**Mobile Phone Access in Sub-Saharan Africa:**

**Research and A Library Proposal**

Tony Maranto and Sara Phang

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K. Hartman

## 1. Introduction

The developing countries of Sub-Saharan Africa (in this paper abbreviated as SSAC) have lagged far behind the OECD nations, East Asia, and even the Middle East and Latin America in their access to information, and especially to information and communication technologies (ICT) and digital information. SSAC nations have been on the wrong side of the "digital divide." (On the digital divide, Warschauer; James, "Information infrastructure"; James, "From the relative"; James, "Leapfrogging"; Potter.) Until recently, access to ICT in developing countries has focused on computers and Internet access. The vast growth in mobile telephones as a form of ICT in SSAC provides a new model of information access, one that surmounts many of the traditional barriers to information and may enable Sub-Saharan African development. Many new services are being offered on mobile telephone platforms. We propose that African libraries and librarians should take advantage of mobile telephony to promote access to public and social services, access to literature and literacy, and community involvement. Our project, Phone Your Library™, offers reference services, information services, access to social services, and cultural opportunities via call center and gives away prepaid mobile phone cards to encourage use of the "mobile library."

Outside of the educated classes in urbanized areas, SSAC populations have lacked access to computers and the Internet, because computers are expensive, because electrical and landline telephone infrastructures are poorly developed and unreliable, and because of their low literacy and education rates. Many Sub-Saharan Africans live in rural areas poorly served by landlines, which are located in urban areas and along the major highways. To use a computer ant Internet

connection requires training (computer literacy); it presumes literacy, for example, entering an URL web address, which until very recently have been composed in English. Even in those African countries (former British colonies) where English is the formal language, most potential users may not have enough English to enter a web address or benefit from the Internet, the majority of web pages being in English. For these reasons, giving communities in developing countries access to hardware without providing the context of training and culturally and socially relevant services, has often been a waste of funding (Warschauer, 1-3 documents instances of non-used donations in Ireland, India, and Egypt; Mutula, "Evolving paradigms," 97-8).

Schools, libraries, and bookstores in SSAC have been ill positioned to help promote literacy because print materials are often limited by high prices, difficulty of distribution over wide distances, the traditional lack of librarian training in organizing print materials, and the difficulties of preservation in a tropical climate (heat, humidity, insects) (cf. Asheim; Golding). International charities readily donate books to Sub-Saharan Africa; however, many of these books are useless for teaching, being in poor condition, out of date, and irrelevant to Africans' information needs.

In short, the supply of conventional information resources to SSAC faces numerous barriers schematized in the flowchart in Figure 1: print books and computer hardware require approval, purchase, transportation to the location of use,  and implementation, whether cataloging or technical support. Each step can be a hurdle in Sub-Saharan African countries lacking conventional information infrastructure, and contributes to the low ranking of SSAC on the "globalization index" (Kearney, 71).

A much publicized initiative has been the $100 Computer project or "One Laptop Per Child," promoted by American IT guru Nicholas Negroponte and unveiled at the World Summit

on the Information Society (WSIS) conference in 2005. The project's goal was to design a laptop that would be easy to use, nearly indestructible under field conditions in Sub-Saharan Africa, and that would cost $100 or less, giving developing communities and especially children access to the Internet's information resources. Many models of laptop were developed and tested; the current X-O model, sponsored by Google, MIT, and other IT companies, is the latest (Figure 2; James, "Global information infrastructure," reviews less publicized low-cost projects). Other projects focused on wireless alternatives to land lines for *computer* Internet access, involving satellite radio, and on the supply of secondhand computers to developing countries (James, "Global information infrastructure," 816-17, 819). Cole discusses recent initiatives by Microsoft and Dell to promote computer access in schools in Africa.

Of course, the "One Laptop" project began to be overtaken by new developments in consumer IT, such as netbooks and smart phones. Netbooks, smaller and lower cost versions of laptops, are dropping in price and the IT company Cherrypal offers a netbook designed for the African market and priced at $99 (slightly higher with Windows operating system). Smart phones increasingly can perform most of the functions of computers, including taking notes, accessing the Web, and running applications (designed for smart phones). Driven by competition, much lower-cost mobile phones began to offer Internet access; Vodafone plans to include a web browser on cheap handsets (Neate). This brings us to mobile telephones in general, which have become the dominant form of ICT in Sub-Saharan Africa.

**2. Mobile Telephone Growth, Coverage, and User Patterns**

According to data collected by the International Telecommunications Union, between 2002 and 2008 (the latest date for which the ITU has data), mobile cellular subscriptions in Africa have skyrocketed, greatly outpacing the slight increase in Internet subscriptions, while fixed telephone lines and fixed broadband subscriptions have remained nearly flat (Figure 3; International Telecommunications Union; Donner; Mutula, "Cellular phone economy," 82-3). This pattern is seen to a lesser degree in East Asia and Latin America (Figure 4), whereas in the developed world, Internet access has grown faster than cell phone access (especially true in the United States: with reliable landlines, many Americans do not own cell phones, and mobile coverage in rural areas of the U.S. is spotty). Mobile cellular telephones run on batteries and use cell towers and satellite uplinks, bypassing Sub-Saharan Africa's problems of intermittent electrical power and unreliable and sparse landline connections. A study of cell phone coverage in Sub-Saharan Africa shows that the urbanized regions, particularly in South Africa and around Lagos in Nigeria and Nairobi in Kenya, have most cell phone coverage, which also tends to follow major highways (Buys, Dasgupta, and Thomas, 1501-2). The authors of this paper suggest that the digital divide now exists within Sub-Saharan Africa as an urban vs. rural divide; the rural area has much less cell phone coverage (cf. Warschauer, 4 on inequities within countries). James and Versteeg have pointed out that cell phone coverage does not equal cell phone access; many people live in the coverage area of a cell phone carrier who do not own cell phones (James and Versteeg, 118). Mobile carriers and phone retailers are among the fastest growing "emerging markets" of SSAC and, where the national government permits, are competing vigorously for market share. It is possible that rural areas might be covered in another decade or two, especially since many Africans regard mobile phones as prestige objects and avidly seek them (Burrell).

Furthermore, cell phone use in SSAC does not necessarily correspond to ownership or subscription, so the ITU figures are potentially misleading, both overestimating and underestimating access (James, "From the relative"; James and Versteeg, 118-120). Many cell phone users in SSAC are not subscribers. Mobile phone subscription packages, even those intended for the regional market, are beyond the means of many poor Africans, who employ prepaid phones instead. There is a large market for prepaid phones and prepaid phone cards, which are often sold by small-scale local entrepreneurs who set up kiosks. The poorest cannot afford prepaid phones, so they rent them, buying airtime for a few cents or a dollar at a time (James and Versteeg, 121). Furthermore, many people share their phones with others, among family members or friends (Burrell, 236). In Uganda it appears to be typical for a male head of household to own a mobile phone and to let his wife use it, controlling her access to it and thus her access to people outside the family. Burrell, 237-239, 241 discusses the social and gendered anxieties that center on mobile phone access. Contrary to Western stereotypes of indigenous peoples, many Sub-Saharan African cultures are highly patriarchal, especially due to Muslim or Christian influence.

## 3. Services Accessible with Mobile Telephones

SSAC entrepreneurs have developed a range of services available via mobile phone, such as mobile banking, a service in which users use cell phones to exchange electronic cash. M-banking is helpful to low-income Africans who cannot afford to set up accounts in physical banks or who may live far from them (Duncombe and Boateng, 1237-8; Masiga). NGOs and associated IT companies have developed mobile phone services for health care workers in

developing countries around the world, enabling them to collect information and coordinate health care efforts. (Murray). Some governments, addressing Sub-Saharan Africa's record for corruption, are encouraging citizens to call anti-corruption hotlines and report abuses. It is possible that the greater connectivity enabled by mobile phone access will increase transparency and decrease corruption and abuses by reducing the "What happens in Vegas, stays in Vegas" pattern (opacity and poor communications favor corruption) (Bailard, 337-339).

At the same time, libraries in Sub-Saharan African countries have lagged behind in ICT use and access; except in South Africa, the print paradigm still dominates (Ocholla, 24). ICT use and access are more routine only in major university libraries such as the University of Ibadan in Nigeria and which even there need development in order to provide full information access (Fatoki; Mutula, "Evolving paradigms"). A local library with one computer might have to use the same computer for OPAC and Internet access for patrons; service might be interrupted by intermittent electrical power and  unreliable Internet access; theft of the computer would be a risk. Mobile phones might provide a more convenient form of ICT access for library patrons, discussed in the proposal. Their use to provide access to conventional academic library services, such as library hours and program schedules, and book due notices and recalls, is discussed by Mutula, "Cellular phone economy," and by Fatoki (267). Mutula suggests that users could access online databases and online catalogues from mobile phones (Mutula, "Cellular phone economy," 88). The U.S. market for doctors' mobile access of medical databases is one example.

In Europe and the USA, several "mobile library" projects have been tried, the University of South Alabama's Library Without A Roof, Carnegie Mellon University's Wireless Andrew Project, and UC Santa Cruz's Richochet Wireless Project (Mutula, "Cellular phone economy," 88). In India and Uganda, the Question Box project has developed call centers that answer users'

reference questions (Nixon), thus providing information access without need for Internet access. The Village Information Project in Pondicherry, India was an earlier version of a similar service employing radio instead of mobile phones (James, "Global information infrastructure," 817).

## 4. Mobile Telephones and Development

In short, mobile phones as ICT shorten the hierarchy of information transmission; the providers of mobile phones are local and the users have direct access (especially if they have Internet-capable phones) to the services mentioned above and to Internet resources. Geographic barriers to information access are partially surmounted, due to the urban / rural divide in cell phone signal coverage cited above. Mobile phone users do not need to travel to public computer centers (libraries and schools) or to Internet cafés. Cell phones are usually simpler to user than computers, and voice access does not require literacy in English. With cell phones, users can access information directly, avoiding the numerous steps/barriers seen in Figure 1.

It is hoped that mobile telephony as ICT access will promote development in Africa, leading to greater domestic product (GDP) growth. Heeks takes a highly rosy view of mobile telephony as a spur to development; James and Versteeg, James "From the relative to the absolute," and James "Leapfrogging," are more pessimistic, since the developed world continues to pull ahead. There is a positive correlation between mobile penetration levels and inflows of both local and foreign direct investment. Access to mobile phones increases social capital, enabling connections between friends, family members, and small business owners (i.e., farmers and market sellers). Mobile phones enable African small farmers to coordinate the transport of

their produce at the right times to market so that supply is better able to meet demand (Muto and Yamano, 1893).

## 5. Proposal: Phone Your Library™

So far, the growth of mobile phone access in Sub-Saharan Africa has been uneven, favoring urban regions over rural, the better off over the poorest (who, however, may rent a few minutes of airtime at a time) and men over women. The environment of mobile telephony is highly commercial (Miriri; noted by Mutula, "Cellular phone economy," 88). Some schools of development are free-market-oriented and promote commercialism. But commercialism is probably not the best mode of promoting literacy and non-commercial information access.  If mobile telephony is truly to bridge the digital divide (rather than perpetuate it, as James, "From the relative to the absolute," argues), it must address social inequities.

Our project proposes the development of a "mobile library" in the form of an inbound call center, staffed by librarians who develop content and reference services guidelines and by library school students who are the call center representatives answering users' questions. This project, Phone Your Library™,  will make phone access more egalitarian by giving away low-cost prepaid phone cards (on the order of $10 each) which will advertise Phone Your Library™ and provide contact numbers for the call center. The phone company Vodafone will donate the cards and will be permitted to also display its logo and advertising on the cards, but the cards will emphasize the information services that are available at the call center, such as:

- reference services (411-type)
- information about health and health services

- AIDS prevention and treatment

- how to use m-banking

- how to start a small business

- free educational resources

- access to e-government (when available)

- books adapted for cell phones

In effect the phone services will form a "virtual public library" accessible by mobile phone. Phone Your Library™ will thus make African libraries more visible, reducing the "invisible library" phenomenon (Borgman). If phones are Internet-capable, Phone Your Library™ can also point out Web information resources and provide tips on how to use the Internet.

Phone Your Library™ will also make cultural enrichment available over mobile phones. In South Africa, publishing companies are experimenting with the distribution of short stories and novels (in installments) over mobile phones (Commiskey; Blaine). So far these appear to be in English, but works in local languages should also be supported and promoted. An information barrier in SSAC is the lack of published texts in local languages, and the promotion of local content should be an important goal of development (Mutula, "Evolving paradigms," 92; Mutula, "Local content," 106-7; cf. Britz and Lor). Local content includes both local news services, community services, and cultural content. The project can encourage writers and artists (such as oral storytellers) to submit work for transmission. Mutula ("Local content," 110) also defines local content as including e-government services and e-learning services.

**Phone  Your Library™ Proposal**


**Executive Summary**


To meet the information needs of lower-income urban and rural Nigerians in a communications environment that relies on mobile phones at the dominant form of ICT, our organization, Phone Your Library™, will establish a "mobile library" as an informational inbound call center in Nigeria. Nigerians can call Phone Your Library™ with reference inquiries, questions about health or agricultural information, how to find health services, how to contact government agencies, or download cell-phone-formatted e-books. A precedent is provided in the successful Question Box call center reference service launched in India and Uganda, enabling Indians and Ugandans to call the center with reference questions and get answers (Nixon).

International library association representatives and Nigerian librarians will help organize and design the content of the virtual library. LIS students at the University of Ibadan will staff the call center. The call center technology and technical services will be provided by Vodafone, a major telephone and telecom company in Sub-Saharan Africa. Vodafone will also provide prepaid phone cards, which will be given away in libraries and by project representatives in rural areas. The phone cards will advertise Phone Your Library™ and provide phone numbers and e-mail and Internet contacts (not to exclude those who can reach the Internet). Funding will also be sought for Phone Your Library™ from international sources. Advice on structuring information services can be sought from members of international library organizations such as IFLA, which emphasized the need to promote local content at the 2005 WSIS (Mutula, "Evolving paradigms," 92).

**Project Description**

Phone Your Library™ is a comprehensive information service that may be termed a "virtual library." It includes:

- Reference services

- Basic information about regional and local library services

- Health information

- Agricultural information

- How to manage a small business

- Information literacy (some mobile phones have Internet browsing functions)

- Information about government services

- Books adapted for cell phones

The project will develop the content of the information service, set up the call center building and technology, recruit and train the call center representatives, and market Phone Your Library™ to Nigerians in major cities such as Lagos, lesser urban centers, and rural areas.

All information will be regionally and culturally appropriate; the project director and librarians will work with the University, government and NGOs to prepare appropriate information. The languages and styles of communication that the Phone Your Library™ call

center representatives use should also be culturally appropriate. This may pose a challenge because, traditionally, library schools recruit cultural elites (Asheim 1966).

The project requires cooperation with local health organizations, the University's medical and agricultural departments, and the government's public services, and African publishers. There are American organizations that provide free e-books adapted for cell phones, but they may not be linguistically and culturally suitable. South African publishers may offer appropriate works, but Mutula, "Local content," emphasizes that much work needs to be done in this area.

## Organizational Structure

- Executive Director and liaison with Vodafone, the University, government, publishing companies, etc.
- Project Director: manager of librarians/trainers and library school students/call center representatives
- Librarians: responsible for regionally and culturally appropriate content development, guidelines for reference services; train call center representatives
- Call center representatives: Library school students at the University; American volunteers may be possible
- Technical services manager: responsible for hardware and software at the call center

## Staffing

Recruiting librarians and LIS students (who will be paid for their research and services)

may ensure more knowledgeable, motivated staffers who are already familiar with the region and culture. Mobile phone usage was already very high among students at the University of Ibadan in 2005 (Olotokun and Bodunwa, 535-9); its penetration may have increased since, so students will be very receptive to the idea of providing m-services. Motivation is always a problem in call centers, especially those with highly scripted services, but the unpredictable nature of reference questions may provide more variety, and the long-term benefit of the project (see Sustainability, below) is an evaluation of the information needs of the clients. We expect that the librarians and LIS students will work part-time and hope that there is not a legal conflict of interest. If the budgeting is such that Phone Your Library™ cannot pay the librarians and LIS students at competitive market rates, volunteer services should be encouraged as promoting professional development.

**Budgeting**

In 2002, it cost on the order of $2.1 million U.S. dollars to staff and operate a call center with 20 reps for the first year (Waite, 111-12).

| | |
|---|---|
| Personnel Costs | $1,084,723 |
| Circuit Costs | $483,840 |
| Telephone Equipment | $105,000 |
| Work Station Technology | $400,000 |
| First Year Total | $2,073,563 |

The majority of call center costs are operating costs. The prices could be adjusted for 2010 and converted into Nigerian currency, but operating a call center may be cheaper than this in Nigeria as in other developing countries, where U.S. companies often outsource their call centers. It is also possible that the cost of equipment has dropped.

If various foundations that promote library and information services development cannot fund a free-standing, new call center, there are several alternatives. An existing call center could be leased. It is also possible that the project could buy up call center equipment being liquidated in the U.S. or India and that still is in good working order. Assuming that the librarians and LIS students are volunteers and that the directors are salaried by NGOs, the funding to be sought for equipment or for rental of call center infrastructure is on the order of $1million U.S. Vodafone will be encouraged to donate funding towards telecommunications and the prepaid phone cards.

**Evaluation**

Call center software can be used to generate evaluative reports of the frequency of calls, the location of callers, the duration of calls, what services are most used, etc. The latter is most important to the evaluation of the Phone Your Library™ project. The librarians and call center representatives will analyze the types of questions that users ask and their satisfaction with individual answers or prepared services. The librarians and call center representatives will also conduct follow-up interviews with a sampling of clients. Vodafone is interested in a positive evaluation of the project, as it will prove the extension of their services into a new submarket. If it appears that any parts of the services are not being used after a reasonable trial period, their implementation will be reevaluated.

**Sustainability; Future Benefits**

Besides the benefit to the Nigerian public, Nigerian librarians and LIS students will benefit professionally from designing and providing these services, which both extend the reach of library and information services and help Nigerian librarians to collect information about users' information needs. Financial aid to Phone Your Library™ will thus help develop Nigerian informational infrastructure and human capital rather than just providing materials or equipment without also developing librarians' experience and expertise (cf. Warschauer; Curry, Theissen, and Kelly). National libraries should take a major role in bridging the digital divide (Lor). Historically, librarians and staff in developing countries are not very oriented towards providing services (Asheim), and designing and staffing a mobile reference service will help promote an orientation towards providing services, essential in today's libraries that emphasize digital resources and knowledge management (Borgman; Mutula, "Evolving paradigms," 94). A call center that employs and provides for the needs of Nigerian citizens rather than following the Western outsourcing model will also benefit Nigeria, as globalization too often takes the form of new forms of exploitation.

Figures and Graphs

Figure 1: Information Access Flowchart Displaying Barriers to Information Access in Africa (author: Sara Phang)
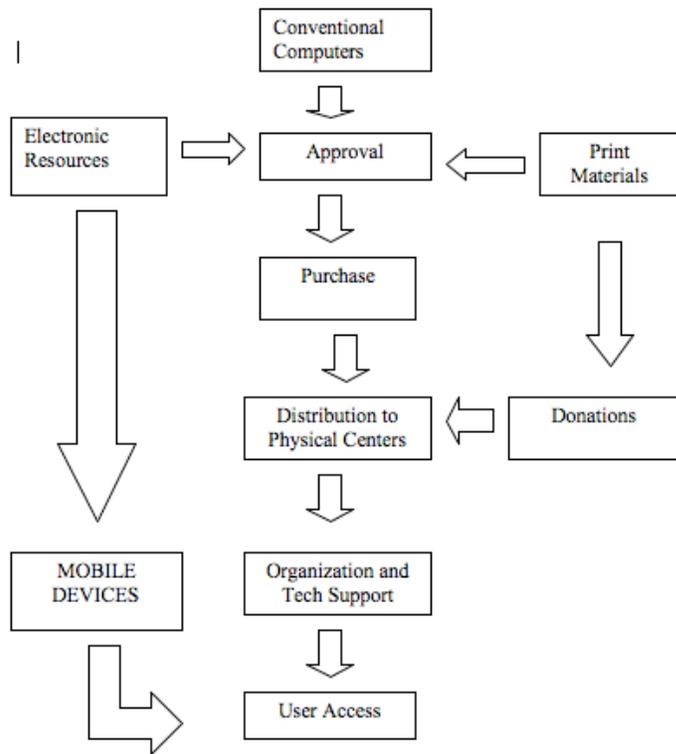


Figure 2: The X-O "One Laptop Per Child" computer

Source: One Laptop Per Child (OLPC) website, <<http://laptop.org/en/laptop/index.shtml>>

Figure 3: International Telecommunications Union Statistics

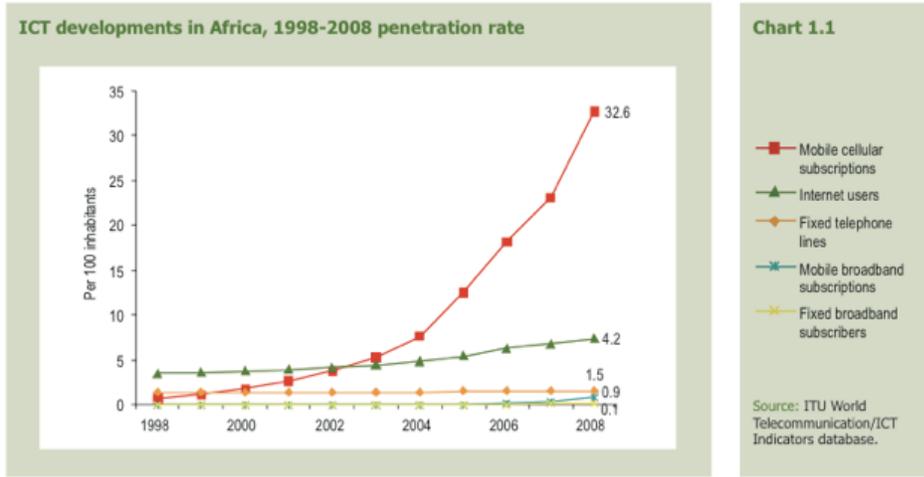Source: International Telecommunications Union, <<http://www.itu.int/en/pages/default.aspx>>



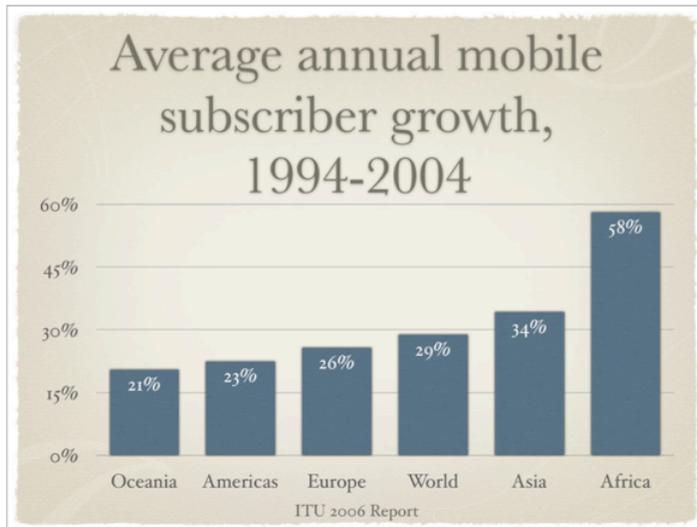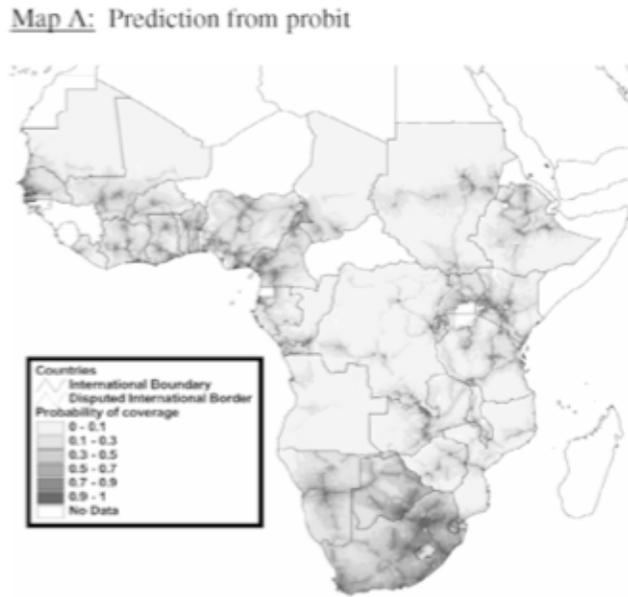Figure 4: Average Annual Mobile Subscriber Growth, 1994-2004

Source: ITU

Figure 5: Cell Phone Coverage in Africa

Source: Buys, Dasgupta, and Thomas, 1501.

Map A: Prediction from probit

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