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Public Access to ICTs: A Review of the Literature

Draft

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This document summarizes CIS's preliminary findings of a literature review of the types of research conducted to date on public access to ICTs, including issues investigated, methods used, main findings, and gaps in the literature.





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Objective

To review what type of research has been done on public access to ICTs, including issues investigated, methods used, main findings, and gaps in the literature. This document summarizes our preliminary findings.

Description

This review is based on approximately 80 journal articles and reports on public access to ICTs. It focuses mainly on electronically accessible research articles and on research published after 1999. The documents were derived from database searches as well as directly from members of the IPAI project community.

Not included in this review are documents which only describe particular projects, or only discuss public access typologies, definitions, or policy, or which critically comment on public access strategies. Also excluded are documents that discuss the socioeconomic impact of ICTs in general.

The initial phase of our research included a language-based inquiry in order to reveal novel and under-appreciated research that represents the perspectives of people living in the environments we aim to study.¹ The languages included in this review were English, French, Spanish, Portuguese, Arabic and Chinese. We asked reviewers to focus their attention on identifying the most important references in their language, providing thorough summaries with full citations. Findings from these foreign language reviews are intertwined with other references.

Summary of Findings

1. Most of the literature leans toward formative (process) evaluation as opposed to summative (impact) evaluations. Several reports that claim to be examining impacts in reality present data and conclusions on venue access and use patterns.
2. Studies have not established a clear link between public access to ICTs and socioeconomic change/impacts. Researchers are beginning to go beyond anecdotal evidence of public access impacts on end-users, but are still limited in their ability to make definitive statements about impacts. There is a trend toward the view that the impacts of public access to ICTs are so highly tied to contexts that generalizability may be impractical.
3. Research conclusions generally still speak to the potential rather than actual impact of public access to ICTs. Aside from the fact that impacts are difficult to measure and attribute, this could be linked to the tendency for most studies to find that public access is underperforming. Despite overall dissatisfaction with the performance of public access ICTs, the perception that they are an important means of bridging digital gaps remains strong.
4. Limited application or testing of theory and hypotheses. Very few studies are placed in the context of any theoretical framework (other than the general idea of ICTs for development). Some exceptions are:
 - a. Actor-Network (Ashraf, Swatman, & Hanisch, 2007)
 - b. Diffusion of Innovation (Ashraf et al., 2007; Hudson, 2001; Rajendra Kumar & Best, 2006b; Simpson, 2005)
 - c. Ecology of Games (Qiu & Zhou, 2005)
 - d. Stakeholder Theory (Bailur, 2006)
 - e. Sustainable Livelihoods (Parkinson, 2005; Parkinson & Ramírez, 2006; UNCTAD, 2008)
 - f. Sustainability/Failure Model (Rajendra Kumar & Best, 2006a)
 - g. Descriptive Research Design (Adeyinka, 2007)

Even fewer studies test specific hypotheses, and those that do don't always fully report the statistics or the process. Studies that include some hypothesis testing (with varying degrees of rigor) are: Gitta & Ikoja-Odongo (2003) – reasons for using cybercafé, relationship between education and internet use; Miller(2004) – statistical significance of findings on gender, occupation and location of infoplazas; Wahid, Furuholt, & Kristiansen (2004) – several hypotheses about the characteristics of early adopters of internet cafes (users and investors).

¹ This process, as well as the building of an extensive database of relevant literature, was coordinated by Ricardo Gomez, Elizabeth Gould, Rucha Ambikar, and Chris Rothschild at the Center for Information and Society.

Types of Research

1. **Mainly project-related studies:** The majority of existing research (about 80%²) is in the form of case studies comprising project descriptions, with an increasing number attempting some type of evaluation of the project. Evaluations tend to concentrate on the venue's level of success in attracting patrons and achieving long-term financial sustainability. A few such as Rajendra Kumar & Best (2006a) do concretely evaluate the societal impact of services (e-government in this case) (e.g., Amariles, et al., 2006; Arunachalam, 2002; Benjamin, no date; Crump & McIlroy, 2003; Gómez & Reilly, 2002; Hudson, 2001; Richa Kumar, 2004; Rajendra Kumar & Best, 2006b; McClure & Bertot, 1997; Parkinson & Ramírez, 2006; Sheppard, 2001; Short, 2001).
2. **Emerging non-project related studies:** More researchers are attempting investigations of public access to ICTs that are not linked to any particular project, or where they are project-related, try to include a selection of projects, rather than a single one (e.g., (Aabø, 2005; Bell, 2006; Benjamin, 2000; Black & Crann, 2002; Chigona, 2006; Eve & Brophy, 2001; Harris, Kumar, & Balaji., 2003; Haseloff, 2005; Kaiser, 2005; Lengyel, et al., 2006; Mayanja, 2006; McClure, et al., 2000; Mercer, 2006; Parkinson, 2005; Poll, 2005; Samarajiva, 2007; Selwyn, 2003; Usherwood, Wilson, & Bryson, 2005). These studies are contributing to a body of knowledge concerning public access in aggregate as a strategy to reduce digital gaps. Nevertheless, most of these also focus on issues relating to the financial sustainability of public access venues. A select few are beginning to attempt more varied analyses such as:
 - Comparing business models, e.g., private vs. public funded (Kaiser, 2005); NGO vs. entrepreneur (Rajendra Kumar & Best, 2006b); enterprise vs. social development vs. social enterprise (Mayanja, 2006); private vs. community-owned (Siochrú & Girard, 2005).
 - Comparing public access venue types and locations, e.g., school vs. library, telecenter vs. cybercafé (Chigona, 2006)
 - Comparing the results of public vs. private access, (Lengyel et al., 2006)
 - Comparing results in communities with and without public access venues, (Rajendra Kumar & Best, 2006a)
3. **Public access venue types:** At least half of the research³ has telecenters as the primary target. (e.g., Amariles et al., 2006; Bell, 2006; Benjamin, 2000, no date; Etta & S. Parvyn-Wamahiu, 2003; Guzzi, 2006; Hudson, 2001; Kiri & Menon, 2006; Richa Kumar, 2004; Rajendra Kumar & Best, 2006b; Kuriyan & Toyama, 2007; Latchem & Walker, 2001; Miller, 2004; Parkinson & Ramírez, 2006; Rangaswamy, 2006; R. Roman & Colle, 2002; Sheppard, 2001; Simpson, Daws, & Pini, 2004). However, there are also several works on other venues:
 - **Cybercafés**, (e.g., Adomi, 2007; Gitta & Ikoja-Odongo, 2003; Haseloff, 2005; Rangaswamy, 2007; Robinson, 2004; Stewart, 2000; Wahid et al., 2004)
 - **Libraries**, (e.g., Aabø, 2005; Bertot, McClure, & Jaeger, 2008; Bertot, et al., 2007; Black & Crann, 2002; Eve & Brophy, 2001; Heuertz, et al., 2003; McClure et al., 2000; Poll, 2005; M. G. Roman, Alexis, 2005; Rutkauskienė, no date; Selwyn, 2003; Usherwood et al., 2005)
 - **Multiple venue types**, (e.g., telecenters in libraries, schools, other venues (Chigona, 2006; Strover, Chapman, & Waters, 2004), telecenters and cybercafés (Etta & Parvyn-Wamahiu, 2003; Mercer, 2006); telecenters, cybercafés and phone shops (Colle, 2000; Mayanja, 2006; Oestmann & Dymond, 2001; Parkinson, 2005); telephones and the internet (Samarajiva, 2007); internet and libraries (D'Elia, et al., 2002); telecenter and home access (Lengyel et al., 2006)
4. **Geographic distribution of research areas**⁴: Most of the telecenter and cybercafé research is done in Asia, especially India. Other countries in the region are Sri Lanka, Philippines, Thailand, Malaysia, Vietnam, Laos, Bangladesh, Indonesia, and China. In the Middle East, Pakistan, Syria, Jordan, Turkey, and Saudi Arabia. In Africa, South Africa seems to be most represented; other countries are Burundi, Tanzania, Uganda, Mali, Mozambique, Ghana, Kenya, Rwanda, Botswana, Nigeria, and Senegal. In Latin America, countries include Costa Rica, Columbia, Panama, Mexico, Bolivia, Brazil, and Chile. Research in North America and Europe includes the US, Canada, UK and Hungary. A few

² Personal estimate.

³ Personal estimate. This conclusion is complicated by the different names used to identify development-oriented public access venues (e.g., telecenters, community networks, community technology centers, rural internet kiosks).

⁴ Note: needs more reviewing to identify patterns, including analysis of foreign language articles.

studies have also been conducted in Australia, New Zealand, and the Pacific. Practically all the library literature is based in the US, with additional studies in the UK, Australia and Chile.

5. Research addressing specific development topics:⁵

- E-Government (Rajendra Kumar & Best, 2006a; Rajalekshmi, 2007)
- Economic opportunity (UNCTAD, 2008; Arunachalam, 2002)
- Agriculture (Richa Kumar, 2004)

6. Public access venue and impact evaluation frameworks: There is a growing body of work that aims to provide evaluation guidelines and recommendations for public ICT access practitioners, policymakers and researchers (Brophy, 2002; Eve & Brophy, 2001; Gómez, Hunt, & Lamoureux, 1999). So far, all the frameworks identified concentrate on telecenter and library type facilities rather than purely commercial establishments such as cybercafés. The telecenter frameworks in particular demonstrate a growing trend towards participatory evaluation methods (e.g., Gómez & Reilly, 2002; Hudson, 2001). (See Appendix B for a list of evaluation frameworks).

7. Literature Reviews: A few overviews of public access research and public access practice. Two major efforts are Kuriyan & Toyama (2007), an in-depth assessment of research on rural internet kiosks; and Paul, Katz, & Gallagher (2004), a detailed analysis of the geographic distribution, funding sources and activities of projects (including telecenter projects) recorded in the Digital Dividends clearinghouse database. In addition, Poll (2007) has created a bibliography of the impact and outcome of libraries.

Research Questions

Research questions are often implied rather than clearly stated. The majority (70-80%)⁶ tend to be venue performance or user access related. Examples of typical research questions are listed below⁷:

1. **Venue performance-related:** (e.g., Aabø, 2005; Bell, 2006; Benjamin, no date; Black & Crann, 2002; Chigona, 2006; Etta & Parvyn-Wamahiu, 2003; Kaiser, 2005; Mayanja, 2006; McClure et al., 2000; Oestmann & Dymond, 2001; R. Roman & Colle, 2002; Short, 2001; Siochrú & Girard, 2005; Usherwood et al., 2005; Wahid et al., 2004)
 - How has the public libraries' role changed due to the widespread use of the Internet?
 - Is there a future for public libraries?
 - Will society still need them? (Aabø, 2005)
 - What challenges and benefits arise when a telecenter operates from a public institution? [implied] (Chigona, 2006)
 - What is the nature of access to ICTs within the telecentres?
 - How relevant (i.e., useful and appropriate) are the services and content offered or available at the telecentres to community members and how well do they meet community needs?
 - What economic, infrastructure, social, educational, or political factors contribute to, or are important to, the sustainability of telecentres?
 - What is the nature of the social, economic, political, and technological context within which the telecentres operate? (Etta & Parvyn-Wamahiu, 2003)
 - Do people in the community know that the centers exist?
 - How well do the centers publicize their services?
 - Do the users believe that the centers make a difference in their lives? (Kaiser, 2005)
 - Is there empirical evidence that in certain circumstances a community owned model has advantages over a private enterprise one? (Siochrú & Girard, 2005)

⁵ Note: needs more reviewing to identify patterns.

⁶ Personal estimate

⁷ Individual reports contain a mix of research questions. The examples here are characterized according to what appears to be the central focus of the research and findings.

- What are the main characteristics of pioneering Internet café entrepreneurs in a developing economy?
 - What lessons can be learned from innovators and early adopters of the Internet café business operating within centrally located and relatively well-developed areas of Indonesia. What are the main contextual elements that could be improved and accommodated in a strategy for diffusing that innovation into more rural and remote areas of the country? [implied] (Wahid et al., 2004). **Hypotheses:**
 - H 1: Since Internet technologies are continuously changing, all Internet cafés, both early and late established, will exhibit innovative change.
 - H 2: Early adopters of the Internet café concept will have to expand and re-invest to keep pace with technological development and maintain a competitive position. They are therefore expected to require a higher level of capital reinvestment in comparison with later business starters.
 - H 3: Early adopters are more highly educated than later adopters.
 - H 4: Early adopters have more advanced technical skills than later adopters.
 - H 5: Early adopters have a higher level of 'entrepreneurial readiness' than later adopters.
 - H 6: The early Internet café market is characterized by young customers, who are well educated and relatively wealthy.
 - H 7: Internet cafés spread first in urban areas characterized by advanced infrastructure and a population with reasonable incomes and 'modern' values.
2. **Access-related:** (e.g., Amariles et al., 2006; Crump & McIlroy, 2003; Haseloff, 2005; Hudson, 2001; James, 2005; Kumar & Best, 2006b; Parkinson, 2005; Samarajiva, 2007; Selwyn, 2003)
- Who has access to what forms of public ICT sites?
 - How does people's 'effective' access to public ICT sites compare with their 'formal' access?
 - Who is making use of different forms of public ICT sites?
 - Who is not making use of public ICT sites and why? (Selwyn, 2003)
 - What does universal access mean and what is it intended to achieve, as stated by policy and national leaders in South Africa and Uganda?
 - What forms have shared access centres taken and what is their role in national universal access strategies?
 - What roles do different forms of shared access centres play in development?
 - In what ways can policy makers, donors and supportive intermediaries expand, sustain and use shared access initiatives to achieve universal access goals and maximize developmental benefits? [implied] (Parkinson, 2005)
3. **Use-related:** (e.g., Amariles et al., 2006; Black & Crann, 2002; Crump & McIlroy, 2003; D'Elia et al., 2002; Haseloff, 2005; Hudson, 2001; Kaiser, 2005; Rajendra Kumar & Best, 2006b; Parkinson & Ramírez, 2006; Samarajiva, 2007)
- Who is using cybercafés in the urban areas of India?
 - What are the reasons people use cybercafés?
 - Do disadvantaged groups such as the elderly, low-income groups or those with low education levels use cybercafés, or are cybercafés just an additional access point for people who already have access elsewhere?
 - Does the relevance of using cybercafés differ for various groups? (Haseloff, 2005)
 - What is the contribution of cybercafés in providing information services to Ugandans in areas such as education and research, trade and commerce, health and recreation? [implied]. **Hypotheses:**⁸
 - HO1: Most users go to cybercafés for only e-mail services.
 - HA1: Users of cybercafés have other information needs than e-mail.
 - HO2: There is no relationship between users' education levels and their Internet use.

⁸ Authors indicate use of chi-square tests but do not report the figures.

- HA2: There is a close link between education levels and their Internet use. (Gitta & Ikoja-Odongo, 2003)
- Why, when computing is available in a socially situated, convenient environment, at no cost, do people choose not to compute? (Crump & McIlroy, 2003)
- 4. **Impact –related:** (e.g., Amariles et al., 2006; Bertot, McClure, & Ryan, 1999; Dangwal, et al., 2005; Eve & Brophy, 2001; McClure et al., 2000; Parkinson, 2005; Parkinson & Ramírez, 2006; Poll, 2005)
 - What are the main direct and indirect cost and benefits to users and non-users?
 - What are the impacts of different key applications (small business support, distant education, emergency response, personal communications etc.)?
 - What are the different impacts of successful and failing telecentres?
 - What are social, economic, cultural impacts on different groups within community?
 - What new demands are created by the telecentres?
 - Do telecentres perpetuate the dynamic of urban-rural links or also encourage more exchanges between small communities?
 - What evidence is there that telecentres strengthen democracy? Local pride? (Whyte, 1998; 2000) ⁹
 - What are the advantages and disadvantages of the spread of information technology on the basis of networks as opposed to institutions? [implied] (Lengyel et al., 2006).
 - Is the availability of the internet at the telecentre leading to improved livelihood outcomes for local residents, especially those who face the most limitations on their livelihood options? (Parkinson & Ramírez, 2006)
 - What is the value and impact of the provision of end-user access to IT-based services in public libraries? (Eve & Brophy, 2001)
 - What types of information are people obtaining through the telecenters?
 - Does the information obtained lead to changes in decision making, in livelihood strategies, and ultimately, in people's welfare?
 - Who are and who were not using the telecenters?
 - To what extent does the project have an impact on organizational performance (effectiveness, efficiency & viability) of collaborating organizations?
 - Hypothesis: through telecenters individuals will obtain information that could help them make better decisions. (Amariles et al., 2006)

Methods¹⁰

Case studies dominate. Also mixed methods, usually a combination of interviews, surveys and observation:

- Household surveys
- Telephone surveys
- User exit surveys
- Non-user surveys
- Public access venue management/staff interviews
- User interviews
- Focus groups
- Case histories

⁹ Impact-related research questions within the proposed telecenter research framework. Not questions examined in an actual study.

¹⁰ Note: Needs more work.

- Observation
- Usage logs
- Analysis of financial records
- Photo documentation
- Literature review

Experimental research designs are rare, some exceptions being Lengyel et al. (2006) and Dangwal et al. (2005). Lengyel et al. (2006) designed a project in which some residents of a community (in Hungary) were provided with computers for home use and were encouraged to share their training and computer access with others in the community. At the same time, patronage of the local community technology center was monitored. The objective of the study was to determine the relative efficiency of IT learning through institutions vs. through social networks. The study by Dangwal et al. (2005) was designed to examine whether children could learn computer skills without formal training. The researchers observed children's unsupervised use of hole-in-the-wall computer kiosks and measured their learning over nine months.

Research Findings on Impact

While several studies are framed as investigating the impact of public access to ICTs, the results they produce generally relate to impact of various factors (e.g., business models, management/operational issues, technical/technological issues, location, community participation, community characteristics, content/service relevance, cost, awareness levels, training and skills, demographics) on the use and financial sustainability of public access venues. Findings are mixed but lean towards conclusions that public access venues are not fulfilling their potential in achieving self-sustainability, reaching disadvantaged populations and bringing about noticeable socio-economic change. Specific results include data on:

- Venue sustainability
- Impact of economic, financial, social, cultural etc, contexts on venue performance
- Level of patronage
- User demographics
- Popularity/demand for particular services and applications
- Barriers to adoption
- Social and economic impact

Overall, although the research is still producing scattered results, there are some areas in which trends are becoming clear. These, as well as some isolated research conclusions are outlined below in relation to venue performance, access, use and impact.

Findings on Venue Performance

These mostly focus on issues related to financial sustainability and local relevance. Conclusions tend to discuss the impact of contextual issues on the venue, usually in an effort to explain the apparent lack of evidence of impact. Isolated conclusions from different studies are also listed below:

1. A low proportion of public access venues have achieved sustainability. For example Benjamin (no date) concluded that less than one-third of Universal Service Agency telecenters had the potential for sustainability. There is no agreement on one best model. Several authors emphasize the importance of commercial services, (e.g., Bell, 2006; Oestmann & Dymond, 2001). On the other hand, a study by Kumar & Best (2006b) found that access to financial subsidies enabled NGO-run kiosks to stay operational while a significant proportion of private kiosks had closed down. Mayanja (2006) suggests that the social development model fosters social capital, the enterprise model is stronger on financial sustainability but weak on social capital, and a social enterprise model may be a workable compromise (also (Siochru & Girard, 2005). Simpson, Daws, & Pini (2004) point out that economic sustainability is the measure of success in many of these ventures, and that these public access points need to be reconceptualized as essential community infrastructures like schools and libraries, and should thus be supported by government funding rather than viewed as potential economic enterprises. "This would mean re-defining the sustainability of a public access only in terms of the outcomes it produces in terms of social and community betterment rather than only in terms of economic gain." All research indicates that

success is associated with a variety of factors including good management, good locations, strong local demand, new service development, locally relevant services, external linkages and networking (e.g., Benjamin, no date; Etta & Parvyn-Wamahiu, 2003; Latchem & Walker, 2001; R. Roman & Colle, 2002).

2. Venues targeting middle and upper class populations demonstrate greater potential for sustainability (Mayanja, 2006).
3. Standalone venues attract fewer patrons and/or are more difficult to maintain than centers attached to other development-related institutions (Parkinson, 2005; Strover et al., 2004).
4. Support from public sector service providers facilitates sustainability (Richa Kumar, 2004; Sheppard, 2001).
5. Findings of the Kuriyan & Toyama (2007) review:
 - Rural PC kiosks are difficult to sustain.
 - Successful rural PC kiosks fall into several categories.
 - Meeting business needs and social development goals simultaneously is difficult.
 - What rural villagers want and what we think they need are frequently different.
 - The kiosk entrepreneur plays the most critical role in the success of a kiosk.
 - A kiosk champion can help sustain a set of kiosks.
 - Services require attention to the entire supply chain, not only to the kiosk.
 - Focus on a single class of services increases likelihood of success.
 - Kiosks do better in towns; kiosks do better in remote villages.
 - Kiosks in offices and schools may provide alternatives to the standalone kiosk.
 - Kiosk usage is dominated by relatively affluent, more educated young men.
 - Per-transaction fees are resisted by many customers.
 - Mobile-phone-based kiosks offer an alternative to PC-based kiosks.
6. Commercial centers are more responsive to technological change than donor-funded centers (Parkinson, 2005).
7. Libraries were found to be more willing than schools to host a public access facility (Chigona, 2006). This was related to greater perception by libraries that they would directly benefit from the association.
8. The location of a public access venue has an impact on the services provided and the way it is used. For example, Sheppard (2001) found that being located in a healthcare institution led the public access facility to focus on health services. Miller (2004) also found that infoplazas inside a library were more likely to be used for study and information-seeking purposes, while those in other locations were more likely to be used for entertainment and social interaction.

Findings on Access

Conclusions generally evaluate access levels/patterns and attribute them to a variety of contextual factors.

1. In most cases there is a sense that public access venues in rural locations are underutilized, especially by those considered most disadvantaged or those who could benefit the most. In western economies such as the US, UK and New Zealand, this has been attributed to low awareness levels (e.g., Kaiser, 2005), lack of interest (e.g., Crump & McIlroy, 2003), or the higher profile of private forms of access (e.g., Eve & Brophy, 2001; Selwyn, 2003). In developing countries low patronage has been attributed to affordability barriers (e.g., Parkinson, 2005), or the perception that public access venues are appropriate places for highly educated people (e.g., Etta & Parvyn-Wamahiu, 2003). However, overall, the central explanation given for observed low levels of use is the failure of public access venues to make their service relevant to the community.
2. The research reviewed overwhelmingly indicates that relative to the general population, the primary users of public access venues are young, male, relatively well-educated, of relatively higher socio-economic status, not physically disabled, and have usually had prior access to the Internet at some other location (e.g., Amariles et al., 2006; Etta & Parvyn-Wamahiu, 2003; Eve & Brophy, 2001; Gitta & Ikoja-Odongo, 2003; Haseloff, 2005; Hudson, 2001; Rajendra Kumar & Best, 2006b; Mercer, 2006; Parkinson, 2005; Parkinson & Ramírez, 2006; Robinson, 2004; Selwyn, 2003; Stewart, 2000). Use of these venues by students (high school and college) is particularly noticeable. There are some contrasting

findings though, such as Hudson (2001) whose review of projects in three African countries found, in addition to the above, that at some sites, NGO staff, medical staff and farmers were major users. Kaiser (2005) found that the users of community technology centers in the US were underrepresented groups (in terms of education, race and income). The overall trend is seen as a disappointing result by most commentators, however at least one author notes that the importance of public access venues to middle class society should not be discounted (Haseloff, 2005).

Findings on Use

1. The dominant finding here is that public access venues are used primarily to meet personal and social needs such as communicating with friends and family, entertainment, doing homework, and computer skills development (e.g., Etta & Parvyn-Wamahiu, 2003; Eve & Brophy, 2001; Gitta & Ikoja-Odongo, 2003; Haseloff, 2005; Lengyel et al., 2006; Mercer, 2006; Parkinson, 2005; Parkinson & Ramirez, 2006; Robinson, 2004; Stewart, 2000; Strover et al., 2004). This is not to say that other activities of more direct developmental benefit are not patronized; only that their use is outstripped by personal and social activities (Kuriyan & Toyama, 2007). Another trend that is becoming noticeable is that public access venue users appear to be motivated by the perception that exposure to computers and the internet will enhance their current and/or future employability, (e.g., Kaiser, 2005; Parkinson & Ramirez, 2006).
2. Specific services for which demand tends to be high are email, internet browsing and computer training. In some locations (especially African countries), traditional services such as videos, photocopying, telephony and print periodicals are often the dominant services sought.

Findings on Impact

There is a limited amount of research output that strongly demonstrates impact. Such findings are usually based on the perceptions of venue staff/management and users. In addition, any findings relating to impact can be said to flow from the benefits of access to ICTs in general. That is, they generally do not reveal unique contributions of public access as a development strategy. By extension however, the most obvious impact of public access ICTs is that the availability, and for some populations, accessibility of ICTs within the community is enhanced – hence the prevalence of studies documenting patronage levels. Beyond this there is no clear convergence of results on impact. Individual findings and conclusions are listed below (*in no particular order*):

1. Increase in IT knowledge and aspirations (Lengyel et al., 2006; Mercer, 2006).
2. The construction of “modern subjects” pursuing global culture, and for whom familiarity and use of the internet becomes a marker of their level of development (Mercer, 2006).
3. Enhanced status of community due to presence of ICT facilities (McClure et al., 2000; Mercer, 2006). For example (McClure et al., 2000) found that libraries were seen as an aspect of quality of life within a community
4. Positive/enhanced attitudes towards public access venues (Bertot et al., 1999; Eve & Brophy, 2001; Sheppard, 2001).
5. Perception of improved financial well being (personal and business) as a result of access to financial, business and job-related information; career support; technology training and other IT resources (McClure et al., 2000). Including cost savings from having access to information resources that users would otherwise have had to purchase.
6. Facilitation of civic activity (Ashton, 2007), (Finquelievich, 2004) e.g., through access to meeting rooms, voter registration etc. (McClure et al., 2000).
7. Enhanced maintenance of extended family networks (Parkinson, 2005).
8. Acknowledgement of venue staff (librarian) as an important resource (McClure et al., 2000).
9. Improved organizational capacity for institutions hosting public access facilities – a result of their access to ICTs, IT training, and resultant changes in working practices. (Amariles et al., 2006) found that these changes were more notable than community and user impacts.
10. Computer literacy can be achieved without formal training (Dangwal et al., 2005). This hole-in-the-wall computer study demonstrated that children had the ability to teach themselves computer skills.
11. Resource expanding activities (e.g., teleworking, job search, learning) are more evident in home/private use than at public access venues (Lengyel et al., 2006). This study concluded that network-based IT learning was as effective as institutionally organized learning, and was possibly more likely to be beneficial for the adult population.

12. Availability of e-government services at public access facilities is positively associated with use of certain services. Use of these services leads to lower levels of corruption in service delivery (Rajendra Kumar & Best, 2006a). In this study the researchers found increased use of birth certificate and old age pension services when residents became aware of the lower cost involved in accessing them at the internet kiosk, including people who would otherwise not have availed themselves of the service through the traditional means.
13. Telephone use is more popular than internet/computer use (Samarajiva, 2007).
14. Social exclusion of non-users/no improvement in social equity (Mercer, 2006; Parkinson & Ramírez, 2006).
15. Limited evidence of employment-related benefits (Lengyel et al., 2006; Mercer, 2006; Parkinson & Ramírez, 2006).
16. No change in low levels of community sociability and trust. Development of instances of envy (Lengyel et al., 2006).

What is missing/under-researched?

- Systematic impact analyses: Research so far can be characterized as relating to outputs and outcomes rather than impact
- Macro level impact analyses (see Ashraf et al, 2007)
- Impact of public access vs. private access or other investigations to identify the value added by public access ICT facilities.
- Measurement of magnitude of impacts
- Determinations of impact timeframes
- Impact of public access on specific sectors (health, education, civic engagement, etc)
- Impact of “development” vs. leisure activities at public access sites
- Cost-benefit analyses of public access provision
- Comparison of different public access business models
- Comparison of different public access venue types
- Examination of libraries as public access ICT venues (in developing countries)
- Incorporation of telephony in particular and technological convergence in general
- Theory applications

References

- Aabø, S. (2005). The role and value of public libraries in the age of digital technologies. *Journal of Librarianship and Information Science*, 37(4), 205-211.
- Adeyinka, T. (2007). Stakeholders' Perceptions of the Impact of the Global System for Mobile Communications on Nigeria Rural Economy: Implications for an Emerging Communications Industry. *The Journal of Community Informatics*, 3(4).
- Adomi, E. E. (2007). Overnight Internet Browsing among Cyber Café users in Abraka, Nigeria. *The Journal of Community Informatics*, 3(2).
- Alampay, E. A. (2006). Beyond access to ICTs: Measuring capabilities in the information society. *International Journal of Education and Development Using Information and Communication Technology*, 2(3).
- Amariles, F., Paz, O. P., Russell, N., & Johnson, N. (2006). The Impacts of Community Telecenters in Rural Colombia. *Journal of Community Informatics*, 2(3).
- Arunachalam, (2002). Reaching the Unreached: How Can We Use ICTs to Empower the Rural Poor in the Developing World through Enhanced Access to Relevant Information? International Federation of Library Associations and Institutions General Conference. Glasgow.
- Ashraf, M. M., Swatman, P., & Hanisch, D. J. (2007). Some perspectives on understanding the adoption and implementation of ICT interventions in developing countries. *The Journal of Community Informatics*, 3(4).
- Ashton, H., and Thorns, D. (2007). The Role of Information Communications Technology in Retrieving. *Local Community*, 6(3).
- Bailur, S. (2006). Using Stakeholder Theory to Analyze Telecentre Project. *MIT Press Journals, ITID*, 3(3), 61-80.
- Balboni, M. R. (2006/2007/2008). Pesquisa sobre o Uso das Tecnologias da Informação e da Comunicação no Brasil 2005, 2006 e 2007 (Survey on the use of Information and Communication Technologies in Brazil 2005, 2006 and 2007). São Paulo: Gestor da Internet no Brasil / Brazilian Internet Steering Committee.
- Bell, T. (2006). *Village computing: A state of the Field*.
- Benjamin, P. (2000). Telecentre 2000 Report 1: Literature Review: LINK Centre, P&DM, WITS University.
- Benjamin, P. (no date). Telecentres in South Africa. *The Journal of Development Communication Telecenters & ICT for Development - Critical Perspectives & Visions for the Future*.
- Bertot, J., McClure, C. R., & Ryan, J. (1999). *Importance of California Public Libraries in increasing public access to the Internet: Final Report*. San Mateo, CA: Peninsula Library System.
- Bertot, J. C., McClure, C. R., & Jaeger, P. T. (2008). The impacts of free public Internet access on public library patrons and communities. *Library Quarterly*, 78(3), 285-301.
- Bertot, J. C., McClure, C. R., Thomas, S., Barton, K. M., & McGilvray, J. (2007). *Public Libraries and the Internet 2007: Report to the American Library Association*. Tallahassee, FL: College of Information, Florida State University.
- Bianco, C., Lugones, G., & Peirano, F. (2003). Propuesta metodológica para la medición de la Sociedad del Conocimiento en el ámbito de los países de América Latina (Methodology Proposals for measuring Knowledge Society in Latin American Countries). Buenos Aires.
- Black, A., & Crann, M. (2002). In the public eye: A mass observation of the public library. *Journal of Librarianship and Information Science*, 34, 145.
- Brophy, P. (2002). *The evaluation of public library online services: Measuring impact*.
- Centro de Investigacion y Desarrollo de la Educacion (2004). Biblioredes - Abre Tu Mundo Project: Intermediate Evaluation Report. <http://www.biblioredes.cl/NR/rdonlyres/EF066796-154B-4380-B52D-687C080E6B2C/51638/InformeIntegradoEvaluaci%C3%B3nIntermediaBiblioRedes200>.
- Chigona, W. (2006). Should communal computing facilities cohabit with public facilities? *Journal of Community Informatics*, 2(3).
- Colle, R. (2000). Communication Shops and Telecentres in Developing Countries. In M. Gurstein (Ed.), *Community Informatics: Enabling Communities With Information*. Hershey: Idea Group Inc.

- Crump, B., & McIlroy, A. (2003). The digital divide: Why the "don't-want-tos" won't compute: Lessons from a New Zealand ICT Project *Journal*, 8(12). Retrieved from http://www.firstmonday.org/Issues/issue8_12/crump/index.html
- D'Elia, G., Jorgensen, C., Woelfel, J., & Rodger, E. J. (2002). The Impact of the Internet on Public Library Use: An Analysis of the Current Consumer Market for Library and Internet Services. *Journal of the American Society for Information Science and Technology*, 53(10), 802-820.
- Dangwal, R., Jha, S., Chatterjee, S., & Mitra, S. (2005). A Model of How Children Acquire Computing Skills from Hole-in-the-Wall Computers in Public Places. *Information Technologies and International Development*, 2(4), 41-60.
- Etta, F., & Parvyn-Wamahiu, S. (2003). *Information and communication technologies for development in Africa: volume 2. The Experience with Community Telecentres*. Ottawa/Dakar: International Development Research Centre (IDRC) /Council for the Development of Social Science Research in Africa.
- Evaluación del Impacto Social del Programa BiblioRedes (2004). Retrieved 3 July, 2008, from <http://www.biblioredes.cl/BiblioRed/BiblioRedes/Estudio+de+Impacto/>
- Eve, J., & Brophy, P. (2001). *The Value and Impact of IT Access in Public Libraries: Final Report*. .
- Fazio, M. E., & Goldstein, R. (2003). Algunas ideas acerca de la medición del impacto social de las TICs, Documento de trabajo N. 10 (Some ideas on measuring ICTs social impacts, Working Report n. 10). Buenos Aires.
- Finquelievich, S. (2004). Community Networks Go Virtual: Tracing the Evolution of ICT in Buenos Aires and Montevideo. In D. Schuler & P. Day (Eds.), *Shaping the Network Society*. Cambridge, MIT Press.
- Gitta, S., & Ikoja-Odongo, J. R. (2003). The impact of cybercafés on information services in Uganda *First Monday*, 8(4).
- Gómez, R., Hunt, P., & Lamoureux, E. (1999). Telecentre Evaluation and Research: a global perspective. In R. Gomez & P. Hunt (Eds.), *Telecentre Evaluation: a global perspective* (pp. 13-29). Ottawa: IDRC.
- Gómez, R., & Reilly, K. (2002). Comparing approaches: Telecentre evaluation experiences in Asia and Latin America. *The International Information & Library Review* 34(1), 22.
- Guzzi, A. d. A. (2006). *Participação Pública, Comunicação e Inclusão Digital (Public Participation, Communication and Digital Inclusion)*. Pontífica Universidade Católica São Paulo.
- Harris, R., Kumar, A., & Balaji, V. (2003). Sustainable Telecentres: Two Cases from India. In S. Krishna & S. Madon (Eds.), *In The Digital Challenge: Information Technology in the Development Context* (pp. 124-135). Aldershot: Ashgate.
- Haseloff, A. M. (2005). Cybercafés and their potential as Community Development Tools in India. *Journal of Community Informatics*, 1(3), 53 - 65.
- Heeks, R. (2007). Impact Assessment of ICT4D Projects: A Partial Review of Frameworks. Unpublished.
- Heuertz, L., Gordon, A. C., Gordon, M. T., & Moore, E. J. (2003). The Impact of Public Access Computing on Rural and Small Town Libraries. *Rural Libraries*, 23(1), 51-79.
- Hudson, H. E. (1999). Designing Research for Telecentre Evaluation. In R. Gomez & P. Hunt (Eds.), *Telecentre Evaluation: A Global Perspective* (pp. 149-164). Quebec: IDRC.
- Hudson, H. E. (2001). *The ACACIA programme: Developing evaluation and Learning systems for African Telecentres*. Vancouver.
- Impact des TIC dans le monde (2008). from <http://www.rezo7.info/2008/02/impact-des-tic.html>
- James, J. (2005). Technological blending in the age of the Internet: A developing country perspective. *Telecommunications Policy*, 29, 285 - 296.
- Jordan, V., & Hilbert, M. (Eds.). (2007). Monitoreo del eLAC2007:avances y estado actual del desarrollo de las Sociedades de la Información en América Latina y el Caribe (Monitoring LAC2007: Progress and present state Latin America and the Caribbean Information Societies). Santiago Naciones Unidas.
- Kaiser, S. (2005). Community technology centers and bridging the digital divide. *Knowledge, Technology & Policy*, 18(2), 83-100.
- Kiri, K., & Menon, D. (2006). For Profit Rural Kiosks in India: Achievements and Challenges. *Information Technologies for Development*.

- Kumar, R. (2004). e-Choupals: A Study on the Financial Sustainability of Village Internet Centres in Rural Madhya Pradesh. *Information Technologies and International Development* 2(1), 29.
- Kumar, R., & Best, M. (2006a). Impact and sustainability of e-government services in developing countries: lessons learned from Tamil Nadu, India. *Information Society*, 22(1), 1-12.
- Kumar, R., & Best, M. (2006b). Social Impact and Diffusion of Telecenter Use: A Study from the Sustainable Access in Rural India Project. *Journal of Community Informatics*, 2(3).
- Kuriyan, R., & Toyama, K. (2007). *Review of Research on Rural PC Kiosks*.
- Latchem, C., & Walker, D. (2001). *Perspectives on distance education: Telecenters: Case studies and key issues*. Vancouver: The Commonwealth of Learning.
- Lengyel, G., Eranusz, E., Füleki, D., Lőrincz, L., & Siklós, V. (2006). The Cserénfa experiment: On the attempt to deploy computers and Internet in a small Hungarian village. *Journal of Community Informatics*, 2(3).
- Maeso, O., & Hilbert, M. (2006). Centros de acceso público a las tecnologías de información y comunicación en América Latina: características y desafíos (Centers of public access to information technologies and communication in Latin America: characteristics and challenges). Santiago.
- Mayanja, M. (2006). Rethinking telecentre sustainability: How to implement a social enterprise approach - Lessons from India and Africa. *Journal of Community Informatics*, 2(3).
- McClure, C. R., & Bertot, J. (1997). *Linking people to the global networked society. Evaluation of the online at PA libraries project: Public access to the Internet through public libraries. Final Report*. Harrisburg, PA: Pennsylvania Department of Education, Office of Commonwealth Libraries, State Libraries of Pennsylvania.
- McClure, C. R., Fraser, B. T., Nelson, T. W., & Robbins, J. B. (2000). *Economic benefits and impacts from public libraries in the state of Florida. Final Report*.
- Mercer, C. (2006). Telecentres and transformations: Modernizing Tanzania through the internet. *African Affairs*, 105(419), 243-264.
- Miller, N. L. (2004). Measuring the Contribution of Infoplazas to Internet Penetration and Use in Panama. *Information Technologies and International Development*, 2(2), 23.
- OECD (Organisation for Economic Co-operation and Development) (2004). *The Economic Impact of ICT: Measurement, Evidence, and Implications*. Paris: Organisation for Economic Co-operation and Development.
- OECD (Organisation for Economic Co-operation and Development) (2008). *Measuring the Impacts of ICT Using Official Statistics*: Organisation for Economic Co-operation and Development.
- Oestmann, S., & Dymond, A. C. (2001). *Telecentres — Experiences, lessons and trends*. Vancouver.
- Parkinson, S. (2005). *Telecentres, Access and Development: Experience and Lessons from Uganda and South Africa*. Warwickshire, UK: ITDG/Fountain/IDRC.
- Parkinson, S., & Ramírez, R. (2006). Using a sustainable livelihoods approach to assessing the impact of ICTs in development. *Journal of Community Informatics*, 2(3).
- Paul, J., Katz, R., & Gallagher, S. (2004). *Lessons from the field: An overview of the current uses of information and communication technologies for development*. World Resources Institute.
- Poll, R. (2005). *Measuring the impact of new library services*. Paper presented at the World Library and Information Congress: 73th IFLA General Conference and Council Oslo.
- Poll, R. (2007). Bibliography "Impact and Outcome of Libraries" [Electronic Version], from <http://www.ulb.uni-muenster.de/projekte/outcome/downloads/bibliography-impact+outcome.pdf>.
- Proenza, F. (2002). *e-ForAll: A Poverty Reduction Strategy for the Information Age*. Rome: FAO Investment Centre.
- Qiu, J. L., & Zhou, L. (2005). Through the Prism of the Internet Cafe Managing Access in an Ecology of Games. *China Information*, XIX(2), 261-297.
- Rajalekshmi, K. G. (2007). E-governance services through telecenters: The role of human intermediary and issues of trust. *Information Technologies and International Development*, 4(1), 19-35.

- Rangaswamy, N. (2006). Social Entrepreneurship as Critical Agency: A study of Rural Internet kiosks. *IEEE/ICTD, May*, 143-152.
- Rangaswamy, N. (2007). *ICT for development and commerce: A case study of internet cafés in India*. Paper presented at the Proceedings of the 9th International Conference on Social Implications of Computers in Developing Countries. from <http://www.ifipwg94.org.br/fullpapers/R0071-1.pdf>
- Robinson, S. (2004). *Cybercafés and national elites: constraints on community networking in Latin America*. London: Community practice in the network society.
- Roman, M. G., Alexis. (2005). *Impact Evaluation of the "Biblioredes Abre tu Mundo" Project*. Retrieved. from <http://www.biblioredes.cl/NR/rdonlyres/EF066796-154B-4380-B52D-687C080E6B2C/171194/ImpactEvaluationoftheBiblioredesAbretuMundoProject.pdf>.
- Roman, R., & Colle, R. D. (2002). *Themes and issues in telecentre sustainability* (Development Informatics Working Paper No. 10): Institute for Development Policy and Management.
- Rutkauskienė, U. (no date). Impact measures for public access computing in public libraries. Vilnius University.
- Salas O., V., Yacometti Z., Ornella, and Bustos G., Atilio (2005). Informe Final de Evaluación: Programa Red de Bibliotecas Públicas Biblioredes. from http://geminis.dipres.cl/virilib/docs/Gestion/2005/doc21-228-200797_EPF090502072005_IF.pdf
- Samarajiva, R. (2007). Telecenters or mobiles? Connecting Sri Lankan families at the bottom of the pyramid. *Journal*, (May 17, 2007). Retrieved from http://www.lbo.lk/fullstory.php?newsID=2086475423&no_view=1&SEARCH_TERM=24
- Sciadas, G. (2005). Infostates across countries and over time: conceptualization, modeling, and measurements of the digital divide. *Information Technology for Development*, 11(3), 299-304.
- Selwyn, N. (2003). ICT for all? Access and use of Public ICT Sites in the UK. *Information, Communication & Society*, 6(3), 350 - 375.
- Sheppard, K. (2001). *The remote community service telecentres of Newfoundland and Labrador, Canada*. Vancouver.
- Short, G. (2001). *The Western Australia telecentre network*. Vancouver.
- Simpson, L., Daws, L., & Pini, B. (2004). Public Internet Access Revisited. *Telecommunications Policy*, 28(3-4), 323-337.
- Simpson, L. E. (2005). Community Informatics and Sustainability: Why Social Capital Matters. *The Journal of Community Informatics*, 1(2).
- Siochrú, S. Ó., & Girard, B. (2005). *Community-based Networks and Innovative Technologies: New models to serve and empower the poor*: UNDP.
- Stewart, J. (2000). *Cafematics: the cybercafe and the community*. Edinburgh: University of Edinburgh.
- Strover, S., Chapman, G., & Waters, J. (2004). Beyond community networking and CTCs: access, development and public policy. *Telecommunications Policy*, 28, 21.
- UNCTAD. (2008). *Information Economy Report 2007-2008: Science and technology for development: the new paradigm of ICT*: United Nations Conference on Trade and Development.
- Usherwood, B., Wilson, K., & Bryson, J. (2005). Relevant repositories of public knowledge. Libraries, museums and archives in "the information age. *Journal of Librarianship and Information Science*, 37(2), 89-98.
- Wahid, F., Furuholt, B., & Kristiansen, S. (2004). Global Diffusion of the Internet III: Information Diffusion Agents and the Spread of Internet Cafés in Indonesia. *Communications of the Association for Information Systems*, 13, 25.
- Whyte, A. (1998). Telecenter research framework for Acacia. *Journal*. Retrieved from http://www.idrc.ca/acacia/ev-10197-201-1-DO_TOPIC.html
- Whyte, A. (2000). Assessing community telecentres: Guidelines for researchers, Available from http://www.idrc.ca/acacia/ev-9415-201-1-DO_TOPIC.html#begining

APPENDIX A: Recommended Reading

Research Reviews

Kuriyan, R., & Toyama, K. (2007). *Review of Research on Rural PC Kiosks*. Available at <http://research.microsoft.com/research/tem/kiosks/>.

A summary of a comprehensive review of research on rural Internet kiosks.

Latchem, C., & Walker, D. (Eds) (2001). *Perspectives on distance education: Telecenters: Case studies and key issues*. Vancouver: The Commonwealth of Learning.

A collection of accounts of telecenter projects around the world. Provides an early assessment of the state of the telecenter movement.

Paul, J., Katz, R., & Gallagher, S. (2004). *Lessons from the field: An overview of the current uses of information and communication technologies for development*. World Resources Institute. <http://www.digitaldividend.org/pdf/lessons.pdf>

An analysis of data on ICT projects in the Digital Dividends Clearinghouse database. One chapter focuses on telecenter projects.

Sample Studies

Bertot, J. C., McClure, C. R., & Jaeger, P. T. (2008). The impacts of free public Internet access on public library patrons and communities. *Library Quarterly*, 78(3), 285-301.

Chigona, W. (2006). Should communal computing facilities cohabit with public facilities? *Journal of Community Informatics*, 2(3). <http://ci-journal.net/index.php/ciej/issue/view/15>

Dangwal, R., Jha, S., Chatterjee, S., & Mitra, S. (2005). A Model of How Children Acquire Computing Skills from Hole-in-the-Wall Computers in Public Places. *Information Technologies and International Development*, 2(4), 41-60.

Heuertz, L., Gordon, A. C., Gordon, M. T., & Moore, E. J. (2003). The Impact of Public Access Computing on Rural and Small Town Libraries. *Rural Libraries*, 23(1), 51-79.
http://www.gatesfoundation.org/NR/Downloads/libraries/eval_docs/pdf/RuralImpacts0301.pdf

Kolko, B. E., Wel, C. Y., and Spyridakis, J. H. (2003). Internet Use in Uzbekistan: Developing a Methodology for Tracking Information Technology Implementation Success. *Information Technologies and International Development*, 1(2), 19.
<http://www.mitpressjournals.org/doi/abs/10.1162/154475203322981932>

Kumar, R., & Best, M. (2006b). Social Impact and Diffusion of Telecenter Use: A Study from the Sustainable Access in Rural India Project. *Journal of Community Informatics*, 2(3). <http://ci-journal.net/index.php/ciej/issue/view/15>

Lengyel, G., Eranusz, E., Füleki, D., Lőrincz, L., & Siklós, V. (2006). The Cserénfa experiment: On the attempt to deploy computers and Internet in a small Hungarian village. *Journal of Community Informatics*, 2(3). <http://ci-journal.net/index.php/ciej/issue/view/15>

Stewart, J. (2000). *Cafematics: the cybercafe and the community*. Edinburgh: University of Edinburgh. Available at <http://homepages.ed.ac.uk/jkstew/work/Cafematics.pdf>.

APPENDIX B: Evaluation Frameworks

- Ashraf, M. M., Swatman, P., & Hanisch, D. J. (2007). Some perspectives on understanding the adoption and implementation of ICT interventions in developing countries. *The Journal of Community Informatics*, 3(4).
- Brophy, P. (2002). *The evaluation of public library online services: measuring impact*. In The Peoples Network, 2002 Workshop Series Issue Papers no.1. http://www.mla.gov.uk/resources/assets/P/pn_impact_issue_paper_pdf_4218.pdf
- Eve, J. & Brophy, P. 2001. The Value and Impact of IT Access in Public Libraries: Final Report. Library and Information Commission Research Report 102. <http://www.cerlim.ac.uk/projects/vital/>
- Gomez, R. and Reilly, K. (2002). Comparing approaches: Telecentre evaluation experiences in Asia and Latin America. *International Information & Library Review*, 34, 57-78.
- Hudson, H. E. (2001). The ACACIA programme: Developing evaluation and Learning systems for African Telecentres. In D. Walker and C. Latchem (Eds.), *Perspectives on distance education: Telecenters: Case studies and key issues* pp. 159-168. Vancouver:
- Rothenberg-Aalami, J. & Pal, J. (2005). *Rural Telecenter Impact Assessments and the Political Economy of ICT of Development (ICT4D)*. Berkeley Roundtable on the International Economy Paper 164. <http://repositories.cdlib.org/brie/BRIEWP164>
- Rutkauskiene, U. (2008?). Impact measures for public access computing in public libraries. Vilnius University.
- Whyte, A. (1998) *Telecenter research framework for Acacia*. http://www.idrc.ca/acacia/ev-10197-201-1-DO_TOPIC.html
- Whyte, A. (2000). *Assessing Community Telecentres: Guidelines for Researchers*. Available from http://www.idrc.ca/en/ev-9415-201-1-DO_TOPIC.html