase the overall understanding of the impact of ICTs. Additionally, it is equally difficult to compile detailed data and analyses on the pre-Internet experience with ICTs and development (McNamara 2003).

Evaluating telecenter-specific projects has proven just as elusive. Rothenberg-Aalami and Pal (2005) note two primary problems with evaluating telecenter projects. First, since telecenters are often implemented in a realm that lies between "entrepreneurial ventures and development

projects", the vast amount of qualitative and quantitative indicators needed for assessment can prove unwieldy. Secondly, the impacts of telecenters occur not just at the individual level but also the community, regional, national, and international levels, resulting in a very broad lens needed for analysis.

Toolkits and Recommendations

In general, there have been very few empirical studies analyzing the outcomes of telecenter projects. Not surprisingly, this and the difficulty of evaluating ICT projects has lead to a dearth of toolkits for ICT development. One of the more robust tools was provided by InfoDev, a World Bank program in 2003. The authors of the study created a list of nine recommendations based on lessons learned from their 17 pilot programs (Bachelor et al. 2003). Their findings are provided in Table 1 below.

Table 1. InfoDev Recommendations for ICT4D Programs	
1.	View information and communication technology as a tool to enhance current projects, activities, and capacities, not as an end in itself.
2.	At the outset of a project, involve the local community in deciding what information needs to be communicated and the most appropriate technology for doing so. Encourage the communities to make these decisions in light of local cultural and social norms.
3.	Have the local community discuss how the introduction of technology will affect current power balances in the community. Such discussions should be held over the life of the project, not necessarily at the start, when the community does not understand the capabilities of the technology.
4.	Involve the community in continuous discussions about how the project is progressing and what adaptations are required.
5.	Develop appropriate and timely content for target groups.
6.	Utilize locally available technology. Don't be afraid of keeping it simple.
7.	Link ICT projects to public and private institutions. Assess potential partners in light of project objectives.
8.	Be certain that the infrastructure required by project technology is in place, or in the process of being put in place.
9.	Incorporate plans for monitoring, evaluation, and impact assessment into the project.

There has also been a limited amount of writing by academics and practitioners specifically describing tools for implementing telecenter projects (e.g., Harris 2001; Wellenius 2003; Maham 2006; Fillip and Foote 2007). One useful toolkit was produced in 2002 by the International Development Research Center (IDRC) and provided ten lessons learned from the study of community telecenter projects in Latin America (Gomez 2002). The lessons provided in the study are summarized in Table 2 below.

Table 2. Gomez (2002) Lessons from Telecenter Projects in Latin America	
1.	**Diversity.** Community telecentres must respond to specific conditions, to the local culture, and to the needs of the communities in which they operate. Users also have differing interests and experiences.
2.	**Support for local processes.** Community telecentres operate within the local setting of their communities, and help to resolve concrete local problems.
3.	**Their impact extends beyond the local sphere.** Community telecentres have a scope that is far more than local, and they can influence national connectivity agendas and the formulation of national and worldwide policies.
4.	**Sustainability involves more than economics.** Although it is important for community telecentres to earn their own revenues and not to depend on outside funding, they must also address the challenge of their political, technological and social sustainability.
5.	**Operators are a strategic resource.** If community telecentres are to be socially relevant, their operators must be more than computer technicians – they must know how to promote the community, facilitate user groups, identify problems and opportunities, and manage information.
6.	**Continuous training is key.** Operators and users alike need continuous training to support their use and appropriation of the tools offered by community telecentres. Groups with special needs such as youth, illiterates or indigenous groups require particular attention and dedication.
7.	**Gender relations are important.** Men and women have differing needs when it comes to using the services of community telecentres.
8.	**Community telecenters strengthen self-esteem.** People can strengthen their self-esteem, their confidence and their faith in the future of their communities through the use and appropriation of community telecentres.
9.	**Monitoring and evaluation are learning tools.** Documenting and systematizing experiences with local telecentres and learning from those elsewhere can enhance the quality and relevance of the services they provide.
10.	**Connectivity is an important but not sufficient condition.** Technology and connectivity help a community telecentre to do its job, but they are not enough to ensure its contribution to human development.

Combining lessons as key predictors of success

Pulling together the lessons from InfoDev, Gomez (2002), and the few other toolkits available certain themes emerge that could be considered as possible predictors of success for telecenter projects. Table 3 provides a list of the predictors of success (in no particular order) generated from the literature.

Table 3. Proposed Key Predictors of Telecenter Success as Seen in ICT4D Literature	
1.	Involve local communities in initial decision making processes and continue to seek their counsel and partnerships once the venue is in place.
2.	Be aware of the differing needs of individuals within communities and the specific needs unique to each community.
3.	Have in place monitoring and evaluation systems.
4.	Do not just train clients, be aware of the training needs for staff as well.
5.	Keep programs and services relevant for the local context.
6.	Create networks and collaborations among telecenters.
7.	Make sure appropriate infrastructure is available.

The following is a description of why each of the above predictors is important:

1. Involve local communities in initial decision making processes and continue to seek their counsel and partnerships once the venue is in place.

Using a participatory approach is a consistent recommendation throughout most modern toolkits for all types of development programs (e.g., Chambers 1997; Campbell-Page 2001). Although it has been suggested that planning for telecommunications development has only recently begun to incorporate the input from multiple stakeholders (Andrew and Petkov 2003), the need for community participation is not a new idea in ICT4D literature (e.g., Mansell and Wehn 1998; Kenny 2001). We would expect, therefore, the presence of community involvement in ICT4D projects to be an important success factor.

2. Be aware of the differing needs of individuals within communities and the specific needs unique to each community.

As is pointed out by a UNCTAD (2007) report, "who uses and who benefits from telecentres largely depends on the networks' aims and design." It is important, therefore, to understand the needs within the community in which the telecenter is located in order to better design services to maximize the use and benefit of the venue.

It is also important for telecenters to address the differences in information needs among males and females. As was noted by Gomez (2002), "Men and women have differing needs when it comes to using the services of community telecentres." In addition, ICTs have been thought to have far reaching impacts on gender issues. For example, Abantu, a development program in Africa that focuses on increasing women's capacities, found that ICT "supports all gender-related advocacy programs" (Batchelor et al. 2003).

3. Have in place monitoring and evaluation systems.

Although previous discussion described the difficulties in evaluating and monitoring telecenter projects, attempts at monitoring and evaluation are important to help understand users, the community, and how telecenter activities should be designed and upgraded to better perform (UNCTAD 2007). Furthermore, monitoring can help demonstrate accountability within the venue (DFID 2005), possibly leading to more support from the community and possible funders. Monitoring can be as simple as documenting and systematizing experiences (Gomez 2002).

4. Do not just train clients, be aware of the training needs for staff as well.

The provision of training services is an aspect of many telecenters that differentiates them from Internet cafés. Training is important to increase the livelihoods of the people they serve as training can help users develop the skills necessary to conduct economic activities (UNCTAD 2007). For example, training in business and entrepreneurial skill has shown a significant increase in the number of wage employees and self-employed telecenter users in Spain (Fundación CTIC 2006)[5].

However, without a well-trained staff, helping clients use ICTs and performing trainings is difficult. Gomez (2002) noted that, just like users, operators, need continuous training to support the appropriation of the tools telecenters provide. Fillip and Foote (2007) found that "In many instances, the success or failure of a telecenter or kiosk is rooted in characteristics and skills of the manager or operator."

5. Keep programs and services relevant for the local context.

The importance of providing content and services that are locally relevant and in local languages stems from the understanding that it is not the technology in telecenters that brings benefit to people; rather, it is the information people are able to access with that technology (Keniston 2002). In addition, as was suggested by a 2002 study in India, locally relevant applications and services that emerge from content development processes that utilize local staff input increase the chance of consistent and robust community involvement in venues (Cecchini 2002). It has been suggested that many failures of ICT projects in rural and underserved urban areas can be traced directly to the failure of project designers and promoters to understand the local

[5] Information from Fundación CTIC 2006 was discussed in UNCTAD 2007.

socioeconomic and political environments (Fillip and Foote 2007). In these situations, projects are designed based on misguided assumptions and face disappointment as a result. However, it has been historically difficult for telecenters to provide locally available content as operators generally had to produce from scratch any content to deliver to customers (Fillip and Foote 2007).

6. Create networks and collaborations among telecenters.

The presence of networks connecting telecenters within a project has been suggested as beneficial for programs as a whole and for the individual telecenters (Fillip and Foote 2007). It has been noted that "telecentre networks play an important role in creating dynamics within the telecenter movement, in pooling resources to, for example, develop content and training materials, in sharing best practices, in creating partnerships and, in summary, in being able to bring about changes" (UNCTAD 2007). It has also been noted by Fillip and Foote (2007) that "Networks, associations, and partnerships play a key role in building capacity, sharing experiences and providing support to telecenter operators, developing robust and appropriate technology solutions, and developing locally relevant services and content."[6]

The degree to which interaction among telecenters constitutes a network is varied. Some networks are very informal and may connect simply using e-mail and occasional meetings. Others, however, may be more formal, rooted in a country's political structure, and easily observable (Fillip and Foote 2007).

[6] For a more comprehensive discussion of the benefits of networks to telecenter projects, see Fillip and Foote (2007).

7. Make sure appropriate infrastructure is available.

Fillip and Foote (2007) note that the three most common technical challenges facing telecenters are a lack of reliable electrical power, a lack of affordable and reliable connectivity, and difficulties associated with maintaining equipment in working order. Unreliable power not only results in lost revenue opportunities and reduction of available services while there is no electricity, but also can result in the early failure of computer equipment, causing further difficulties for the long-term sustainability of the center. The importance of providing a reliable and fast Internet connection is vital to ensure users are able to perform the maximum types of services. For example, telecenters that offer broadband Internet connection are able to provide such services as downloading more comprehensive training materials, VoIP,[7] and buying and selling online, service that are difficult at best with more limited Internet access (UNCTAD 2007). The difficulty of maintaining working computer equipment is a pain felt by many telecenters, especially those in rural ar6eas, as hardware is often designed for business or personal use in clean, controlled environments.

With the ever-growing number of telecenter programs and the lack of empirical literature providing guidance for how to implement these projects, there is a need for more research to help understand why some telecenter projects fail and some succeed. In addition, there remains little literature describing why telecenters do or do not exhibit certain indicators of success. Using the existing toolkits in ICT literature does not help to understand these why questions. Rather, it merely serves to provide guidance for what future projects should take into consideration. It is

[7] VoIPis an acronym for Voice Over Internet Protocol which refers to services that allow users to communicate verbally over the Internet. An example of a VoIP service is Skype.

important to understand, however, why projects may or may not incorporate the recommendations in the literature into their venues.

An important starting point for new research is to understand what themes and trends emerge from existing telecenter projects. Analyzing these themes in the context of how current literature depicts possible key predictors for success can help to understand what issues current projects are addressing, the reasons for any gaps, and where more research should be conducted to better understand why telecenters are operated the way they are. The remainder of this paper seeks to analyze telecenters in 17 developing countries to examine the extent to which those countries exhibit the previously proposed indicators for success of telecenter projects.

2. Methodology

This paper uses a comparative analysis deriving from a study of ICT environments in 24 developing countries. The unpublished data was collected at the University of Washington's Center for Information & Society (CIS) from September 2007 – March 2008. Country data includes a combination of that which is publically available and research on ICT environments conducted by in-country research teams. Appendix I details the selection process CIS used to obtain the list of 24 countries for in-depth research.

Research direction CIS provided to country-team researchers

CIS asked country teams to select five to seven of the most salient public access information (PAI) venues within their countries to study. CIS asked country teams to choose "Venues where public access to *information* [*sic*] is a core mission (with and without ICT); venues where public access to *ICT* [*sic*] is a core mission (with or without information services); and libraries (with and without ICT)." For each of the venues country-teams selected, CIS asked researchers to provide the following information:

- The total number of facilities, number of facilities with ICT service, and any networks of facilities
- Administrative and rural/urban distribution of venues
- Fee requirements
- Services offered (both ICT and non-ICT)
- Programs designed to reach underserved communities
- Other equitable access factors
- Physical access factors
- Extent of appropriate technology and services
- Affordability
- Human capacity and training
- Local language content
- Ease of the population integrating the venue into their daily routines
- Social appropriation

- Information gaps
- Staff training of users
- Users' abilities to take advantage of ICT resources and ways clients use the venues
- Public perceptions of the venue
- Enabling, funding, and economic environment of the venue

From the reports, only 17 of the 24 countries indicated that telecenters (or a local venue that falls under the definition of telecenter[8]) were of the most important PAI venues. Table 4 indicates the countries where telecenters were deemed important and the venue name used by country-teams. Of the countries with telecenters or telecenter-like venues, Bangladesh, Colombia, the Dominican Republic, Honduras, Moldova, Namibia, and Turkey provided inconsistent amounts of description. The findings section will provide clarification on which questions each of the above seven countries did not answer with enough depth so as to justify excluding the countries from analysis of particular questions.

Table 4. Countries Where Telecenters are Important PAI Venues and the Local Venue Name

Country	Venue name as indicated by country-team
Brazil	Telecenter
Bangladesh	Telecenter
Colombia	Community Telecenter
Costa Rica	Intelligent Community Center (CEIC)
Dominican Rep.	Public Access to Technology Center (CAPT)
Ecuador	Telecenter
Egypt	IT Club
Honduras	Communication and Knowledge Community Center (CCCC)
Moldova	Telecommunication Center
Namibia	Telecenter
Nepal	Telecenter
Peru	Telecenter
Philippines	Community e-Center
South Africa	Telecenter
Sri Lanka	Nenasala (Knowledge Center)
Turkey	Telecenter (but no information provided)
Uganda	Multi-purpose Community Telecenter (MCT)

[8] For this study, the Wikipedia definition of "telecenter" was used

Qualitative methods

The analysis for this project utilized a grounded theory approach (e.g., Corbin and Strauss 1990; Stone 1997; Boyatzis 1998; Charmaz 2000), which allows for themes to iteratively emerge from data. Initially developed by Glaser and Strauss in the 1960s, grounded theory sought to provide an alternative to the common top-down sociological research method of the time that tended to begin with general concepts and search for instances within the data supporting hypotheses built around these concepts (Glaser and Strauss 1967). Rather, grounded theory utilizes an inductive method that seeks to generate theories that emerge from the data instead of using preconceived theories based on speculation. Using grounded theory for this research was deemed important in order to better allow data within the reports to lead to new lessons about telecenter projects and not simply support or counter existing theories. Grounded theory research is trustworthy to the extent that "(a) the data are as factually accurate and complete as possible, (b) the interpretations capture the participants' meanings while minimizing researcher bias, (c) the categories fit with the phenomena under study and elucidate the relationships between concepts in the data, and (d) the theory is transferable (i.e., it makes sense to the reader and can be applied to persons, times, and settings other than those studied)" (Van Vliet 2008).

Analysis of the data in this research began by first reading each country report one or more times to better understand the general context of the data. Atlas.ti 5.0 was then employed to assist in *open coding* of the data, which involved identifying words, phrases, and sentences that, within the context of the report, represented a "meaning unit" in the data (Strauss and Corbin 1998). A full list of the codes in the analysis can be found in Appendix II. Codes were grouped into categories to better organize the data and to help refine codes to look for similarities and

differences within the meaning units (see Strauss and Corbin 1998). Atlas.ti outputs that were utilized for the analysis include the quotation count primary document table, list of co-occurring codes, and the list of quotations.

Themes that emerged from the data were then discussed in the order of their relation to the list of proposed indicators of success provided at the end of the literature review. To be clear, themes were discovered within the data independently of the proposed indicators. The findings are introduced in the order of the proposed indicators simply to provide structure and present context for discussion.

3. Findings

The following is a summary of the most notable findings that emerged from the coded data that relate to the indicators of success determined through the literature review. As can be seen in further detail in Appendix II, codes were clustered into larger families to better understand the relationship among codes. The families created are as follows: community participation, users, services, planning, staff, networks/collaboration, infrastructure, and sustainability. In general, the families correspond to the seven indicators of success provided in the literature review. However, as clustering was only performed to better understand the connection among codes and not to generate an exclusive family for each code, certain codes are used in the analyses of multiple indicators of success. An example of this is the code "service", which occurs in analyses looking at differing individual needs (analysis 2) and that looking at the relevance of services to the local context (analysis 5). Appendix III provides a list of codes used in the discussion, the family codes were placed into during the qualitative analysis, and the indicator of success each code is used in during the discussion of findings.

Findings are presented in order of the indicators of success to provide better context for discussion. At the beginning of each section, a table is provided that lists the codes used in the analyses for that section and the countries included in the analysis for each code. See Appendix IV for a compiled list of codes analyzed and the countries included for each analysis.

1. Involve local communities in initial decision making processes and continue to seek their counsel and partnerships once the venue is in place.

Table 5. Codes analyzed and the countries included in each analysis*

	Bangladesh	Brazil	Colombia	Costa Rica	Dominican Rep.	Ecuador	Egypt	Honduras	Moldova	Namibia	Nepal	Peru	Philippines	South Africa	Sri Lanka	Turkey	Uganda
Community involvement	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Community support	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Support from civil society	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I

***** "I" = included in the analysis; "E" = excluded from the analysis

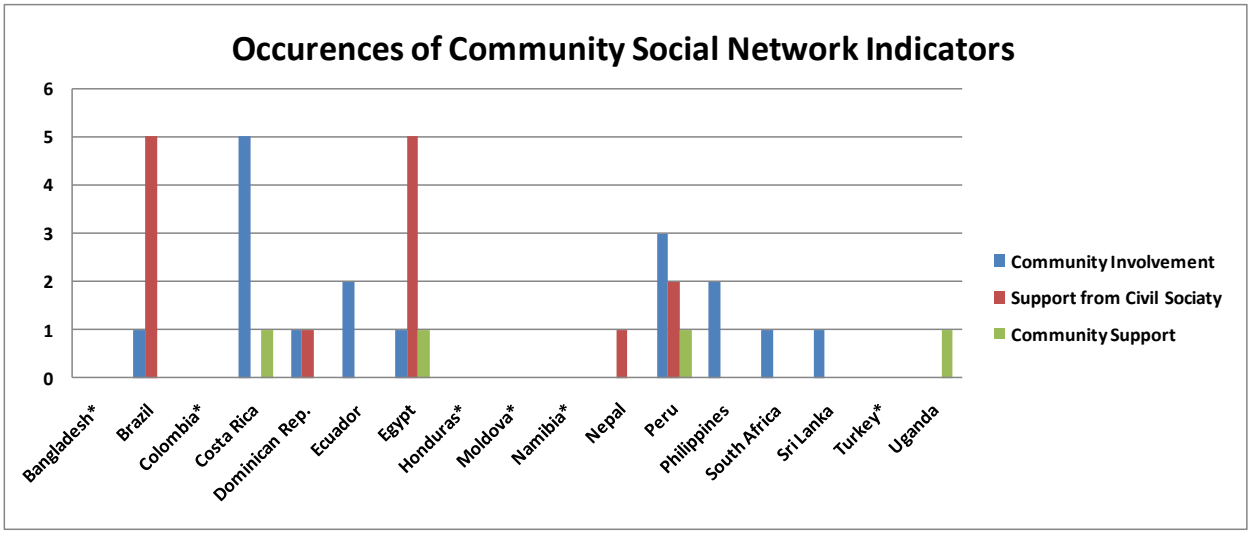
Based on the open coding approach, there emerged three codes that reflect community participation: community involvement, community support, and support from civil society. Discussion of community involvement occurred 18 times in 9 of the 11 countries with adequate discussion, with nearly one third of the occurrences coming from only one country (Costa Rica, 5 times). In addition, support from civil society occurred 14 times in 5 countries and community support occurred 4 times (4 countries). See Chart 1 below for a summary of the number of occurrences of community social network indicators. The directives CIS provided to the country-teams for research did not include any questions relating to community involvement. However, the 36 total occurrences of community participation indicators is just slightly less than the 41 mentions of affordability that occurred across the same documents. Country teams were specifically asked to address affordability.

There also occurred mentions of community social networks that had negative connotations. An example of this is Costa Rica that states, "communities often don´t have information about the

venues (in many cases, they don´t even know there is a CECI in the community)." In South Africa, some "Communities using telecenters or the Thusong Centers are not very aware of what ICTs can offer, although the youth generally tend to be more aware." Uganda also shared this problem, stating, "Overall, public awareness of the telecentres…appeared low, even amongst those living nearby."

The negative occurrences of community social networks indicate that there indeed appear to be constraints to developing strong community networks within some countries. However, that there was such a relatively large overall number of occurrences despite the lack of directive in the research design to discuss them, it appears the problems derived from poor community networks easily emerged from the preliminary research in the countries. This brings up questions as to the extent to which the organizations that implement/manage telecenter projects are also aware of these issues and the extent (if any) to which they are being addressed.

Chart 1



* Note: Countries indicated by "*" did not provide enough information in their reports to allow for them to be included in this section of the analysis.

2. Be aware of the differing needs of individuals within communities and the specific needs unique to each community.

Table 6. Codes analyzed and the countries included in each analysis*

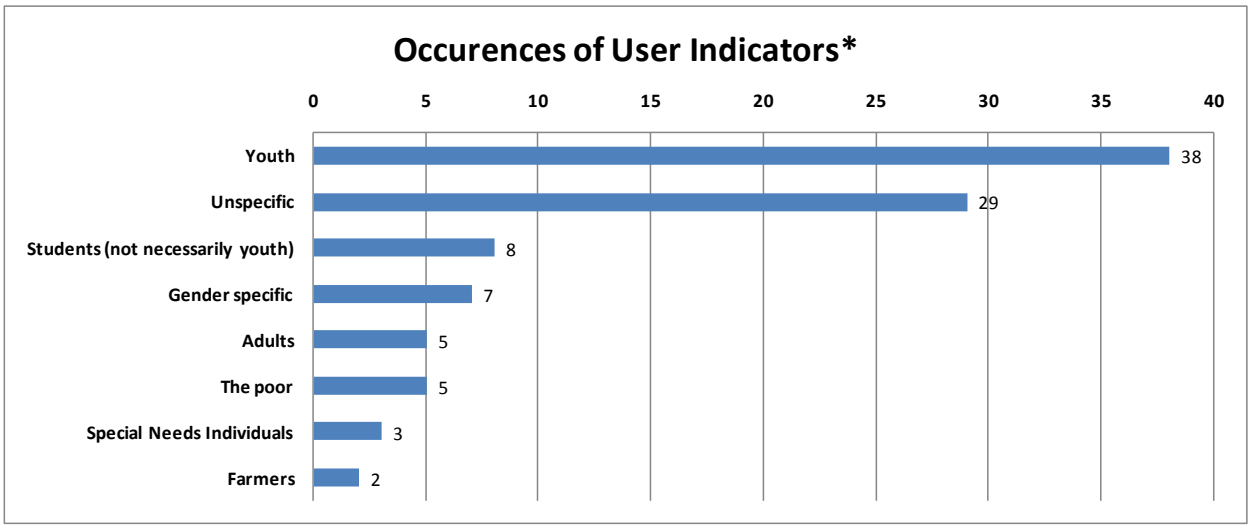
	Bangladesh	Brazil	Colombia	Costa Rica	Dominican Rep.	Ecuador	Egypt	Honduras	Moldova	Namibia	Nepal	Peru	Philippines	South Africa	Sri Lanka	Turkey	Uganda
Users	E	I	E	I	I	I	I	E	I	E	I	I	I	I	I	E	I
Gender	E	I	I	I	I	I	I	E	I	E	I	I	I	I	I	E	I
Services	E	I	I	I	I	I	I	E	I	E	I	I	I	I	I	E	I

***** "I" = included in the analysis; "E" = excluded from the analysis

In this study, of the 91 times users were coded from the 12 documents with sufficient discussion, 38 occurrences specifically referred to youth. This compares to 8 times for education, 7 times for gender specific users, 5 times for adults, 5 for the poor, 3 for special needs individuals, and 2 times for farmers (See Chart 2).[9] The frequency of the occurrence of youth is not surprising as it has been suggested that often one of the key user groups of telecenters are students (e.g., Kumar and Best 2006; UNCTAD 2007). However, given that all countries indicated their telecenters aimed to provide services to underserved communities, it is surprising that there were not more occurrences of other groups that could be considered underserved. An example of the discrepancy between countries giving the impression that telecenters support underserved communities and the actual narrow band of users is the case of Brazil. Despite claiming that telecenters "have projects that aim to benefit an underserved public", the Brazil report notes that users are, in general, between 7 and 26 years old. Although the youth that frequent telecenters may be considered "underserved", there are certainly more groups that should be using the venues if the aim of the telecenters is indeed to "benefit an underserved public".

[9] Note: There was overlap among some of the references

Chart 2



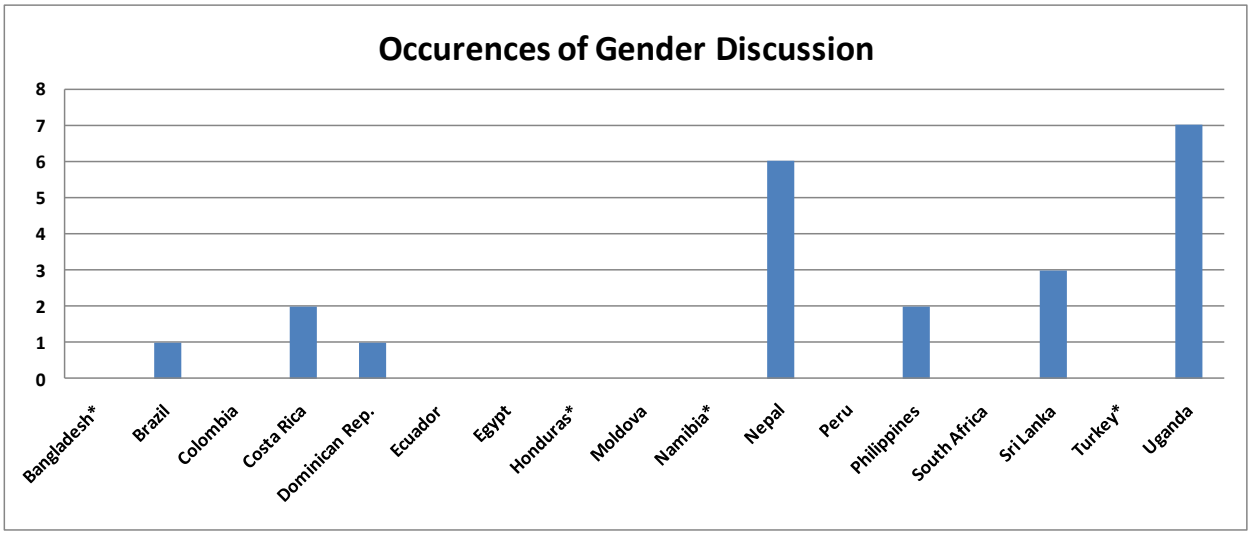
* Note: There was overlap among some of the occurrences.

Examples of the way youth were discussed include "special pricing for students" in Egypt and a "particular emphasis on youth development" in Namibia. An example of a situation that provides a reason for adults not using the telecenters is that of a case in Honduras. For reasons that could be due to misinformed perceptions or actual situations (it is not clear which), it was noted that "People 25 years old and up do not visit the center because they consider that the information offered is not relevant to improving their lifestyle." This statement has implications for the type of content and services made available at the center and the outreach to inform the community of the benefits of the center.

Despite the importance suggested in the literature of serving the specific needs of women in ICT projects, gender references only occurred 25 times in the 13 countries where discussion was adequate and mention of gender could have arisen. These occurrences were concentrated in 8 reports, with the majority in Nepal and Uganda (6 and 7 times, respectively. See Chart 3). Mention of gender only occurred with mention of services 4 times (Costa Rica, Ecuador,

Uganda), and only occurred once with training. What is interesting is that, besides the inconsistency in the number of mentions of gender across countries, there is also a wide variation in how telecenters target women. Whereas in Ecuador it was mentioned that "mothers…only go for the day-care center service", in Costa Rica it was mentioned that "The gender issue might be uncovered in places where people do not have access to a day-care center, so mothers cannot attend training." This suggests an inconsistency in the extent to which the different needs among males and females is addressed across countries.

Chart 3



* Note: Countries indicated by "*" did not provide enough information in their reports to allow for them to be included in this section of the analysis.

3. Have in place monitoring and evaluation systems.

Table 7. Codes analyzed and the countries included in each analysis*																	
	Bangladesh	**Brazil**	**Colombia**	**Costa Rica**	**Dominican Rep.**	**Ecuador**	**Egypt**	**Honduras**	**Moldova**	**Namibia**	**Nepal**	**Peru**	**Philippines**	**South Africa**	**Sri Lanka**	**Turkey**	**Uganda**
Evaluation and monitoring system	E	I	E	I	I	I	I	E	I	E	I	I	I	I	I	E	I
Framework for implementation	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I

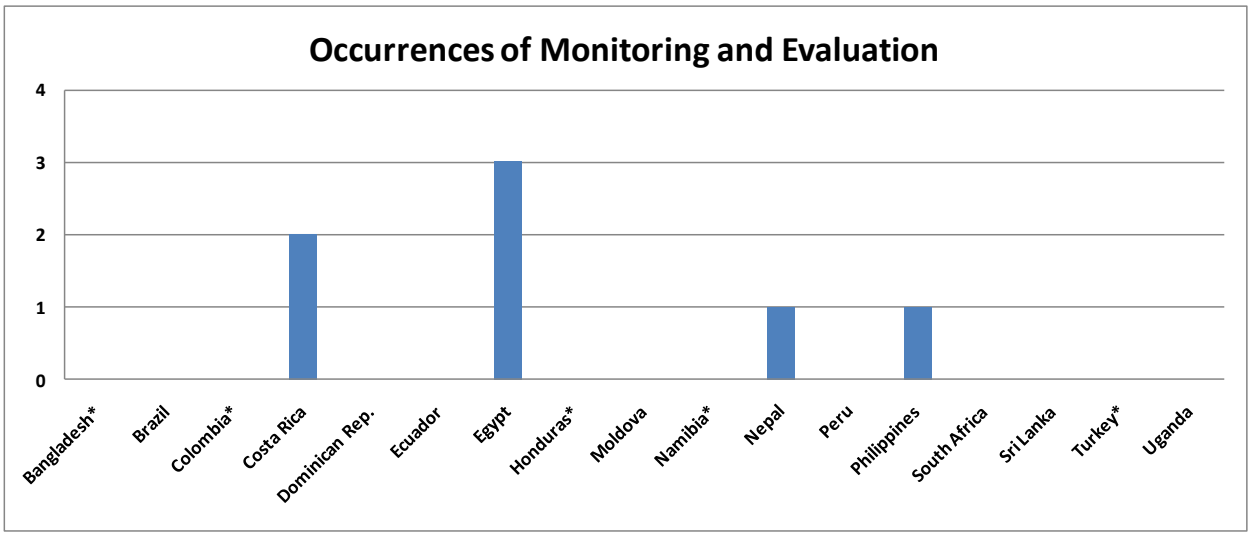
***** "I" = included in the analysis; "E" = excluded from the analysis

Of the 12 countries with adequate discussion where monitoring and evaluation could have been discussed, there were only 4 occurrences of monitoring and evaluation, limited to only 4 countries (See Chart 4). In addition, of those countries that discussed monitoring and evaluation, no countries indicated they had adequate monitoring and evaluation whereas 3 countries indicated it was inadequate (Costa Rica, Egypt, and the Philippines) and the final country (Nepal) did not provide a clear description (See Chart 5). In the case of Egypt, the monitoring and evaluation system was inadequate to understand the usage of the telecenters because monitoring was based on revenue alone. The Philippines noted that there were "no monitoring mechanisms in place to identify the impact of the CeC in the community."

Although there were 7 countries with adequate discussion that did not mention monitoring or evaluation, we cannot say that these countries do not have such systems in place. However, that there were no occurrences of monitoring and evaluation within the reports from these countries, we can infer that even if there were systems in place they might not be integral in the functioning

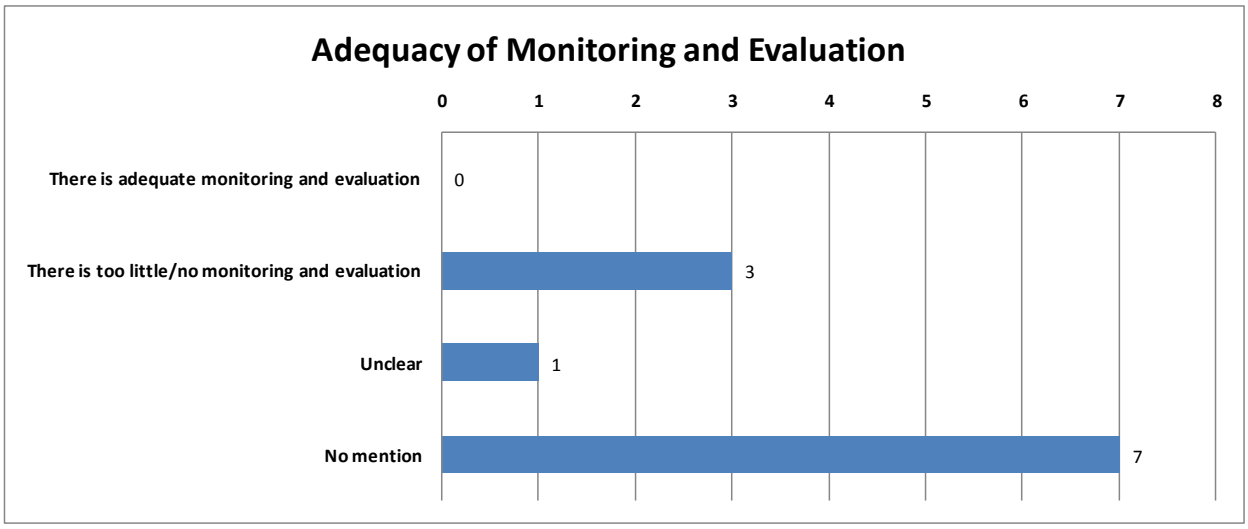
of the venues. From this analysis, it appears that monitoring and evaluation within the countries researched was inadequate.

Chart 4



* Note: Countries indicated by "*" did not provide enough information in their reports to allow for them to be included in this section of the analysis.

Chart 5

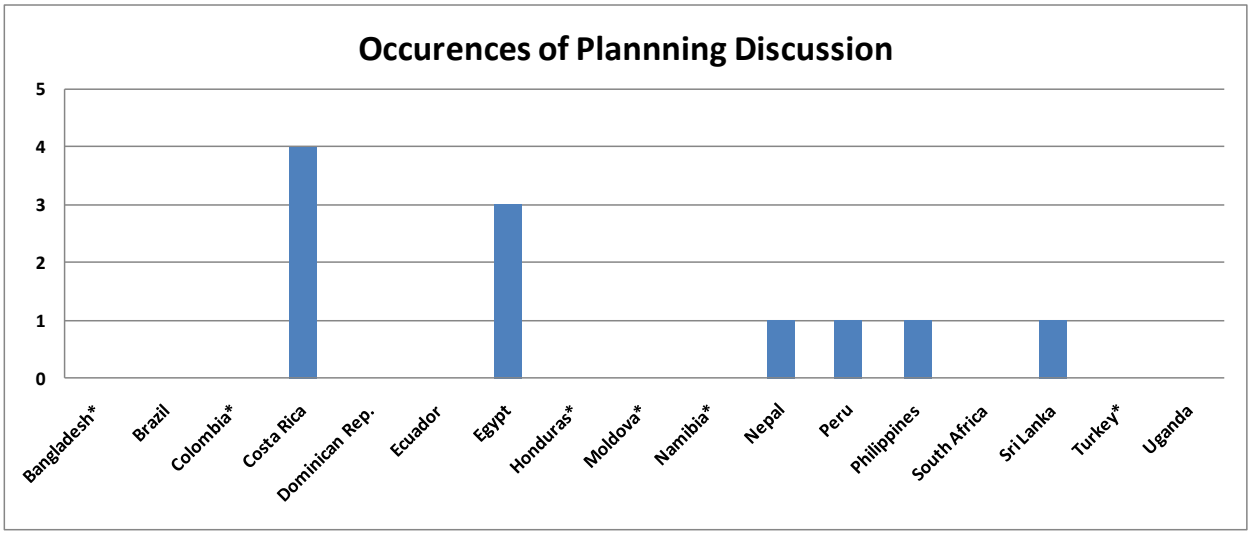


An indicator of the extent to which monitoring and evaluation systems could exist is the presence of a framework for implementation. Despite the importance of such planning in any project, the mention on having some implementation framework only occurred 11 times in 6 countries across

the 11 countries with adequate discussion in sections in which planning could occur (See Chart 6). Furthermore, only 3 countries indicated there was a useful planning system in place (See Table 8). Whereas Sri Lanka noted that the program in which the telecenters are implemented "is well resourced with an institutional framework for its implementation" poor planning has been suggested in the Philippines as "There are no criteria in place that helps in strategically placing CeCs around the country."

That 5 countries did not mention the presence of a planning system does not indicate an absence of planning within those countries. However, it does suggest the possibility that when addressing users, usage, and content, adhering to the goals set forth in a long-term plan were not of significant importance. This may have an important impact on the evaluation and monitoring systems and tools that are often included in long-term plan.

Chart 6



* Note: Countries indicated by "*" did not provide enough information in their reports to allow for them to be included in this section of the analysis.

Table 8.* Presence of Proper Planning Across Countries	
Occurrence of useful planning	Egypt, Peru, Sri Lanka
Occurrence of poor planning	Costa Rica, Nepal, Philippines
No occurrence of planning	Brazil, Dominican Republic, Ecuador, Peru, South Africa, Uganda

*Note: Bangladesh, Colombia, Honduras, Moldova, Namibia, and Turkey did not answer any questions related to planning so were not included in this section of the analysis.

4. Do not just train clients, be aware of the training needs for staff as well.

Table 9. Codes analyzed and the countries included in each analysis*

	Bangladesh	Brazil	Colombia	Costa Rica	Dominican Rep.	Ecuador	Egypt	Honduras	Moldova	Namibia	Nepal	Peru	Philippines	South Africa	Sri Lanka	Turkey	Uganda
Training	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Local language and relevant content	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Staff education level/ qualifications	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I

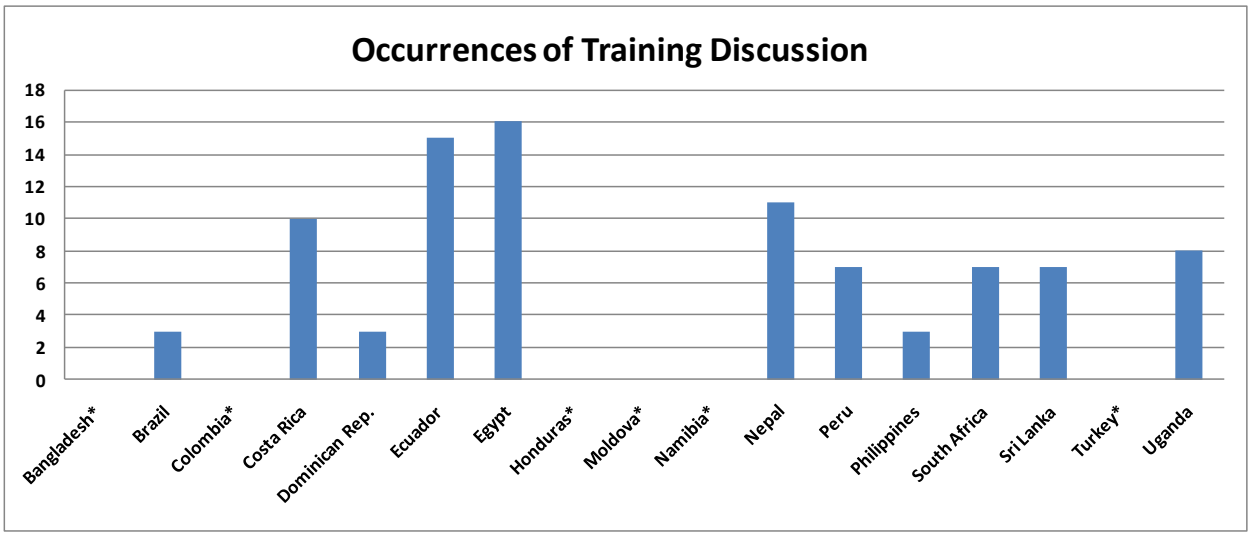
***** "I" = included in the analysis; "E" = excluded from the analysis

Mentions of training did occur 90 times throughout the 11 documents that contained substantial training information on telecenters (See Chart 7). However, it is not surprising that this value was so high given that teams were specifically asked to address training at the venues. What is interesting is that there appeared very little occurrence of training with local language and relevant content. The two only co-occurred 10 times, and these co-occurrences only represented 5 countries (See Chart 8). The description of the locally relevant training was generally vague, primarily alluding to or simply stating that the presence of training in local languages without going into more depth.

An additional finding from the coding of training is the lack of connection between training and the staff education level/qualifications. Although training did occur with staff education level/qualifications 16 times, the majority of these instances indicated a poor level of training for the staff (See Chart 9). Only 2 countries, the Philippines and Sri Lanka, mentioned that staff were trained. Furthermore, in the case of the Philippines, it was noted that "only initial training is given to staff." What appears to be a more common characteristic is exemplified by the

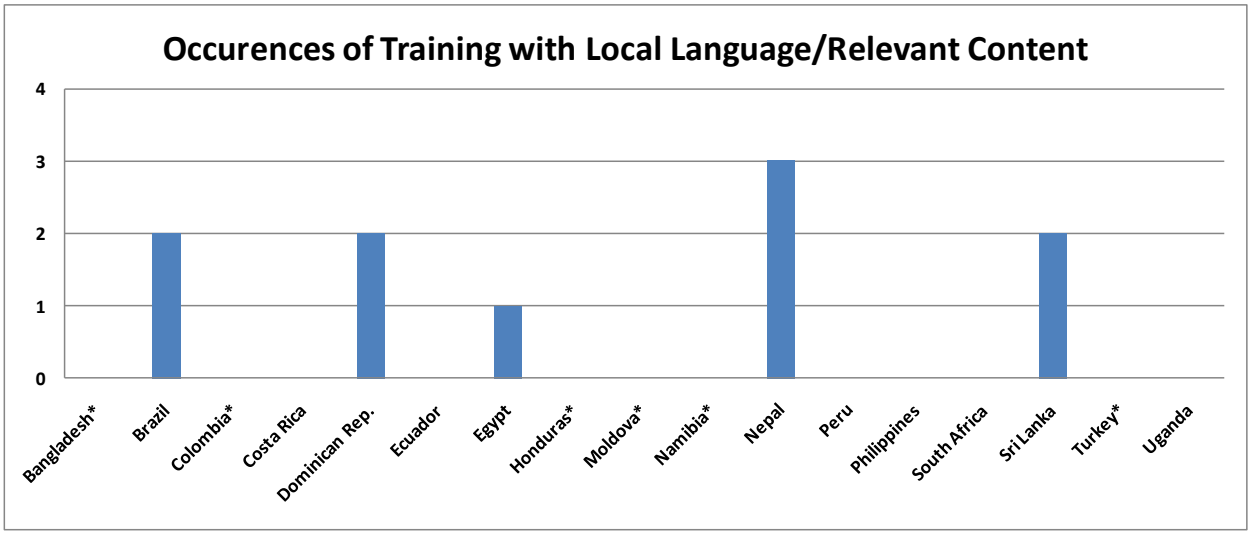
researcher from Peru when describing telecenters, "And those who manage this place [do] not receive training, and there is a lack of inter-institutional activities to allow him/her to develop."

Chart 7



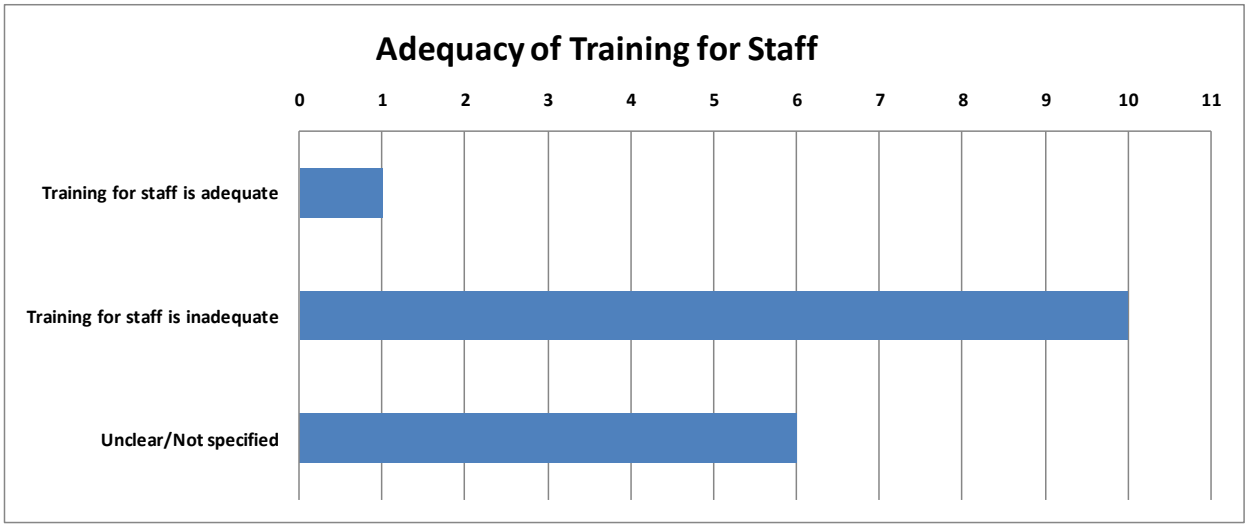
* Note: Countries indicated by "*" did not provide enough information in their reports to allow for them to be included in this section of the analysis.

Chart 8



* Note: Countries indicated by "*" did not provide enough information in their reports to allow for them to be included in this section of the analysis.

Chart 9


Adequacy of Training for Staff
0
1
2
3
4
5
6
7
8
9
10
11
Training for staff is adequate
Training for staff is inadequate
Unclear/Not specified

5. Keep programs and services relevant for the local context.

Table 10. Codes analyzed and the countries included in each analysis*

	Bangladesh	Brazil	Colombia	Costa Rica	Dominican Rep.	Ecuador	Egypt	Honduras	Moldova	Namibia	Nepal	Peru	Philippines	South Africa	Sri Lanka	Turkey	Uganda
Services	E	I	I	I	I	I	I	E	I	E	I	I	I	I	I	E	I
Local language and relevant content	E	I	E	I	I	I	I	E	I	E	I	I	I	I	I	E	I
Venue manager awareness of clients	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Community involvement	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Community perceptions	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Stakeholder partnerships	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Information gaps	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I

***** "I" = included in the analysis; "E" = excluded from the analysis

The data from the countries researched in this project support the difficulty of providing content in local languages or designed for local needs. Of the countries with telecenters that had adequate information, less than 1/3 indicated they had very limited, if any, services utilizing local language or relevant content (See Table 11). Examples of types of services offered in local languages include training materials, templates and digital libraries in the Dominican Republic and government information and high school curriculum in Sri Lanka. An example of a country that has limited local language content is Egypt, whose report states, "the amount of content available in local languages (Arabic) is very limited, and that with local relevance are even more scarce."

In some countries it is difficult to determine if content is available in local languages. For example, although Nepal states that "the useful content available in English like…agriculture prices, health information, etc…are translated, printed and pasted in their notice boards," the country later goes on to report that "in the fields of education and government services, apart from the government forms available online, they don't really seem to have materials in Nepali Languages. It is also seen that telecenters don't really have content available in the local community languages as such." The lack of locally relevant content in Nepal seems to be reflected in the users that frequent the venue. As was stated in the report, "Mostly it is people who can speak at least Nepali if not English that visit telecenters (60%)."

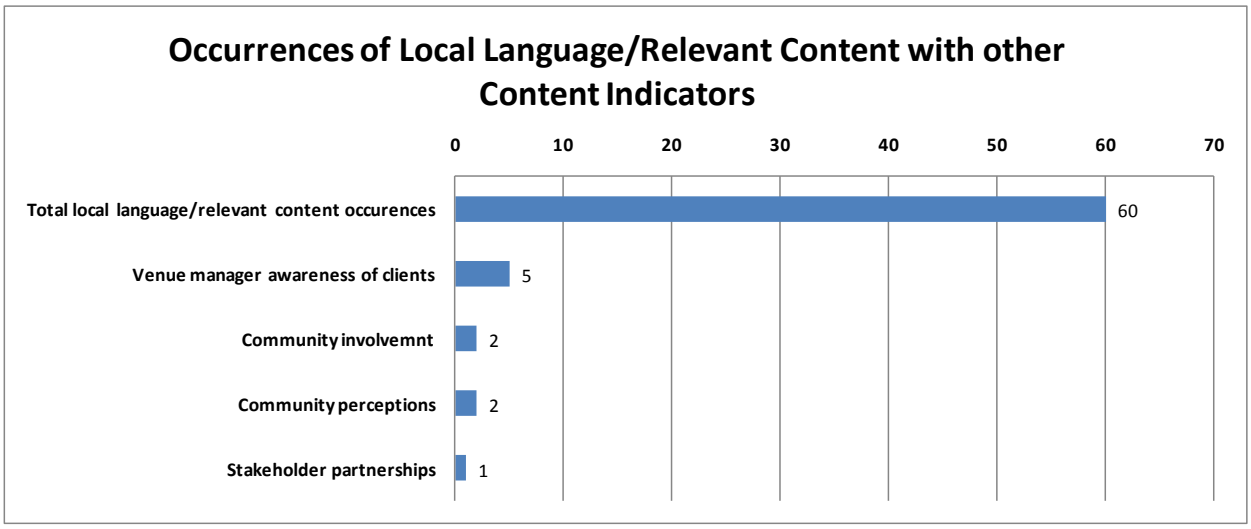
Table 11.* Extent of the Presence of Local Language/Relevant Content Across Countries	
Presence of services utilizing local language/relevant content	Brazil, Costa Rica, Dominican Republic, Sri Lanka
No presence of services utilizing local language/relevant content	Ecuador, Egypt, Philippines, Uganda
Unclear presence of services utilizing local language/relevant content	Moldova, Nepal, Peru, South Africa,

*Note: Bangladesh, Colombia, Honduras, Namibia, and Turkey did not answer any questions related to the utilization of local language or relevant content.

The creation of local content is dependent upon garnering community input and awareness of community needs. However, local language and relevant content, although appearing 60 times throughout the documents, only occurred 5 times with venue manager awareness of clients, twice with community involvement, twice with community perceptions, and once with stakeholder partnerships (See Chart 10). In addition, despite the fact that researchers were specifically asked to comment on information gaps within their selected venues, information gaps only occurred once with local language and relevant content. This indicates that within the countries studied there was a lack of connection between the provision of local content and relevant services and

the means with which that content should be created. It is not surprising, therefore, that there were such low levels of local language content and relevant services appearing at the venues.

Chart 10



6. Create networks and collaborations among telecenters.

Table 12. Codes analyzed and the countries included in each analysis*																	
	Bangladesh	**Brazil**	**Colombia**	**Costa Rica**	**Dominican Rep.**	**Ecuador**	**Egypt**	**Honduras**	**Moldova**	**Namibia**	**Nepal**	**Peru**	**Philippines**	**South Africa**	**Sri Lanka**	**Turkey**	**Uganda**
Network connecting centers	E	I	I	I	E	I	I	E	I	I	I	I	I	I	I	E	I

From this research, it appears that 8 countries out of 13 that answered questions relating to networks have networks obviously present, with 2 having no networks, and the remainder being unclear (See Table 13). The presence of a network connecting telecenters can be illustrated with the case of Sri Lanka, whose report states, "To facilitate the implementation of the programme [telecenters] are joined in a network to enable the operators to interact with ICTA and among themselves." The absence of a network can be illustrated by the case of Nepal which states, "Although there have been several attempts to form a network of telecenter operators and practitioners in Nepal, it has not been successful."

That just slightly more than half of countries have apparent telecenter networks may be a result of the networks in some countries being so subtle that researchers simply failed to learn about them. However, if this was the case, the presence of networks, if significant, might have revealed itself during discussions of other topics like the provision of locally available content or information provided. As this was not the case, it may be that networks may indeed be absent or, if present, play a subtle and intangible role in the functioning of telecenters.

Within countries that have networks there is inconsistent information to determine the extent or size of networks. For example, although Peru states, "Telecenters promoted by one institution

are networked with the rest of them," the country report later goes on to state, "There have been attempts to build a national network of telecenters but they have not worked until now." This indicates that networks of telecenters, although present, are not at the national level. This compares to the Central IT-club Entity in Egypt that is working to create telecenter networks not just within the country but also "networking telecentres in the MENA region". Unfortunately, there was not such detailed information about the exact size of networks to make this analysis comparable across countries.

Table 13.* Extent of Telecenter Networks Across Countries	
Countries with obvious networks	Brazil, Colombia, Costa Rica, Egypt, Peru, South Africa, Sri Lanka, Uganda
Countries with no networks	Nepal, Philippines
Countries with unclear network systems	Ecuador, Moldova, Namibia

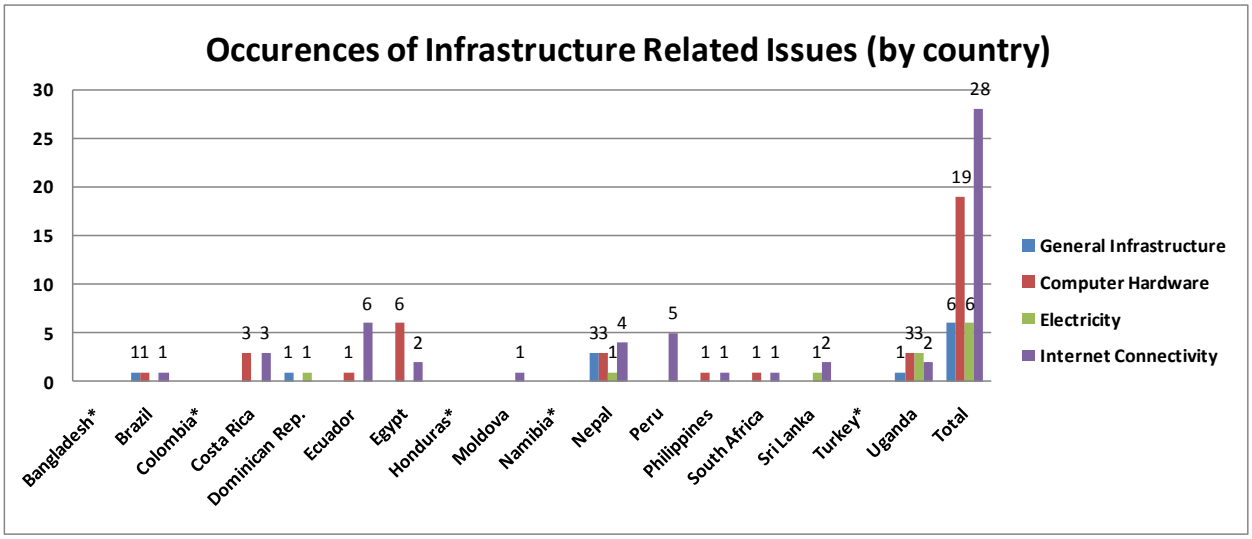
*Note: Bangladesh, Dominican Republic, Honduras, and Turkey did not answer any questions related to the presence of networks.

7. Make sure appropriate infrastructure is available.

Table 14. Codes analyzed and the countries included in each analysis*																	
	Bangladesh	**Brazil**	**Colombia**	**Costa Rica**	**Dominican Rep.**	**Ecuador**	**Egypt**	**Honduras**	**Moldova**	**Namibia**	**Nepal**	**Peru**	**Philippines**	**South Africa**	**Sri Lanka**	**Turkey**	**Uganda**
Infrastructure	E	I	E	I	I	I	I	E	I	E	I	I	I	I	I	E	I
Internet connectivity	E	I	E	I	I	I	I	E	I	E	I	I	I	I	I	E	I
Hardware condition	E	I	E	I	I	I	I	E	I	E	I	I	I	I	I	E	I

Mention of infrastructure related issues occurred 59 times throughout the 12 documents with adequate discussion despite that discussion of infrastructure was not explicitly asked for in the research design (See Chart 11). Discussion of infrastructure seemed to include four different themes: general infrastructure (6 times), computer hardware (19 times), electricity (6 times), and Internet connectivity (28 times).

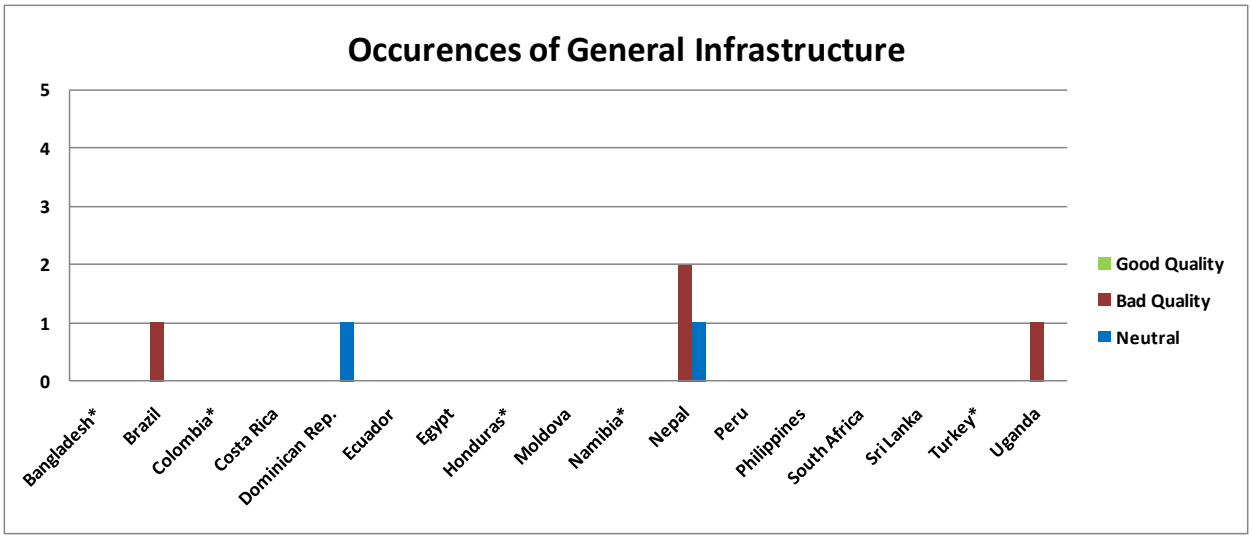
Chart 11



* Note: Countries indicated by "*" did not provide enough information in their reports to allow for them to be included in this section of the analysis.

Of the mentions of general infrastructure, 4 indicated poor quality infrastructure and 2 had neutral connotations of quality (See Chart 12). An example of poor quality infrastructure was the mention by the Brazil team that the "adequacy of the physical infrastructure" is a significant problem limiting the physical access of special needs users to the venue.

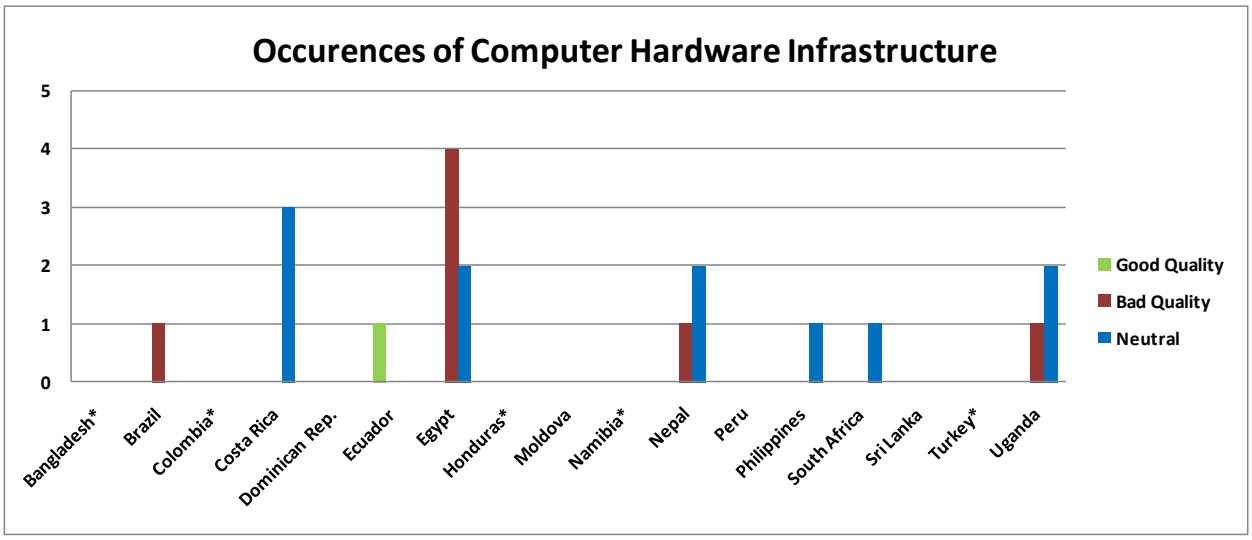
Chart 12



* Note: Countries indicated by "*" did not provide enough information in their reports to allow for them to be included in this section of the analysis.

Of the mentions of computer hardware, 1 indicated good quality of infrastructure, 7 indicated poor quality infrastructure, and 11 had neutral connotations of quality (See Chart 13). The single positive reference to computer hardware infrastructure came from the Ecuador researchers who quoted a report discussing rural services, stating "Telecenters are well equipped. As an example, I saw some computers in a Telecenter of project CORAPE in Tsachilas that I have not even seen here in Quito." An example of a negative connotation during discussion computer hardware infrastructure is the Egypt report that states, "The computers themselves are usually older than the year of establishment of the IT-clubs and by the end of the three year period they are mostly obsolete and overused."

Chart 13



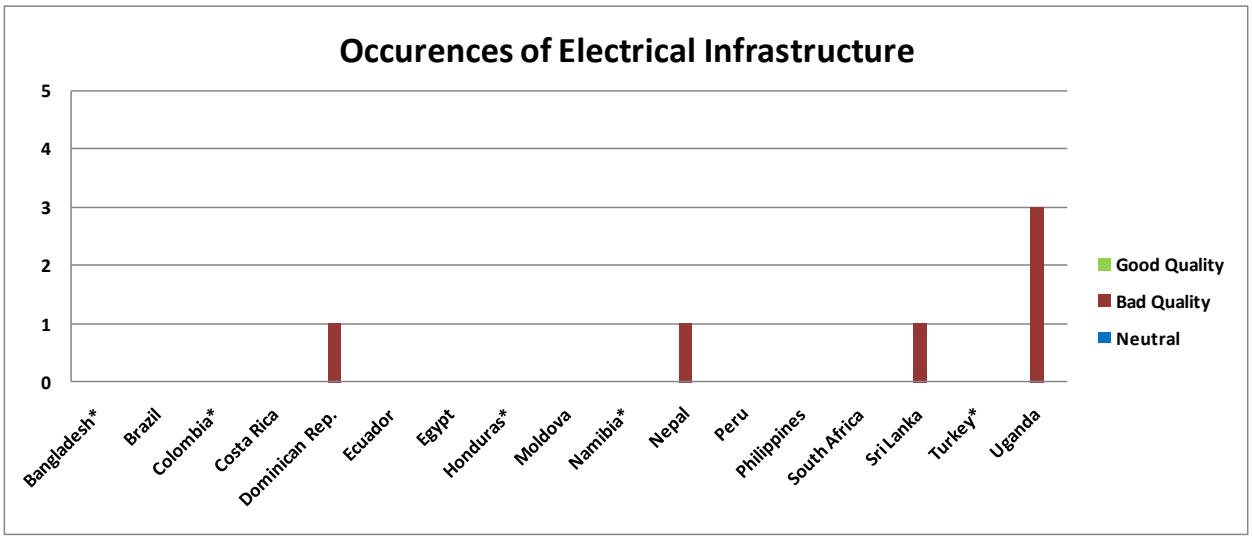
* Note: Countries indicated by "*" did not provide enough information in their reports to allow for them to be included in this section of the analysis.

Of the mentions of electricity, all 6 occurrences indicated poor quality infrastructure. These mentions occurred in 4 countries (Dominican Republic, Nepal, Sri Lanka, and Uganda), with 3 of the mentions in Uganda (See Chart 14). An example of the types of negative occurrences of electricity can be seen in the case of Uganda that states, "The problem of accessibility of electricity and internet coverage to all the areas in Uganda is a main factor that is largely affecting the use of PACs. Only 3% of the population is connected to the national grid." In addition, the poor electricity infrastructure was noted as the cause of poor computer hardware: "some centres visited had damaged computers due to power failure."

Of the mentions of Internet connectivity, 3 occurrences indicated good quality infrastructure, 18 indicated poor quality of infrastructure, and 7 had neutral connotations of quality (See Chart 15). An example of an occurrence of Internet connectivity infrastructure with a positive connotation is in the Nepal report that states, "Telecenters with sufficient funds are expanding their services by having reliable connectivity." An example of an occurrence of Internet connectivity

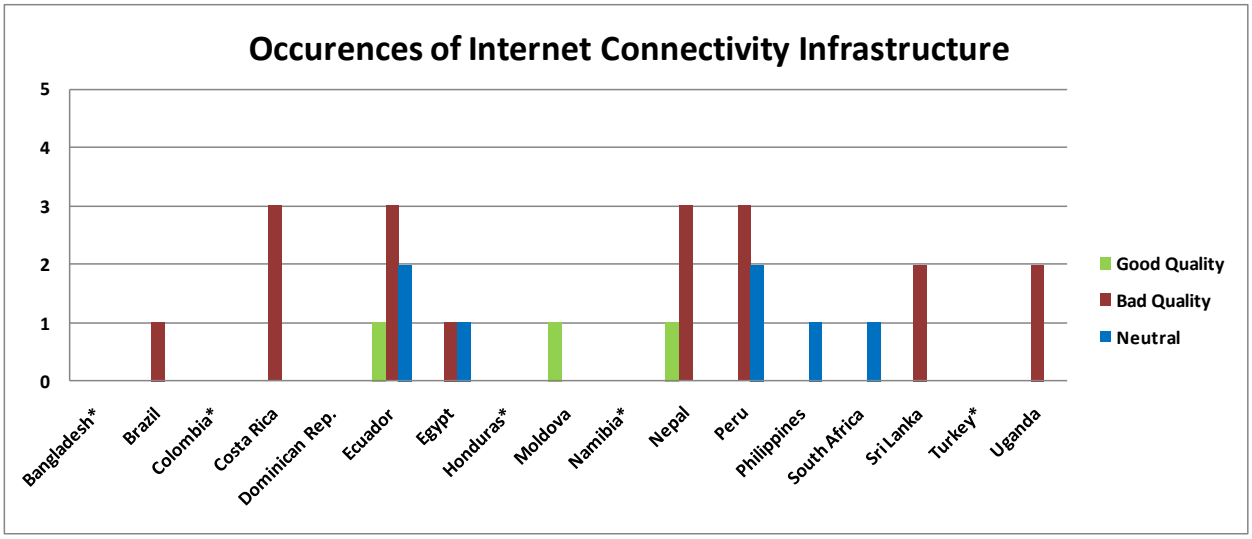
infrastructure with a negative connotation can also be seen in the Nepal report that states, "full time connectivity is always a problem for telecenters in Nepal".

Chart 14



* Note: Countries indicated by "*" did not provide enough information in their reports to allow for them to be included in this section of the analysis.

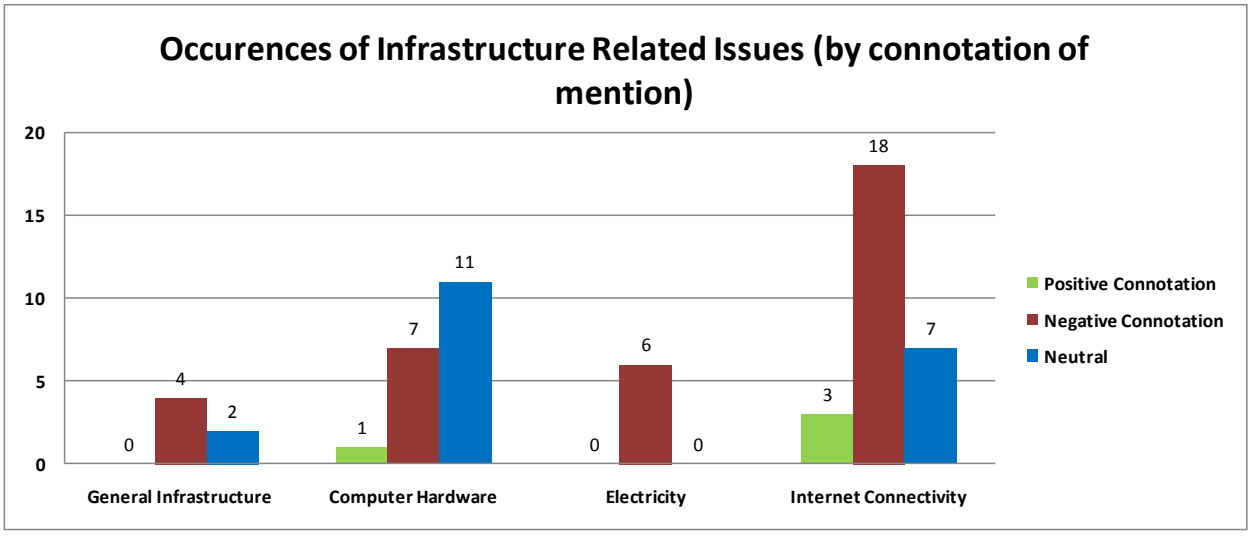
Chart 15



* Note: Countries indicated by "*" did not provide enough information in their reports to allow for them to be included in this section of the analysis.

Of the four infrastructure-related issues Internet connectivity had the most occurrences, with more than 60% of those occurrences having a negative connotation (see Chart 16). Although occurrences of electrical infrastructure with negative connotation occurred only 1/3 of the number of times of negative Internet connectivity occurrences, there were no mentions of electricity with positive or neutral connotation. In addition, as was mentioned by Uganda, problems with electrical infrastructure led to problems with computer hardware. It appears that with the relative lack of discussion of general infrastructure, the biggest infrastructure issues the countries in the study face are with computer hardware, electrical, and Internet connectivity.

Chart 16



Additional Themes

Of the codes that emerged during the qualitative analysis, the majority seem to be in similar families of themes that are present in the proposed factors of success. There remains a group, however, that does not relate to the proposed factors of success. During the qualitative analysis, this group was clustered into a family called "sustainability". Codes within this group primarily describe factors relating to financing of the venues. Although discussion of financing is important to understand the economic sustainability of telecenters, those issues are out of the realm this paper intends to discuss. Of course a telecenter that is forced to shut down due to financing problems is no longer actively serving underserved communities. In addition, as income generated from user fees is important for financial sustainability, community participation can be linked to sustainability. However, discussion of the best way to provide funding for telecenters is more appropriately left to a paper on policy and business planning. Although the profit-motive of a telecenter may play a part in the types of services a venue may choose to provide (for example, trainings that earn little money may not be offered at a venue that only generates revenue based on user fees), discussion of who and how to fund venues is a topic separate from that in this paper of how communities are served.

Also included in the sustainability group were codes for "success" and "failure". However, as the discussion in the literature points out, determining how a "successful" venue looks is difficult due to problems with measurement and fundamental disagreements over definition. As researchers were not provided a definition of success to use in the study of venues in their countries, nor were they explicitly asked to discuss what they feel success looks like in their countries, coding for "success" and "failure" was used to serve as placeholders for achievements

or problems within venues and are generally cross-coded with codes discussed previously. An example of a "failure" cross-coding is the "[in]adequacy of the physical infrastructure" as a significant problem limiting the physical access of special needs users to venues in Brazil. If a fundamental goal of telecenters is to serve the underserved, issues like problems with physical infrastructure that limit access to the venue by underserved communities can be considered a possible failure. Further discussion of the "success" and "failure" codes would simply lead to a repetition of the issues discussed in the preceding sections of the findings.

4. Conclusions

The following provides a summary of the analyses, questions that arose from conducting the analyses, and suggestions for future research:

1. *Involve local communities in initial decision making processes and continue to seek their counsel and partnerships once the venue is in place.*

Findings: With respect to community participation, although not explicitly asked to discuss it, related codes occurred relatively often when comparing the frequency of occurrence with codes explicitly asked for (like affordability). Although there was no consistency across countries as to the degree to which community involvement was adequate, that researchers noted it so many times indicates that it does seem to be important for the functioning of telecenters, and thus **appears to be an important success factor**.

Questions raised: Although issues with community participation arose within the research, it is still not clear if the organizations that implement and/or manage the telecenters aware of the issue. In addition, it is not clear what the reasons are behind the variation of the extent of community participation.

Suggestions for future research: Specifically ask telecenter managers to discuss levels of community participation. Discern if community participation is a specific goal of the venue. Ask managers the degree to which they feel community participation is important, what the venues are actively doing (if anything) to increase/maintain it, and how "successful" these actions have been.

2. *Be aware of the differing needs of individuals within communities and the specific needs unique to each community.*

Findings: It appears that although all countries indicated their telecenters aimed to provide services to underserved communities, there were relatively few occurrences of groups besides youth that are primary users of the venues. In addition, gender references were not very common despite the number of sections where mention of gender could occur. There appears to be an inconsistency between who telecenters define as their target populations and the extent to which telecenters are actually serving these groups. This is also illustrated with the general lack of emphasis of addressing the differing needs of individuals and groups at the venues. This could be a reason for the lack of diversity of users. From this research, it appears that **being aware of the differing needs of individuals and communities is an important success factor.**

Questions raised: It is still unclear why there is such a distinct discrepancy between who the telecenters aim to serve and who actually uses them. More in depth research should also be conducted to see if the students who use telecenters bring home their knowledge and teach other members of their families or if they access information for their families. Individuals not physically using telecenters may still be directly benefitting from the information and services the venues provide.

Suggestions for future research: Future research should explicitly ask venue managers what populations or groups they are targeting and how (if at all) they are addressing these groups' needs. Managers should be asked what constraints they have (including, but not limited to, financial, political, and social) to adequately serve the needs of the different groups. More information from people *not* using the telecenters would also be useful to understand why they

are not taking advantage of a resource intended to serve them. In addition, a larger level analysis should be conducted to learn what groups were targeted in the initial framework of the telecenter (and telecenter network if applicable) and what practices were expected to be implemented to attract and serve these groups.

3. *Have in place monitoring and evaluation systems.*

Findings: The data indicated very little explicit discussion of monitoring and evaluation or discussion of long-term planning. Of those countries with discussion, it appears there were very few monitoring or evaluation mechanisms in place. Although there was no direct link between the lack of monitoring and evaluation mechanism and failure of venues, as described above discussion of users did indicate that there was a discrepancy between the stated target populations and the actual populations using the telecenters. The data suggest that there could be a connection between the general lack of obvious monitoring and evaluation systems and the general discrepancy in users. It seems that **monitoring and evaluation is an important success factor.**

Questions raised: Why was there such little discussion of monitoring and evaluation systems? Although researchers were not explicitly asked to report on this, the presence of such systems could have been alluded to during the required discussion of users, services, appropriate technology, or equitable access. That there was little to no discussion of monitoring and evaluation systems does not indicate there are none present. However, it does raise the question of the extent to which such systems play a role in venues (in)adequately understanding users and their needs.

Suggestions for future research: Ask venue managers to discuss their views of the importance of monitoring and evaluation systems. Ask them how they think this may or may not assist in targeting the right populations in the most relevant manner. Understand the extent to which monitoring and evaluation systems are in place, the extent to which any systems are carried out, and the reasons for strong or weak follow through of the monitoring and evaluation systems. Learn what local contexts must be considered to better monitor users *and* non-users. Learn if there are informal monitoring systems in place.

4. *Do not just train clients, be aware of the training needs for staff as well.*

Findings: Although there were many occurrences of training, this is most likely due to researchers being explicitly asked to discuss training. However, the majority of instances that staff education level/qualifications occurred with training indicated a poor level of training for staff. Overall, it seems staff are generally poorly trained, a possibly important reason for lack of diversification of clients at the venues. It appears that **adequate training for staff appears to be an important success factor.**

Questions raised: The analysis of staff training brought up the issue of the extent to which the already tight budgets of telecenters might be able to afford to train staff. In addition, staff retention may become difficult as staff might be able to use their technology skills at a higher paying job.

Suggestions for future research: Explicitly ask venue managers the extent of staff training and the requirements for hiring staff. Understand what the limitations are to having properly trained

staff (e.g., limited resources for training, limited resources to pay qualified staff). It would also be important to speak with venue users and those who do not use the venues to understand what their needs of staff are and how this is/is not met with the current level of training.

5. ***Keep programs and services relevant for the local context.***

Findings: A relatively low number of countries indicated they have services utilizing local language or relevant content. In addition, local language and relevant content did not occur with community need variables very often. It appears that within the countries studied there was a general lack of connection between the provision of local content and relevant services and the means with which that content should be created. It is not surprising, therefore, that there were such low levels of local language content and relevant services appearing at the venues. This could be a reason for the lack of diversity of users frequenting venues. From this study, it appears that **locally relevant content is a success factor.**

Questions raised: It was not clear from the research from where the venues received their content. If content and services are to be truly local, much of the work developing them must be done at the local level. However, limited resources may make this prohibitively expensive. There was also no discussion on the extent to which telecenters share content and services they develop and the extent to which trained individuals are available to help create the content.

Suggestions for future research: Future research should further study why there is such a deficiency of local content and services. Researchers should study the degree to which finances, capacity, staff training, venue directives, or other reasons that limit local content and services. In

addition, further research should be conducted on those people who do *not* use the venues to see if the extent to which locally relevant content and services affects their decision to use the venue.

6. *Create networks and collaborations among telecenters*

Findings: It appears that more than half of countries with adequate discussion had obvious networks present connecting telecenters. With these networks, however, it is not clear how their presence is related to possible success of the venue. Although countries were specifically asked to discuss networks, occurrences did not go into much depth about the responsibilities of networks. As such, there is little data available discussing the role of networks in shaping the functioning of the venues. Therefore, **it is not clear if networks linking telecenters are an important success factor.**

Questions raised: Although most countries did indicate the extent to which they are connected by networks, there was relatively little discussion on how networks (or lack thereof) played a role in the ability for telecenters to effectively serve communities. This raises questions of the extent to which the literature supporting the presence of networks holds true.

Suggestions for future research: Do telecenter managers view their venues as a part of a larger network? What do managers see as the benefits/disadvantages of belonging to a network? How does this compare to the intent of networks in the initial planning of the venues (if venues are networked). What capacity is needed to share services across venues through networks?

7. *Make sure appropriate infrastructure is available.*

Findings: Despite that it was not explicitly asked for, discussion of infrastructure did occur relatively often. This discussion centered on the following areas: general infrastructure, computer hardware, electricity, and Internet connectivity. Internet connectivity had the most discussion, followed by computer hardware. Electricity and general infrastructure had much fewer occurrences. With more than 60% of Internet connectivity occurrences having a negative connotation, it appears that this was the biggest issue countries seemed to have with infrastructure. General infrastructure seemed to be of less importance relative to the others. Of the occurrences of electrical infrastructure, all were negative, including a reference to poor electricity ruining computer hardware equipment. There did occur some discussion linking poor infrastructure to the ability of communities to use venues. It appears **that infrastructure may be an important success factor, with Internet connectivity and electricity seeming to be the most pressing problems.**

Questions raised: With the high occurrences of problems with Internet connectivity, it appears that Internet connectivity does, indeed, seem to be important to the telecenters. If so, how does poor connectivity affect retention of new users? Also, it is not clear of the poor connectivity is indicative of connectivity problems across entire countries or if it is a problem faced generally by poorly financed telecenters.

Suggestions for future research: What ways are governments or other entities working to enhance Internet connectivity to telecenters? Are there emerging technologies (e.g., satellites) that could make Internet connectivity more reliable? When telecenter projects are designed,

what proportion of funds are allocated to providing reliable Internet connectivity? What importance do users place on accessing the Internet versus using computers for word processing or offline computing/training activities?

Final Thoughts

The results from the open-coding process indicate that grounded theory was a useful tool to understand the general issues that are occurring across countries. However, even with detailed and consistent directives provided to research teams, there still remained inconsistent data to allow for extensive comparisons across countries, limiting the robustness of the findings. In addition, the lack of detailed data also made it difficult to go beyond describing the current environment of the venues to understand why venues display certain characteristics.

The basic issue with defining how success looks at a telecenter also posed problems in understanding the venues. It would be very helpful for future research of telecenters (or other venues for that matter) to ask what researchers think success looks like in their countries. Not only will this help to make data more comparable across countries, but it will also enable a better empirical way to discuss success in ICT projects.

The analyses in this research brought to issue concepts very similar to those prescribed in the possible success factors generated from the literature. The only success factor that seemed to possibly not be as important as initially indicated is the presence of networks. The major group of codes that emerged from the open-coding but was not present in the success factors all related to sustainability. However, as discussion of sustainability is out of this paper's realm of

discussing the provision of necessary services to the intended populations, this paper did not analyze the issue of sustainability. However, this does point to sustainability being an important issue to consider when designing telecenter projects and that this should be added to the list of success factors.

This analyses point to the need to address more specific questions related to the indicators for success in future telecenter research. Although there remains abundant research describing what is happening within telecenters, this research indicates the paucity of answers for *why* this is happening. It appears that the literature providing recommendations for telecenter operators does not seem to discern why telecenters may not follow through with these recommendations. However, understanding why telecenters do not exhibit these indicators and the extent to which this affects their abilities to adequately serve their target populations is an essential next step to better implement telecenter projects in the future.

References

Abraham, R. (2006). Mobile phones and economic development: Evidence from the fishing industry in India. Paper presented at International Conference on Information and Communication Technologies and Development (ICTD2006), Berkeley, May.

ALA (2005). "Bangladeshi Libraries Win 2005 Gates Award." Available online at http://www.ala.org/ala/alonline/currentnews/newsarchive/2005abc/august2005abc/bengladesh.cfm [May 14, 2008].

Andrew, T., and D. Petkov. (2003). The need for a systems thinking approach to the planning of rural telecommunications infrastructure. *Telecommunications Policy* 27(1–2):75–93.

Arunachalam, S. (2002). "Reaching the unreached: How can we use information and communication technologies to empower the rural poor in the developing world through enhanced access to relevant information?" *Journal of Information Science* 28(6): 513– 522.

Batchelor, S., Evangelista, S., Hearn, S., Pierce, M., Sugden, S., and Webb, M. (2003). "ICT for Development Contributing to the Millennium Development Goals: Lessons Learned from Seventeen infoDev Projects". World Bank.

BMGF (2006). "BiblioRedes: Abre tu Mundo Overview: Opening the World for Chileans." Available online at http://www.gatesfoundation.org/GlobalDevelopment/GlobalLibraries/LibraryProjectChile/Chile_Overview.htm [May 14, 2008].

Boyatzis, R. E (1998). Transforming Qualitative Information: Thematic Analysis and Code Development. Thousand Oaks, CA: Sage Publications.

Brewer, E., Demmer, M., Du, B., Ho, M., Kam, M., Nedecschi, S., Pal, J., Patra, R., Surana, S., and Fall, K. (2005). The case for technology in developing regions. *IEEE Computer* 38(6):25–38.

Cabanero-Verosa, Cecilia (2003). "Strategic Communication for Development Projects: A Toolkit for Task Team Leaders." World Bank.

Campbell-Page, Elizabeth (ed.) (2001). *Participation in Development Assistance*. World Bank Operations Evaluation Department. Reoirt Number 24566.

Cecchini, Simone (2002). "Information and Communications Technology for Poverty Reduction- Lessons from Rural India," IEEE.

Cecchini, Simone and Christopher Scott (2003). "Can Information and Communications Technology Applications Contribute to Poverty Reduction? Lessons from Rural India." *Information Technology for Development*, 13 (4) 311-313.

Chacko, J. G. (2002). *ICT Policies for Poverty Reduction and Human Development - Reassessment,* UNDP.

Chambers, Robert (1997). Rural Development: Putting the First Last. London: Intermediate Technology Publications.

Charmaz, K. (2000). "Grounded Theory: Objectivist and Constructivist methods." In N. Denzin and Y. Lincoln, eds., Handbook of Qualitative Research (2nd ed., pp. 509–536). Thousand Oaks, CA: Sage.

Colle, R. D. (2005). Memo to Telecenter Planners. *Electronic Journal of Information Systems in Developing Countries*, 21(1), 1-13.

Corbin, J., and A. Strauss. (1990). "Grounded Theory Research: Procedures, Canons, and Evaluative Criteria." *Qualitative Sociology*, 13, 3–21.

DFID, Department for International Development (2005). "Monitoring and Evaluating Information and Communication for Development (ICD) Programmes: Guidelines." Wiltshire, UK. March.

Dagron, G. (2001), "Prometheus Riding a Cadillac? Telecentres as the promised flame of knowledge",J*ournal of Development Communication: Special Issue on Telecentres*12(2). Available online at http://ip.cals.cornell.edu/commdev/documents/jdc-dagron.doc [May 10, 2008].

Dewan, S., and F.J. Riggins. (2005). The digital divide: Current and future research directions. *Journal of the Association for Information Systems*, 6(12), 298–337.

Eggleston, K., Jensen, R., and Zeckhauser, R. (2002). "Information and Communication Technologies, Markets, and Economic Development." In *The Global Information Technology Report 2001–2002: Readiness for the Networked World*, G. Kirkman, P. Cornelius, J. Sachs, and K. Schwab (eds.).

Etta F. and S. Parvyn-Wamaliu, eds. (2003). *Information and Communication Technologies for Development in Africa, Vol 2, The Experience with Community Telecentres*. Available at www.idrc.ca.

Fillip, Barbara and Dennis Foote (2007). "Making the Connection: Scaling Telecenters for Development." Informatin Technology Applications Center of the Academy for Education Development. Washington, D.C. Available online at http://connection.aed.org/index.htm [April 20, 2008].

Fink, C., and C. Kenny. (2003). *W(h)Ither the digital divide?* Washington, DC: World Bank.

Fonseca, R and J. Pal. (2004). “Bringing Devices to the Masses: A Comparative Study of the Brazilian Computador Popular and the Indian Simputer.” Presentation at the South Asia Conference, UC Berkeley, February 2004.

Fundación CTIC (2006). Las Redes de Telecentros en España. Una Historia Por Contar. Asturias. Available at www.fundacionctic.org [17 September 2007].

Gomez, R., Delgadillo, K., and Stoll, K. (2002) “Community Telecentres for Development: Lessons From Community Telecentres in Latin America and the Caribbean.” . IDRC, Ottawa. Available online at http://reseau.crdi.ca/en/ev-11917-201-1-DO_TOPIC.html [April 26, 2008].

Glaser, B. G., and A.L. Strauss. (1967). The Discovery of Grounded Theory: Strategies for Qualitative Research. New York: Aldine Publishing.

Harris, R. (2001). “Telecenters in rural Asia: Towards a success model.” Conference proceedings of International Conference on Information Technology, Communications and Development, November, Kathmandu, Nepal.

Heeks, Richard (2002). “i-Development Not e-Development: Special Issue on ICTs and Development.” *Journal of International Development* 14 (1).

Hill, R., et al. (2004). Beyond access: Bridging the digital divide. Paper presented at the European Conference on Information Systems, Turku, Finland, June 14-16. Association for Information Systems, 1–8.

IFLA (2002). “Donkeys Help to Provide Multimedia Library Services”. Press Release. Available online at http://www.ifla.org/V/press/pr0225-02.htm [May 14, 2008].

Information Technologies Group (undated). “Readiness for the Networked World: A Guide for Developing Countries.” Available online at http://cyber.law.harvard.edu/readinessguide/index.html [April 24, 2008].

Keniston, Kenneth (2002). “Grassroots ICT Projects in India: Some Preliminary Hypotheses.” *ASCI Journal of Management* 31 (1&2).

Kenny, C. (2001). Information and communication technologies and poverty. *TechKnowLogia* July/August.

Kiri, K., and D. Menon. (2006). “For Profit Rural Kiosks in India: Achievements and Challenges.” *i4d Magazine*. Available online at http://www.i4donline.net/articles/current-article.asp?articleid=700&typ=Features [May 14, 2008].

Kumar, Richa (2004). eChoupals: A Study on the Financial Sustainability of Village Internet Centers in Rural Madhya Pradesh. *Information Technologies and International Development*. 1 (3) 45-73.

Kumar, Richa and Mike Best. (2006). "Social impact and diffusion of telecentre use: a study from the sustainability access in rural India project." *Journal of Community Informatics*. Available at http://ci-journal.net/index.php/ciej [17 September 2007].

Kuriyan, Renee, Ray, I., and Toyama, K. (2008). "Information and Communication Technologies for Development: The Bottom of the Pyramid Model in Practice." *The Information Society*. Volume 24(2).

Kvasny, L., and M. Keil. (2006). The challenges of redressing the digital divide: A tale of two US cities. *Information Systems Journal.* 16 (23) 23–53.

Maham, A., ed. (2006). *Telecottage handbook: How to establish and run a successful telecentre*. New York: United Nations Development Program. Available online at http://europeandcis.undp.org/?menu=p_cms/show&content_id=1EAEB3D3-F203-1EE9-BD0C279330992AC8 [April 20, 2008].

Mansell, R., and U. Wehn, eds. (1998). *Knowledge societies: Information technology for sustainable development.* Oxford: Published for the United Nations by Oxford University Press.

McNamara, Kerry S. (2003). "Information and Communication Technologies, Poverty and Development: Learning from Experience." Background paper for the infoDev Annual Symposium, December 9-10, 2003 Geneva, Switzerland.

Myers, M. (2004). *Evaluation methodologies for information and communication for development (ICD) programmmes*, Guidelines. London: DFID.

Parks, Will (2005). "Who Measures Social Change? An Introduction to Participatory Monitring and Evaluation of Communication for Social Change." Communication for Social Change Consortium. Available online at http://www.communicationforsocialchange.org/publications-resources.php?id=283 [April 7, 2008].

Pontin, James. (2005). "From the Editor: The Hundred-Dollar Laptop." *Technology Review*. August 2005. Available Online at http://www.technologyreview.com/Infotech/14659/ [February 24, 2008].

Proenza, Francisco (2001). "Telecenter Sustainability: Myths and Opportunities". From Dixon and Wattenbach (eds.) "Bridging the Rural Knowledge Gap: Information Systems for Improved Livelihoods". Available online at http://www.e-forall.org/pdf/TelecenterSustainability.pdf [May 10, 2008].

Ramirez, Ricardo (2007). "Appreciating the contribution of broadband ICT with rural and remote communities: Stepping stones toward an alternative paradigm". *Information Society*. Volume 23 (2).

Rothenberg-Aalami, J., and Joyojeet Pal (2005). "Rural Telecenter Impact Assessments and the Political Economy of ICT for Development (ICT4D)." . Berkeley Roundtable on the

International Economy (BRIE). January. Available online at http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1127&context=brie [April 20, 2008].

Standage, Tom. (1998). The Victorian Internet: The Remarkable Story of the Telegraph and the Nineteenth Century's On-line Pioneers. New York: Berkley Books.

Stoll, Klaus (2003). "Telecentres Sustainability: What Does it Mean?," Development Gateway, February 8, 2003.

Stone, P. (1997). "Thematic text analysis: new agendas for analyzing text content." Text analysis for the social sciences: methods for drawing statistical inferences from texts and transcripts. Ed. C. W. Roberts. Mahwah, NJ: Lawrence Erlbaum Associates, 35-54.

Strauss, A., and J. Corbin. (1998). Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory (2nd ed.). Thousand Oaks, CA: Sage.

Strover, S., Chapman, G., and Waters, J. (2004). Beyond community networking and CTCs: Access, development, and public policy. *Telecommunications Policy* 28:465–485.

SUBTEL (2005). *Estudio: Sistematización de la Información del proceso de implementación de Telecentros Comunitarios en Chile*. Gobierno de Chile. Subsecretaria de Telecomunicaciones. Available at www.infocentros.gob.cl [24 April 2008].

Telecentre. (2008). In *Wikipedia, the free encyclopedia*. Retrieved April 24, 2008, from http://en.wikipedia.org/wiki/Telecenre.

telecentre.org (2008). "History." Available online at http://www.telecentre.org/en/about/101441/ [May 14, 2008].

Toyama, Kentaro, Karishma Kiri, Maithreyi L. Ratan, Anil Nileshwar, Rama Vedashree and Rafael F. MacGregor (2004). "Rural Kiosks in India," Microsoft Research Technical Report, December.

Toyama, K., R. Reddy, et al. (2007). "An Introduction to the Best ICTD 2006 Conference Papers." Information Technologies and International Development 4(1): 1-3.

UNCTAD (2007). "Promoting Livelihoods through Telecentres." Chapter 7 Information Economy Report 2007-2008, Science and Technology fro Development: The New Paradigm of ICT. UNCTAD: Geneva.

UNDP. (2001). "Human Development Report 2001: Making new Technologies Work for Human Development." New York: Oxford University Press.

Wellenius, B. (2003). Sustainable telecenters: A guide for government policy. Note no. 251. Washington, DC: Private Sector and Infrastructure Network, The World Bank Group. January.

Appendix I – Country Selection Criteria

The following describes the process CIS employed to choose the final 24 countries used in this research.

Step 1

CIS researchers used a systematic process to select 24 countries from the United Nation's list of 237 countries and territories. The first reduction step included using population, GNI per capita, and Human Development Index (HDI) factors to stratify the sample. Countries with populations less than 1 million or greater than 1 billion were deemed too small or large for the study. Additionally, all high income-countries (those with a GNI per capita above $11,116) were considered too wealthy and excluded. Low-HDI countries (those with an HDI below .5) were excluded as being too undeveloped. CIS then eliminated an additional 11 countries based on a lack of minimum political rights and civil liberty issues outlined in the Freedom House Index (countries with a score below 6.5 were eliminated). Finally, another five countries were excluded due to concerns over physical security for in-country research. This process reduced the UN list to 74 countries.

Step 2

The remaining 74 countries were then narrowed to 30 countries by using three "need" and three "readiness" criteria.

The "need" criteria included:

- Inequality – income inequality using the Gini Index was used as a proxy indicator for such types of inequality as geographic, ethnic and gender. CIS assumed that countries

with relatively greater inequality suggested greater potential need for public ICT access. The index was normalized for the need ranking and given a weight of 1.

- ICT usage – Internet users per capita (as included in the 2007 CIA World Factbook) was employed as a proxy indicator for ICT use within a country. CIS assumed that countries with relatively low ICT usage indicated greater potential need for public ICT access. The values were normalized for the need ranking and given a weight of 1.
- ICT cost – lowest broadband cost as a percentage of monthly income (from the 2006 International Telecommunications Union's World Information Society Report) was used as a proxy indicator for ICT cost. CIS assumed that countries with relatively high ICT cost suggested greater potential need for public ICT access. The values were normalized for the need ranking and given a weight of 1.

The "readiness" criteria included:

- Politics – eight indices were used, including: government prioritization of ICT; importance of ICT to government's vision of the future; government success in ICT promotion; intensity of local market competition; freedom of the press; corruption perceptions; government effectiveness; and, regulatory qualities.[10] Each index served as proxy indicators to evaluate multiple dimensions of political support and policies, while also suggesting greater potential readiness for public ICT access. Each index was normalized for the readiness ranking and given a weight of .25.
- Skills – adult literacy and school enrollment (using the 2007 International Telecommunication Union opportunity skills index) was employed as a proxy indicator

[10] Listed in order, data from: World Economic Forum Global Information Technology Report (2006), Transparency International (2007), World Bank Worldwide Governance Indicators (2006).

for skills. CIS assumed that countries with relatively high literacy and enrollment rates indicated a greater potential readiness for public ICT access. The index was normalized for the readiness ranking and given a weight of 1.

- ICT infrastructure – fixed phone density, mobile phone density and international Internet bandwidth (using the 2007 International Telecommunication Union opportunity network index) was used as a proxy indicator for ICT infrastructure. CIS assumed that countries with relatively high teledensities and Internet bandwidth indicated greater potential readiness for public ICT access. The index was normalized for the readiness ranking and given a weight of 1.

These 6 criteria were considered collectively and each was assigned a weight of "1," except for Politics, which was given a weight of "2" due to the higher relative importance political readiness plays in any country-wide public access ICT program. Data were normalized for comparison values across all criteria.

CIS then used a three-tier ranking system representing high, medium and low readiness, with each tier ranked according to need. This placed 25 countries in Tier 1 (high readiness, high to low need), 25 countries in Tier 2 (medium readiness, high to low need), and 24 Tier 3 countries (low-readiness, high to low need). Next, CIS decided on a distribution of 8 countries in Tier 1, 14 countries in Tier 2, and 8 countries in Tier 3 for a total of 30 countries. This distribution was chosen in order to capture more countries in the middle tier of readiness along with a sample of countries that represent higher risk and high impact potential (Tier 3).

Finally, to select countries within each Tier, four additional criteria were applied:

1) Regional representation

2) Library counts[11]

3) Availability of research teams

4) Other tipping factors (future infrastructure plans, etc.)

Step 3

Because research partner selection was closely associated with the final country selection, the final process occurred simultaneously.

In mid-September 2007, a call for expressions of interest (EOI) was sent to researchers by way of listservs and leads provided by CIS and Information School colleagues, from which 220 research teams responded. Subsequently, in mid-October, CIS distributed a request for qualifications (RFQs) to interested researchers from the approved list of 30 countries delineated above.

Based on established selection criteria methodology, global and regional representation, quality of researcher proposals and availability of research teams to cover multiple countries, the final 25 countries were chosen on November 9, 2007.

The final tier breakdown for readiness, ranked by need was 7-11-7. That is, CIS selected 7 high readiness and 7 low readiness countries, with the majority of countries (11) in the middle tier of readiness.

[11] Library counts from the International Federation of Libraries Association, Internet and literature searches. Libraries per capita derived from library counts and population.

Part way through the in-country research process, the Malaysia research team encountered problems continuing with the research. CIS thus eliminated Malaysia from the list, bringing the final total to 24 countries. At the time of this research, the team from Indonesia had still not submitted a report so Indonesia was left out of this analysis. Table 15 below shows the need/readiness scores of the final 24 countries relative to each other and their need/readiness rankings relative to the group of 24.

Table 15. Need/Readiness Rankings of Final 24 Countries

Country	Need/Readiness			
	Normalized Need Score (relative to 24)	Need Ranking ("1" reflects highest need)	Normalized Readiness Score (relative to 24)	Readiness Ranking ("1" reflects highest readiness)
Algeria	-0.71	16	-0.22	14
Argentina	-1.88	22	1.67	7
Bangladesh	0.8	5	-4.92	24
Brazil	0.13	9	3.13	3
Colombia	0.6	6	2.88	4
Costa Rica	-2.04	23	2.65	5
Dominican Rep.	0.09	10	1.25	8
Ecuador	0.16	8	-1.53	18
Egypt	-0.89	17	-0.72	16
Georgia	-0.03	11	0.2	12
Honduras	1.26	4	-2.13	20
Indonesia	-0.98	18	-1.59	19
Kazakhstan	-0.41	14	1.8	6
Kyrgyzstan	-1.06	19	-2.28	21
Moldova	-1.38	20	0.07	13
Mongolia	-1.6	21	0.75	10
Namibia	3.26	2	-0.77	17
Nepal	2.6	3	-4.83	23
Peru	-0.5	15	0.83	9
Philippines	-0.2	12	0.29	11
South Africa	0.4	7	3.35	2
Sri Lanka	-0.32	13	-0.67	15
Turkey	-2.35	24	4.03	1
Uganda	5.04	1	-3.24	22

Appendix II – Atlas.ti Codes

The following table provides a list of the codes that emerged during open-coding process. Numbers in parentheses indicate the number of occurrences. Codes are clustered into larger families. The term cluster implies a connection among labels and in no way designates any form of exclusiveness of codes within one cluster. Rather, clustering allows for a grouping of more related terms to better understand the relationship across broader families.

Table 16. Codes that Emerged from Atlas.TI Analysis

Users	Access restrictions (13)	**Networks/Collaboration**	Collaboration with NPs (22)
	Affordability (41)		Collaboration with other projects (12)
	Appropriate usage (4)		Competition with other venue types (13)
	Cool factor (4)		Collaboration with private sector (22)
	Equality (7)		Collaboration with public sector (52)
	Demand (4)		Government coordination to provide ICT (4)
	Gender (24)		Government support of ICT (14)
	Literacy (26)		Government support of venue (46)
	Physical access (25)		Knowledge sharing (3)
	Underserved communities (127)		Network connecting centers (32)
	Urban/non-urban breakdown (36)		Stakeholder partnership (6)
	Usage (31)		Support of venue by other entities (18)
	User perceptions (1)		Support past initial investment (4)
	User skills (19)	**Sustainability**	Age of venue (9)
	Users (90)		Awareness of venue problems (7)
	Venue manager awareness of clients (13)		Capacity building (16)
Community Participation	Community awareness of venue (23)		Failure (41)
	Community involvement (18)		Fee system (51)
	Community perceptions (49)		Finances (40)
	Community support (4)		Fundraising (1)
	Lobbying and activism (1)		Incentives for investment (1)
	Outreach (8)		Outcomes (6)
	Program visibility (1)		Profit motive (12)
	Support by civil society (14)		Success (25)
Services	Appropriate technology/services (9)		Sustainability (29)
	Certifications (12)	**Staff**	Staff commitment to the center (2)
	Content development (2)		Staff education level/qualifications (59)
	Definition (8)		Staff size (19)
	e-Government (5)		Staff turnover rate (1)
	Expansion of services (4)		Volunteers (6)
	ICT tools/services (46)	**Planning**	Evaluation and monitoring system (7)
	Information gaps (8)		Framework for implementation (11)
	Information provided (35)		Locally relevant business plan (3)
	Local language/relevant content (61)		Objectives (3)
	Security (1)		
	Services (66)	**Infrastructure**	Availability of repair people (6)
	Similarity of services across locations (21)		Hardware condition (19)
	Special services (2)		Infrastructure (20)
	Support services (3)		Internet connectivity (21)
	Training (93)		Reliability (7)
	Venue role (1)		

Appendix III – Code Families and Indicators of Success each Code Used in for Discussion

Table 17. Code Families and the Indicators of Success each Code Discussed in

Code	Family Code Clustered into During Qualitative Analysis	Indicator of Success Used in For Discussion
Community involvement	Community Partnerships	Involve local communities Local context relevance of services
Community support	Community Partnerships	Involve local communities
Support from civil society	Community Partnerships	Involve local communities
Users	Users	Be aware of differing individual needs
Gender	Users	Be aware of differing individual needs
Services	Services	Be aware of differing individual needs Local context relevance of services
Evaluation and monitoring system	Planning	Monitoring and evaluation systems
Framework for implementation	Planning	Monitoring and evaluation systems
Training	Training	Training of Staff
Local language and relevant content	Services	Training of Staff Local context relevance of services
Staff education level/qualifications	Staff	Training of Staff
Venue manager awareness of clients	Users	Local context relevance of services
Community perceptions	Community Participation	Local context relevance of services
Stakeholder partnerships	Networks/Collaboration	Local context relevance of services
Information gaps	Services	Local context relevance of services
Network connecting centers	Networks/Collaboration	Networks and collaborations
Infrastructure	Infrastructure	Appropriate infrastructure
Internet connectivity	Infrastructure	Appropriate infrastructure
Hardware condition	Infrastructure	Appropriate infrastructure

Appendix IV – Compiled list of codes analyzed and the countries included for each analysis

Table 18. Codes analyzed and the countries included in each analysis*

	Bangladesh	Brazil	Colombia	Costa Rica	Dominican Rep.	Ecuador	Egypt	Honduras	Moldova	Namibia	Nepal	Peru	Philippines	South Africa	Sri Lanka	Turkey	Uganda
Community involvement	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Community support	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Support from civil society	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Users	E	I	E	I	I	I	I	E	I	E	I	I	I	I	I	E	I
Gender	E	I	I	I	I	I	I	E	I	E	I	I	I	I	I	E	I
Services	E	I	I	I	I	I	I	E	I	E	I	I	I	I	I	E	I
Evaluation and monitoring system	E	I	E	I	I	I	I	E	I	E	I	I	I	I	I	E	I
Framework for implementation	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Training	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Local language and relevant content	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Staff education level/ qualifications	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Services	E	I	I	I	I	I	I	E	I	E	I	I	I	I	I	E	I
Local language and relevant content	E	I	E	I	I	I	I	E	I	E	I	I	I	I	I	E	I
Venue manager awareness of clients	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Community involvement	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Community perceptions	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Stakeholder partnerships	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Information gaps	E	I	E	I	I	I	I	E	E	E	I	I	I	I	I	E	I
Network connecting centers	E	I	I	I	E	I	I	E	I	I	I	I	I	I	I	E	I
Infrastructure	E	I	E	I	I	I	I	E	I	E	I	I	I	I	I	E	I
Internet connectivity	E	I	E	I	I	I	I	E	I	E	I	I	I	I	I	E	I
Hardware condition	E	I	E	I	I	I	I	E	I	E	I	I	I	I	I	E	I

***** "I" = included in the analysis; "E" = excluded from the analysis