GLOBAL IMPACT STUDY
OF PUBLIC ACCESS TO INFORMATION & COMMUNICATION TECHNOLOGY

In-Depth Study Proposal Coversheet

Date: 10-01-2010
Title of Study: Benefit Cost Analysis of Public Access to Information and Communication Technology in Chile, A Contingent Valuation Method Approach to Demographic and Geographic Characteristics
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Abstract (summarize the proposed study in no more than 150 words)

What are the costs and benefits of public access venues for ICT to different demographic and geographic groups within Chile?

Libraries, and institutions that offer similar information-based such as public access ICT venues,

are beginning to use benefit cost analysis (BCA) to assess value. The trend is due to legal and financial demands for increased accountability. As an emerging BCA sub-field, access to ICT venues is challenging: How can one value services that are traditionally viewed qualitatively?

Library BCA has relied upon contingent valuation methods and willingness to pay/accept surveys. We propose a mixed methods approach using new work on stated preference (contingent valuation) and existing data on revealed preference (travel cost method). Benefits will be contextualized across geographic and demographic characteristics and against types of venue within a case study of Chile. Costs will be aggregated by venue type.

Proposal

Section I: Research Participants
[Please attach resumes for all research participants named in this section]

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Section II: Research Questions and Study Justification

A. The Global Impact Study has six areas of research interest. Which of them does the proposed study address? (1) Reach of Public Access ICTs (4) Public Access Venue Services and Operations (2) Usage of Public Access ICTs (5) Information Ecologies (3) Physical Design and Location of Public Access ICTs (6) Policy and Regulatory Context

(1) Reach of Public Access ICTs

The research objective of this proposal is to quantify the value individuals place on public access to ICT. Will do this in two steps: 1) a contingent valuation survey of a random sample of individuals using cell phone random digit dial; and 2) analysis of existing data on travel costs to use ICT venues. Within the proposed survey we will include questions on demographic and geographic characteristics. Demographic and geographic data is included in existing travel cost observations. These data will allow descriptive statistics on demographic and geographic characteristics of users across venues.

(2) Usage of Public Access ICTs

One component of our research is to identify the rate of usage of public access ICT across demographic and geographic characteristics. We will collect usage rates from our sample population of users to infer aggregate rates of usage across demographic and geographic groups. These data may be used for descriptive statistics of the usage patterns of ICT in Chile by user group and location. By itself this will help achieve Global Impact Research Objective #2. We will infer aggregate rates of usage and aggregate expenditures on access to ICT to the general population as statistical power allows.

(4) Public Access Venue Services and Operations

Our research will incorporate existing findings from a TASCHA study to identify the types of services provided at each type of public access ICT provider. As the response rate and subsequent statistical power allows, we will use fixed effect models to estimate the value of an individual type of service within each type of venue. If the response rate of the user survey is insufficient to identify individual venue characteristics we may use other statistical techniques to estimate the willingness to pay for groups of characteristics instead of individual characteristics. Ideally, this analysis will allow for hedonic estimations of public access ICT venues and contribute to Global Impacts Research Area #4.

B. What are the specific research questions for this study?

This proposal consists of two parts: first a contingent valuation survey of the general population, and second, the analysis of travel cost data from a survey of public access ICT venue users. In combination these two components will allow us to make generalizations about use and non-use value of public access to ICT venues.

For the contingent valuation work the **background research question** is:
What are the benefits and costs of three different types of public access to ICT in Chile: libraries, telecenters, and internet cafes, and how are those benefits and costs distributed across demographic and geographic characteristics?

Systematized Research Questions for this proposal:

1) What is the stated willingness to pay for public access to ICT?
2) How does stated willingness to pay differ across venue?
3) How does stated willingness to pay differ across demographic and geographic characteristics?

The systematized research questions will return data that may be analyzed alongside the existing BCA data from the TASCHA user survey and the TASCHA venue survey.

The proposed contingent valuation survey will elicit information on willingness to pay for access to types of ICT venues. Information will be collected from both users of ICT venues and non-users of ICT venues. Because the sample will be a random draw the majority of respondents will not be ICT users. The values we collect from non-users will be used to estimate non-use value of ICT venues.

The second part of this proposal is to estimate the use-value of public access to ICT venues. To estimate the use value of ICT venues we will rely upon existing data from a survey of users conducted by TASCHA in 2010. This survey, often called the "user survey", provides data on revealed preferences for public access ICT in the form of travel cost data.

To contrast the benefit side of our analysis, we will use existing cost data from the TASCHA venue survey. In the venue survey ICT venue operators are asked for sunk and running costs.

Using the existing data in conjunction with stated preference data from this survey we will be able to make value estimates for both the users and the non-users of public access ICT venues and contrast these values with cost estimates. Our work will constitute a first for value estimations of ICT in a less developed country, and a first for ICT valuation studies across multiple venues.

C. What are the hypotheses?

The Global Impact Study has six areas of research interest, of which we propose to contribute to areas 1 and 4; research on public access ICT, and research on the services of public access ICT venues.

For convenience we have specified libraries within the hypotheses though our research interests include each of the three types of ICT venues: libraries, telecenters and internet cafes.

Background Research Question:
H1: Libraries are the most cost effective way to provide public access to ICT in Chile.
H2: Libraries provide the types of services in highest demand at public access ICT in Chile

Systematized Research Questions:
H3: As a group Chileans reveal a higher preference for public libraries than other public access

to ICT controlling for geographic, demographic characteristics of the individual and controlling for the services provided by the venue.
H4: As a group Chileans reveal spend more time and money to access public libraries than other public access to ICT controlling for geographic, demographic characteristics of the individual and controlling for the services provided by the venue
H5: Libraries provide more of the services in highest demand at public access ICT venues.
H6: Libraries have a higher benefit cost ratio than other public access ICT venues when benefits are measured through travel cost method inference on willingness to pay and costs are measured through self reported operational costs.

D. What is the theoretical justification/rationale for this study?

In spite of advances in evaluation approaches… most librarians are unable to determine the impact of library services or answer the key evaluation question- What has changed as a result of our work?
(Durrance and Fisher-Pettigrew 2002)

Three independent threads of literature and legal precedent intersect to promote the use of benefit cost analysis for evaluation of libraries in developing economies. First is a legal trend toward quantifiable accountability via Benefit Cost Analysis, both in the US and in Chile. This trend has originated from increased demand for accountability of publically funded projects and services. Second is movement for greater quantitative accountability with the library community. Advocacy within the library community for quantitative analysis date back at least 90 years and is increasing. Finally, the donor community that funds public access ICT venues has explicitly requested that sponsored programs, and programs seeking sponsorship, conduct benefit cost analysis of their programs. This research proposal is an effort to help meet this challenge.

Trends in Law
In the United States accountability of public funds began at least eighty years ago and includes executive, legislative and judicial advocacy for benefit cost analysis. In the Federal Navigation Act of 1936 congress dictated that federal flood projects be undertaken only if the economic benefits exceed the costs. Beginning in 1981 US Presidents have broadened the definitions of benefits and costs, mandated the consideration of distributional effects and expanded the use of benefit cost analysis in federal activities through Executive Orders and Engineering Circulars (see EO 12291; EO 12866; Circular A-4 U.S. OMB 2003; EO 13497). The expansion has precipitated the development of BCA methods that take into consideration qualitative and quantitative costs, and distributional effects-- including income, race, gender, industry, and geographic distribution. The legislature has followed executive actions with additional demands for greater accountability in the form of performance goals for agencies (GPRA 1993). Additionally, congress has mandated that non-use values be included in assessments of damages to public goods (Oil Pollution Act 1990). Finally, the Supreme Court has found that BCA is an appropriate tool for estimating the value of non-market goods, including non-use

values (*Ohio vs US Dept. of Interior 1989,* 880 F.2d 432). The Supreme Court found that estimations such as contingent valuation are acceptable means of assessing non-use values (*Ohio vs US Dept. of Interior 1989,* 880 F.2d 432, section XIII).

Chilean law has anticipated and paralleled the trend to greater use of benefit cost analysis in the US. The Chilean government is required by the Ministry of Planning to conduct benefit cost analysis of public investment projects (PREM 2006; Aranciba 2006; Fontaine 2004). In 1975 Chilean Federal Law established the National System of Investments to review the costs and benefits of public expenditures. The assessment was assigned to the Ministry of Planning, but is currently administered jointly with the Ministry of Finance. The Ministry of Planning currently performs appraisals for all public-investment projects using the economic tool of cost benefit analyses. The Ministry conducts analysis within clearly a specified methodology- including shadow social price system and a social rate of discount. By 2006 the Ministry had compiled a database of over 300,000 entries (Word Bank 2006).

Legal obligations to conduct benefit costa analysis have resulted in increased attention to quantifying the costs and benefits of social programs not often considered candidates for analysis.

Increased Accountability for Libraries

The move toward library accountability is not new within library sciences. At least four methods for identifying the benefits of libraries have been developed. These five methods can be characterized as Worth, Output, Social Audit and the related Social Impact, and Benefit Cost Analysis.

At the turn of the century the measure of value of a library or museum was the monetary value of the collection. John Dana, the founder and director of the Newark Museum from 1909 until 1929 gave a paper in at the American Association of Museums 1916 on the methods of assessing the value of public institutions. Dana railed against the assessment of the value of libraries and museums through summing the "cost of its building … and the rarity, [or] auction-value or money cost of its collections." Dana stated that "a museum is good only in so far as it is of use" (Rea 1916, p 83). Instead, Dana suggests that "the highest and best influence of the library may be summed up in that much-abused word 'culture'" (Dana 1920, p 9). Identifying *how not to* value libraries is more easily accomplished than identifying *how to* value libraries. The "use" component of Dana's charge is more readily analyzed than the impact on culture.

In an effort to quantify the impact of libraries a substantive movement to define value championed the use of "output" measures. The use of static outputs allows researchers to use quantifiable metrics that may be "summed" and thus assess library performance (Van House et al. 1987). Van House et al. include Library Use, Material Use, Material Access, Reference Services and Programming as the five types of output measures to assess the benefit of a library. This work was subsequently followed by criticism that identified benefits of libraries that are not captured within the output method and raised questions about the validity of the

output method (Weech 1998; Smith 1994).

Following the criticism of output measures, presenters at the 1998 General Conference of the International Federation of Library Associations and Institutions, Usherwood and Linley, declared "soft measures" of library outputs equally important to the "hard measures" of the output method (Usherwood and Linley 1998). Usherwood and Linley's advocate for the "social audit" measure which has three objectives:

1. To develop a tool for measuring the social impact of library activities in relation to stated objectives
2. To investigate the social and economic impact of public libraries
3. To investigate how far a library's activities, in practice, contribute towards the achievement of its social objectives (Usherwood and Linley 1998)

Following directly from the move to greater accountability in public endeavors, the social audit is intended to improve the way the value of the service is reported to policy makers, enable stakeholders to make a judgment on the service" (Usherwood and Linley 1998). The second of Usherwood and Linley's objective foreshadows metrics later developed by Holt and Elliott (1998, 2002, and 2003).

The third wave of assessment promoting social measures of library success tools came to the fore in the late 1990s. In an review of the existing case studies of library benefits, with a focus on assessment methods, Debono concludes that "the public library community may now want to consider if it is worthwhile to develop a set of standard approaches to the assessment of social impacts or whether research will continue in an uncoordinated way" (Debono 2002). Debono concludes that the field of research calculating benefits from libraries should focus on social measures of benefits, but that social measures are underdeveloped and unsatisfactory.

Durrance and Fisher-Pettigrew (2002) follow this theme in two ways. First, they link a government-inspired trend to greater accountability with libraries. The authors state "federal initiatives in particular are driving interest in outcome measurement in governmental agencies: the Government Performance and Results Act (GPRA) of 1993 and the Government Accounting Standards Board Concepts Statement 2 in 1994" (Durrance and Fisher-Pettigrew 2002). Secondly they identify that the environment is ripe for "measures that will be able to determine the impact of library services" (*ibid*).

Use and Non-Use Values

The debate on how to value impacts exists outside the information science setting. As economists view the challenge, there are two components of benefit to conceptualize: the value that users of the resource place upon the resource, and the value that non-users place upon the resource (Portman 1994, and see Krutilla 1967 for one of the first explicit treatments of non-use values).

Use values may be estimated in a wide variety of ways, including using market pricing to hedonically estimate the total value for the good or service, or travel cost to estimate expenditures that facilitate consumption. Each of these examples is a method where individuals reveal their preferences for the good or service through their actions. Economists refer to these methods as revealed preference methods (Clawson 1959; Clawson and Knetsch 1966; Brown and Mendelsohn 1984).

Non-use values are more difficult to estimate because no market exists to establish prices for hedonic estimates. In many cases the good or service to be valued is a public good or a common property resource. Examples include national defense, national parks, and a clean environment. One classic example of a non-use value is the value of the health and cleanliness of Prince Rupert Sounds held by individuals who have no intention of visiting (see Pierce 1994). In the case of libraries or public access ICT venues, the non-use value is the value that individuals in society place on the ability of others to access ICT. In these cases the value placed upon the resource is measured by how individuals state they value the resources. Economists refer to these methods as stated preference methods.

Contingent Valuation

Within stated preference estimate methods one stands out as the most researched, most used and most widely accepted: contingent valuation (CV). One standard of legitimacy met by CV is the acceptance in valuing Supreme Court findings (see Ohio v. United States Department of the Interior 1989). A second standard is acceptance by the US Congress as a method for quantifying values of non-market goods (Oil Pollution Act of 1990; Comprehensive Environmental Response, Compensation, and Liability Act of 1980).

As with every evaluation method, CV has known strengths and weaknesses. Advocates for the broad use of CV as well as detractors of CV have made legitimate contributions to the field (Portney 1994, Hanemann 1994, Diamond and Hausman 1994). One of the advantages of the CV method is that the challenges have been identified, and methodological responses have been developed to address these challenges over the past three decades. This is not to say that CV is a perfect tool, but in many ways CV is the best known tool for valuing non-market goods (see Arrow et al. 1993, Mitchell and Carson 1989 among many).

Challenges and Standards

Perhaps the most cited study of CV methods was commissioned by the US Congress in the wake of the 1989 Exxon Valdez oil spill. Congress convened a blue ribbon panel of experts, including two Nobel laureates, to assess the viability of CV for use in assessing non-market goods. In their subsequent report the panel concludes that “CV studies can produce estimates reliable enough to be the starting point of a judicial process of damage assessment, including lost passive-use values” (Arrow et al. 1993, p 43).

The recommendation of CV for assessment of non-use values comes with qualifications. Aarow et al. assess the state of contingent valuation: “Proponents of the CV technique acknowledge

that its early (and even some current) applications suffered from many of the problems critics have notes, but believe that more recent and comprehensive studies have already or soon will be able to deal with these objections" (Arrow et al. 1993, p. 5).

Section II identifies the challenges to accurate use of CV. The challenges include inconsistency with budget constraint, inconsistency with rational choice theory, incomplete understanding of the good or service being valued, acceptance of the "scenario" that researchers present to survey participants, and the tendency to answers survey questions to achieve the satisfaction of the "warm glow" (Arrow et al 1993). Section III gives recommendations for research design to overcome the known challenges to CV, including survey design, context, survey methods and characterization of contingencies. Section IV presents guidelines for the application of CV in assessing non-use goods.

The resulting seven distinct recommendations for the use of CV are worth reviewing.

1) Where possible, CV should rely upon personal interviews rather than telephone surveys
2) CV surveys should elicit willingness to pay to prevent a loss rather than willingness to accept compensation for an existing loss
3) Payment options should be presented in referendum format, not open ended questions
4) CV surveys must begin with an accurate and understandable scenario
5) CV surveys must remind respondents of budget constraints
6) CV surveys must include reminders of the substitutes
7) CV should include questions to ensure that respondents understood the choice they were being asked to make

Though the possibility for inaccurate measure exists, the report concludes that:
"*CV studies convey useful information. We think that it is fair to describe such information as reliable by the standards that seem to be implicit in similar contexts, like market analysis for new and innovative products and the assessment of other damages normally allowed in court proceedings. As is on all such cases, the more closely the guidelines are followed the more reliable the result will be. It is not necessary, however, that every single injunction be completely obeyed; inferences accepted in other contexts are not perfect either* (Arrow et al. 1993, p. 43).

Application of Benefit Cost Analysis Methods to Libraries

In the past decade a trend has developed in the field of library effectiveness analysis- the quantification of benefits and costs. This growing field of literature explores using existing benefit cost analysis methods including contingent valuation (CV) method, including both willingness to pay (WTP) and willingness to accept (WTA), limited travel cost method and return on investment (Aabo 2005; Chung 2008; Holt and Elliott 1998; Barrow et al 2005). The existing literature informs the research design of this proposal.

Holt and Elliot published findings from a three year study of the St. Louis public library system (Holt and Elliott 1998). These researcher used results from a survey of 320 library cardholder

from the population of 39,444 users, which elicited responses for three types of valuation methods: consumer surplus, "asking library patrons to place a dollar value on a specific service or offering"; contingent valuation "asking how much money patrons would be willing to accept in reimbursement to voluntarily give up certain library services"; and opportunity cost "asking patrons to estimate the amount of money it costs them- in terms of time spent and transportation- to use the library, thereby establishing a minimum value for the library (Holt and Elliott 1998). Notably, the Holt and Elliott study found that 89% of their survey respondents (drawn exclusively from library card holders) refused to consider closing the St. Louis libraries ***at any cost*** (Holt and Elliott 1998, p 43). Perhaps unwittingly, the researchers had identified a principle criticism of the stated preferences WTA method of benefit cost analysis: the over-estimate of value.

Aabo's 2005 dissertation work was a random sample of 999 individuals who were asked willingness to pay (WTP) to continue to receive library services, or willingness to accept (WTA) to have library services discontinued (Aabo 2005). Abbo used two forms of elicitation, dichotomous choice, where survey respondents were asked to choose between two options, and multiple bounded discrete choice, where respondents were asked to choose between discreet options, then were asked follow-up questions. Both of these measures are forms of stated preference benefit cost analysis.

In a test case study of valuation tools for a library in Korea, Chung (2008) developed a stated preference survey drawing upon contemporary approaches to minimize bias identified by Arrow et al. In response to the existing criticisms of stated preference contingent valuation methods for evaluating good or services Blamey et al (1999) and Ready et al (1995) developed the dissonance minimizing survey format where yea-saying and protest answers are theoretically reduced. Chung combined the dissonance minimizing survey format with a new information-bias minimizing format and contrasted the findings from each method in a study of 399 respondents. Chung found different stated preferences for library services, and higher response rates using the dissonance minimizing and information-bias minimizing questionnaire formats (Chung 2008). Chung concluded that valid stated preference contingent valuation could be used when including with bias minimizing and non-response minimizing survey structures.

At least three other studies on the benefits and costs of libraries have been conducted, the British Library Study (British Library 2005), the economic impact of public libraries in South Carolina (Barron et al. 2005), and a study of the Florida public libraries return on investment (Griffiths et al 2004). These studies addressed the challenges identified by Arrow et al. and Chung in varying degrees. The Barron et al. report stated that 32 percent of respondents valued the information obtained from the public library between $10,000 and $1,000,000 (Barron et al. 2005, p. 3-4). The breadth of this range suggests that reason remains for Arrow's concern that stated values for a theoretical market have the tendency to be inflated beyond actual willingness to pay for goods or services (Missingham 2005).

Conclusion

What does this review of government inspired trends to accountability, historical development of library assessment tools, and development of benefit cost analysis tools for evaluating non-market goods suggest? We submit that the sum of these factors is a growing desire to evaluate libraries using cost benefit analysis tools that are better grounded in microeconomic theory and present researchers with more defensible inferences. We propose to conduct a contingent valuation of public access to ICT venues.

E. Which public access stakeholders (e.g., governments, donor agencies, users) could benefit from the findings and other outputs of the study (e.g. research reports, survey instruments, software)?
Please note research outputs that would be particularly relevant to the library community.

This proposal has two parts: first a contingent valuation survey of the general population, and second, the analysis of travel cost data from a survey of public access ICT venue users. These two elements contribute different insights to stakeholders.

One unique advantage of benefit cost analysis of public works or public service projects is the ease of application to policy problems. In many cases, including in the USA and Chile, the federal government requires benefit cost analysis of public investments to inform policy decisions (PREM 2006). Our proposed project will offer policy relevant findings to **(1) government, (2) donor agencies**, and **(3) ICT venues**. Additionally the application of contingent valuation to three types of public access ICT venues has never been done; and the travel cost method has never been used to value public access ICT. The **(4) research protocol** and analysis methods will contribute to the field.

(1) To local governments this project will identify the characteristics of the population that are accessing ICT, and what their personal expenditures are to access ICT. The travel cost analysis will show what demographic groups are getting use value from venues, while the CV analysi will show how the general population values public access to ICT.

With demographic information on use and non-use values the local government may identify populations groups that are not accessing ICT, and populations that are disproportionately accessing ICT. The Chilean government is required by the Ministry of Planning to conduct benefit cost analysis of public investment projects (World Bank 2006). Our report will identify geographic and demographic areas where individuals receive higher minimum benefits when accessing ICT. This information may be coupled with geographic information on national library

costs to identify areas where additional public access ICT venues are more likely to pass benefit cost analyses.

Policy implications of our study are clear: BCA travel cost method identifies population groups that use or do not use public access to ICT and have the most to gain from the location of public access ICT closer to their community. Contingent Valuation contributes to an understanding of the difficult to measure non-use value of public access ICT venues. This information is especially important to a government with a legal mandate to apply benefit cost analysis to public projects such as libraries.

(2) For NGOs, our work to identify rates of usage while controlling for demographic and geographic characteristics has development policy implications, funding implications and advising implications. For NGOs working in development, the identification of user groups with high minimum benefits of access to public ICT venues leads directly to targeted development policy. Our work will identify demographic and geographic user groups that may reap the greatest benefit from closer public access to ICT, or for whom a specific group of characteristics of public ICT access is most important. Secondly for NGOs that fund public access to ICT, our work will help to identify the type of ICT venue with lowest costs. Coupling this information with minimum benefits, in the form of travel cost to access ICT, our work will inform targeted funding decisions to impact target demographic and geographic groups. Finally, for NGOs partnering with government or advising government, our work will allow more specific advice for impacting targeted demographic groups with the types of venues and services for which they have the highest minimum benefit.

(3) ICT venues will find the outputs of our research relevant. Our large sample across venues, demographic and geographic settings will allow us to identify the characteristics of public access ICT with greater statistical power than the individual venue operator. The individual operator may better know the characteristics of their customer/users, but their sample is limited to a single venue type and a single venue. For operators of series of venues, such as public libraries, our research will identify what the most demanded public access ICT services are for that type of venue with the characteristics of the local demography.

Additionally, the finding from the contingent valuation portion of this study will provide information for public access venue advocates. Our study will allow advocates to present more complete information when advocating for the value of their institution by allowing them to present difficult to measure non-use values.

(4) Finally, we have identified the types of past benefit cost analysis for libraries in the USA, Australia, the UK and some European nations. All of these examples come from developed countries and all the methods used to perform cost benefit analysis are variants of *stated preference* contingent valuation (Holt et al 1996; Holt and Elliot 1998; Holt and Elliot 2002; Aabo and Audunson 2002; Holt and Elliot 2003; Aabo 2005; Aabo 2009). Stated preference has been controversial due to high stated willingness to pay for resources, but low revealed

payment for these same resources, leading two scholars to state that "contingent valuation surveys do not measure the preferences they attempt to measure"(Diamond and Hausman 1994).

We are proposing contingent valuation methods that address these challenges. We are also adding a level of robustness to our findings by checking our findings from the contingent valuation portion of this proposal with information from the travel cost method portion of this proposal. The travel cost analysis relies upon *revealed preference* method, and allows a complement to the *stated preference* method of contingent valuation. The travel cost methods does not rely upon the theoretical willingness to pay for a service, or the theoretical willingness to accept compensation for loss of a good or service. Instead, we identify the actual costs incurred by individuals to use public access ICT.

F. Does this study overlap with or complement other in-depth studies in the Global Impact Study? How?
Our proposed study complements the existing work on quantifying benefits and costs of public access to ICT within the general user survey, and the venue survey. In the user survey TASCHA has asked public access users about their incurred costs imbedded within an extensive series of questions about ICT travel costs, use patterns and demographic characteristics. The user survey was designed to get general characteristics of users, for use in descriptive statistics about access to ICT in multiple countries. Our proposed work will be informed by findings from the user survey. Secondly, we will use the cost data from the venue survey to contextualize the benefits we find from the travel cost analysis and the contingent valuation analysis.

Section III: Methodology

A. In which countries will this study take place?	
Country: Chile Chile shares some demographic and economic characteristics with neighboring countries. Clearly Chile is unique, it has sustained the longest GDP growth of the Latin American countries in the past 25 years, but the economic diversity within Chile lends itself to valid external extrapolations of valuation of public access to ICT.	Local research partner (if applicable):

B. Methods
What methods will be employed? What types of primary data will be collected? What types of secondary data (if any) will be incorporated into the study?

This proposal consists of two parts: first a contingent valuation survey of the general population, and second, the analysis of travel cost data from a survey of public access ICT venue users.

Our research is an effort to gather data to answer the conceptual research question: *What are the benefits and costs of three different types of access to ICT in Chile: libraries, telecenters, and internet cafes, and how are those benefits and costs distributed across demographic and geographic characteristics?* The conceptual question itself is insufficiently specified to direct research protocol. For that reason we have identified systematized research questions that imply methods to quantify appropriate measures.

Analysis of Benefits:

Systematized research question 1) What is the willingness to pay for public access to ICT?
Method: Contingent valuation of a sample from the general population

Systematized research question 2) How much time and money do individuals spend to access public ICTs in Chile?
Method: Analysis of existing data from TASCHA user survey.

Analysis of Costs:

Systematized research question 4) What are the fixed and variable costs for providing public access to ICTs in Chile?
Method: Analysis of existing data from TASCHA venue survey

We associate each of the systematized research questions with a unique research method. Because we propose several questions we use mixed methods for assessing value: revealed preference, and stated preference. This proposal only explores the values that individuals place on public access to ICT. We are able to limit our focus on values because of existing TASCHA work estimating the costs of providing public access to ICT.

Analysis of Benefits:

1) *What is the willingness to pay for public access to ICT?*

For this question we will employ the contingent valuation (CV) method of a stated preference of "willingness to pay" for a public good in a random survey of individuals (*see section D: Theory and Rational for more on CV*). The CV method has been used successively for diverse topics such as social sciences, sociology, psychology, survey research, experimental design, and marketing, and natural resource economics (Mitchell and Carson 1989; Carson 1991). The CV

method is a method from economics and is well known for the use of evaluating public access goods (Mitchell and Carson 1989; Braden and Kolstad 1991; Kopp, Pommerehne, and Schwarz 1997). The CV method uses surveys to value nonmarket goods and has been used for surveys of libraries (Aabo 2008).

In the CV method respondents are presented with a description of the good to be valued, its present quantity and quality, and an estimated change in this quantity or quality, as well as the payment vehicle (Aabo 2008). Typically in an interview setting the respondents are asked to state their value of constructed changes in the provision of particular goods. The respondents are asked to state how they would vote on a referendum to increase taxes to support the good (Aarow et al 1993).

Our CV survey will first ask the respondents to state their willingness to pay (using the referendum format) for each of the three public access ICT venues. The order in which the venues are presented will be rotated. Secondly, it will ask the respondent to state their willingness to pay for all three public access venues. This survey adapts elements from a survey used by Chung (2008) in a contingent valuation survey for libraries in Korea.

Controlling for bias

Our survey will control for bias identified by Arrow et al. Chung's survey identifies three types of bias introduced commonly cited for diminishing the validity of contingent valuation surveys: 1) Yea-saying, 2) Protest Answers, and 3) Information bias. Each of these potential vectors for bias are addressed through using two innovative CV survey characteristics: the Dissonance-minimizing format (DM) and the information bias minimizing method (IBM).

The DM is an effort to reduce protest answers by allowing respondents to express their opinion about the payment method as opposed to refusing to answer the question or giving a response of zero. The IMB is an effort to reduce information bias through two steps: first, providing an "information tip" about the services and cost of the ICT venue, and secondly by identifying the alternative options available if the venue were not available.

Analysis

Analysis techniques have been developed to allow for "follow-up" questions where the respondent is asked how they would vote if the tax is lower or higher (see Cameron and Quiggen 1994 among many). Including a "follow-up" question allows for greater efficiency in estimating the willingness to pay for the non-market good.

Calibrating the referendum

The values associated with costs should the average cost of access to that type of venue in that country. For example, the information tip about the cost of accessing an internet café in Chile should be a the average cost from internet cafes in Chile. The provision of information on the cost of the service is consistent with existing CV studies on the value of libraries (Aabo 2009, Aabo 2005, Aabo and Audunson 2002, Chung 2008).

2) How much time and money do individuals spend to access public ICTs in Chile?

For this question we will employ the "travel cost method" of evaluation of willingness to pay for a public access good with either a low access fee or no access fee. This data for this portion of our analysis has been collected by the TASCHA user survey. We propose to analyze the data to contrast with values from the CV survey.

The travel cost method was developed by Clawson and Knetsch (1966) to systematically address the question of how a community or society can value a public good or resource. Under more common circumstances the good or service is subject to market forces, with increases in price resulting in decreases in quantity demanded. However, in circumstances where the good or service has a price ceiling, or is provided without user fees the challenge is to identify the demand for a good or service for which there is no existing market.

Clawson and Knetsch propose that a minimum value to place on the good or service may be identified by the costs they incur to access the good or service. In the first applications of the travel cost method the non-market good to assess was a natural resource. The most common example of travel cost is to ask individuals to sum the costs they incurred to visit a destination with a below market entrance fee or free admission. A common example is a national park destination. Clawson and Knetsch developed a methodology to categorize the distances individuals travel to reach the destination, consider the frequency that the individuals partake in the destination, the population the individuals represent, and the total travel costs incurred.

The travel cost method estimates a demand schedule for access to show the relationship between the quantity demanded and the price by asking individuals about the costs they incur to visit their destination. Costs related to travel are broken into three components: time, distance and money. The schedule of demand may be sub-divided by demographic characteristics to achieve greater accuracy within that group (Clawson and Knetsch 1966, p. 53). In such a case the demand schedules are aggregated independently and then the values across demographic group are summed to give the total minimum value place on access to the resource.

We propose using the travel cost to establish the minimum value individuals place on public access to ICT venues using existing TASCHA data. We will use demographic characteristics to control for differing demand schedules across the Chilean population. Secondly, we will use characterizations of geographic setting to test for differences in demand schedules. Finally we will control for the characteristics of the destination of the individuals. Through permutations of the typology of these three types of characteristics we will be able to identify how different demographic or geographic constraints impact the demand for types of ICT technology.

Analysis of Costs:

3) What are the fixed and variable costs for providing public access to ICTs in Chile?

To contrast the analysis of benefits from public access to ICT venues we need to estimate the costs of establishing and maintaining the venue. To estimate costs we will rely upon the existing data from the TASCHA Venue Survey. Please see the research methodology section of the Venue Survey for details on the methods.

Finally, we use the Chilean Peso as a measure of costs and benefits. We differentiate between variable costs and fixed costs to give additional information on the cost side of providing public access to ICT venues. The statistical power need to detect slight differences between means of user groups is one of the reasons that we propose a larger sample of users than the general TASCHA survey currently underway.

C. Sampling strategy and sample size
What types of public access venues and user/non-user populations will be included? What sampling methods will be used?

This proposal includes the collection of data from a contingent valuation survey. To get a generalizable finding we will draw from a random sample of the Chilean population. One of the most cost efficient and expeditious methods of obtaining a representative sample is by contracting with a professional survey company

The Chilean Association of Business on the Investigation of Markets (Asociacion Chilena de Empresas de Investigacion de Mercado) is an industry group for market research. Each company has a way of calculating a representative sample. We will rely upon their ability to reach a representative random sample and include their methodology in any subsequent reports. Methods include including random digit dial and household interviews conducted face to face with a panel of households that represent the country.

Preliminary correspondence with these groups resulted in suggestions for a sample ranging from 1,100 to 2,000. Best practice for CV surveys is face to face interviews, but these are more costly. We propose getting the largest sample possible within the budget constraint using face to face interviews.

We have created a preliminary sample structure using demographic data available (World Factbook 2010). The preliminary sample distribution is merely an example of the breakdown of the sample. The actual sample breakdown will be given to us from our survey contractor.

Example sample structure:

Setting	City			Sub-Urban			Rural		
Sample size	1000			500			500		
First Venue in CV survey	Lib	Internet Cafe	Telecenter	Lib	Internet Cafe	Telecenter	Lib	Internet Cafe	Telecenter
Sample size	333	333	333	166	166	166	166	166	166

One concern is that the use of a sample from the general population will result in many individuals who have little to no experience with public access ICT giving a low value. Thus they would have a difficulty forming a realistic basis for an answer about how much they would be willing to pay to keep public access. While the scenario is likely it is not a cause for concern. If the individuals do not have a high willingness to pay for the service they should accurately state that they are not willing to vote for a referendum to keep ICT access in libraries (for example). Individuals with low willingness to pay should not be excluded from the sample, they should be included as a proportion of the population that they represent.

D. Impact measurement

i) How will the study assess "impact"? What type(s) and/or level(s) of impact will be measured? What indicators will be used?
ii) The Global Impact Study highlights six areas of impact: employment and income; education; civic engagement; democracy and governmental transparency; culture and language preservation; health). Which of these will the study address and in what ways? If other areas of impact will be examined, please specify which areas.

Our proposal is specifically on the benefits and costs of public access to ICT. By identifying the types of services used in venue types as well as the value the population places on access to these venues we can inform service providers and policy makers of the value placed upon types of ICT services.

E. Cost-benefit analysis

Specify how the study will incorporate cost-benefit analyses – for example, what level of cost information will be collected, from whom (e.g., public access venues, users), what perspectives on costs and benefits will you focus on (e.g., venue management, user, policymaker)?
Note: There will also be project-wide guidance on this topic with a view to have both global standards as well as project-specific flexibility. You may be required to incorporate some common elements in your research design.

The purpose of this study is explicitly benefit cost analysis.

F. Gender analysis

Specify how the study will incorporate gender analysis

Gender analysis will be an important component of demographic analysis. Specifically, using our data set we will be able to pose hypotheses on the difference between male and female users of public access ICT controlling for geographic and other demographic characteristics. The ability to detect statistically significant differences between male and female user groups allows for testing of multiple research hypotheses. Examples of these hypotheses include but are not limit to:

Hypothesis: Does a difference in mean travel cost indicate a higher value of public access to ICT for women or men, controlling for education, income, location and age?

Hypothesis: Does a difference in mean travel cost indicate that women and men of the same educational achievement value public access to ICT differently?

Hypothesis: Does a difference in mean usage frequencies indicate that women prefer more frequent public access to ICT more than men, controlling for age, income and location?

G. Capacity building

How will local research capacity-building be built into the study?
Partnering with a local research team is not a primary motivation for this proposal. Our contribution to local researchers is more likely to be in the form of analysis and data sets available for public use.

Section IV: Research Outputs

A. What specific outputs will this study produce (e.g., research reports, publications, questionnaire instruments/tools, software)? *List with descriptions and anticipated delivery dates.*
This proposal will produce three types of reports: 1) Methodology and instruments, 2) Interim report and 3) Final report. **May, 2011** Methodology and Instrument Report detailing our analytical process and instrument development. This report will contain the majority of the information on the strengths and weaknesses of different BCA methods for evaluating public access to ICT. This report will be adapted for a paper on BCA methods. **June 15, 2011** Interim Report with draft benefits and costs of each of the three types of public access ICT in Chile. This report, even in draft form, should form the basis for an oral presentation at the June workshop. The report will contrast the findings from the travel cost method with the CV method. Each of these methods provides important information, but different information on public access to ICT. The travel cost method provides a hard minimum total benefit. This is the user-value of the services. The CV method provides a high end estimate of the total benefit. This is the non-use benefit. In conjunction they give a range of total benefits for public access to ICT. **October 2011** Final Report and research papers submitted to academic journals. We expect at least three academic papers from this research; one on the findings of the travel cost method for benefit cost analysis of access to public access ICT, a second on the research methodology which contrasts the benefits of travel cost with CV, and a third on the findings using CV methods.

Section V: Work Plan and Timeline

A. What is the expected duration of the study (in months)

This In-Depth Study is tentatively scheduled for 12 months beginning in October 2010, and concluding in October 2011. Our year long in-depth study is comprised of three four-month segments.

4 months (Oct 2010 to Jan 2011) to develop the research logic, review the relevant literature, formalize the research methods, and identify the measures.

4 months (Feb 2011 to May 2011) to field test the survey instrument, finalize the distribution of sites to survey, collect and clean the data.

4 months (June 2011 to October 2011) to analyze data and write reports.

B. Work plan
Please provide a work plan with major milestones and as much detail as possible

Jan 2011 Begin research seminar to work on existing data from travel cost method survey. Begin work on CV survey.

March 2011 Circulate draft CV survey to contractors in Chile. Finalize the contract with them by the end of the month.

April 2011 Methodology and Instrument Report detailing our analytical process and instrument development. This will be a product of the research seminar. Vet CV survey using contractor focus group.

May 2011 Begin our fieldwork and begin collecting surveys. Data collection will be completed by May 30th.

June 2011 Data cleaning and data analysis will be complete; and short presentation detailing preliminary results for the TASCHA workshop.

August 2011 Draft research papers, short white papers to distribute within our research network.

October 2011 Research papers submitted to academic journals, and reports to donors.

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