Appeared: ICT4D Conference, Kuala Lampur, October 2003

Marketplace of Ideas

Prof. Alex (Sandy) Pentland
Juan Carlos Barahona

ABSTRACT

Technology and innovation are the motors of economic and social advance in any society[1], and thus there are many efforts around the globe trying to bring the benefits of digital technology to underserved communities. Telecenters of different types are being installed everywhere, usually with a lot of attention at the beginning, but after a year or two they often start to show serious operational problems related with the lack of organizational and economic sustainability. This paper proposes a novel approach to integrating telecenters into rural communities, and shows preliminary results in a rural coffee-growing village.

Keywords

Social Networks Analysis, community development, telecenters, microeconomic development, business climate, digital technologies, wireless communications.

THE ROLE OF DIGITAL TECHNOLOGY IN RURAL SETTINGS

In rural settings, and especially developing countries, it is often difficult to argue for the benefits of digital technologies and its relation with higher levels of productivity through better coordination, communication and knowledge sharing. Many times there are a skeptical reactions from community members, who are usually focused on more traditional methods of economic development, and when it comes to arguing for provision of Internet services the skepticism becomes even greater.

The common promises about Internet for the people are:

….the opportunity to do better business through the access to international market
….prices or even next town prices for their goods;
….the possibility to deal with the local government from home;
….medical assistance provided by a faraway physician on line;

and so forth. However most villagers do not care about the international prices --- they must take the offered price in local commodities markets because of their small production size. Dealing with local government through the Internet is justifiably seen as just sending an email to an incompetent and unresponsive official in a distant municipality, and not much better than trying to `fix' the problem through the local *babu.* And as for medical and agricultural advice, that is only useful if the local health and agricultural systems have the correct drugs and trained personnel.

PEOPLE ARE THE CONTENT

In the seemingly endless number of studies and position papers concerning the introduction of digital technology into underserved communities, the first recommendation is to obtain more local content. Perhaps the key component of the Marketplace of Ideas proposal is to recognize human contact among the villagers as the main content, at least in the early stages. The goal should be finding easy and efficient ways for them to meet and share with their friends and peers within the community. For instance, having means to distribute simple but crucial information on time, such as "I just found a "x" fungi in my field, check yours to prevent infection" or "I am going to town with my truck half full in about an hour, who wants to use the remaining half and share the cost?" could make a world of difference.

Traditional ICT programs…the village phone or the central telecenter…are useless for communication within the community. Even if every villager has a phone it is not easy to call hundreds with such `opportunistic' messages, and traditional broadcast means such as radio are inefficient because they depend on every member listening at the same time. In contrast, the asynchronous digital media (where the receiver can be view the message whenever convenient) are ideally suited for such communications. Whether by two-way pagers, or SMS messages, or Internet email, simple asynchronous messages have the potential to raise the productivity of all the producers through better coordination of their activities.[2]

However bringing connectivity to a rural community by providing the appropriate infrastructure for low cost communications is not enough. People need support and motivation to understand why it is worth their time and money to acquiring these new tools and learn how to use them[3]. Since resources are limited there is a need to seek the most effective and efficient methodologies to introduce these technologies into the community, and to spread their benefits to largest number of individuals within the community.

We argue that in rural areas, the existing social networks are the critical change agents in the community. Introduction of digital communications technologies must be done recognizing these key groups of people and connecting them to each other, allowing them to immediately find the value of the technology in the wealth of new `community communication content'. Our approach therefore begins by exploring the structure of the community to find the networks of influence, motivation and support among the community members.

Ideas as a source of wealth

Marketplace of Ideas is a metaphor to help think of ideas as a good that is produced, imported and shared by community members. Ideas can have both value and cost. They can be registered and protected in the form of patents, trademarks and copyrights or can be given away. Ideas also have opportunity, distribution and production costs.

Wealth, innovation and economic growth are the result of ideas, collaboration and the ability to transform those ideas into valuable tools, products or services. This is true at personal, business, community and national level. Ideas come in a variety of forms, including knowledge, values, attitudes, information and coordination.

A better flow of ideas generates wealth. The new media should provide to the right people means to enhance substantially the way and frequency of their contacts and the quantity and quality of their relationships.

The role of social networks

Identifying who to start with is key for success and finding ways to later reach the highest possible number of community members is an ethical obligation. Social Network analysis could play a key role in both.

Communities are collections of superimposed social networks build of different community agents or actors and the relations or links among them. This social networks act as the distribution channel for the flow of ideas. The process of an idea flowing through a social network is critical to its usefulness.

The flow of ideas from one individual to the community and vice versa will depend on the relations or links among them. The different channels and patterns will depend on the different levels of influence of different individuals.

Since the 1930´s cognitive and social psychologists have worked on the problems of sociometry and group dynamics, and have develop methods to look at group structure and at the flow of information and ideas through groups[4]. More recently Social Network analysis has become an important multidisciplinary field of knowledge and research[5]. It has been used to understand better how ideas flow, how technology can help them spread more efficiently. We can used these methods to explore ways to foster growth within the Marketplace of Ideas as a method to reach the underserved members of the community.

Social Network analysis should provide a useful insight on the regularities in the relationships and the key structural properties of the community. This approach should guide an intervention to enhance the abilities of key agents and to provide better or new links. These richer networks should be a vehicle for richer and more significant content for the different categories of actors within the community.

There are already social networks sharing basic ideas, the challenge is how to strengthen a expand those networks helping the actors in the social network to link themselves in a more effective and efficient way. In other words, **how could they meet themselves and their ideas more effectively?**

We have observed that usually the most connected community and the one that is already sharing a common language is the business community. Having accurate empirical

information about the social networks that are more relevant in terms of revenue generation and problem solving will help to allocate better the available resources to promote a better and more productive flow of ideas.

From Little Intelligent Communities to the Marketplace of Ideas

The MIT Media Laboratory[6] has been experimenting with several different models in different settings with the goal of improving community access to digital technologies. The LINCOS telecenters are one of these projects and they have provided important and interesting lessons about the dynamics of development in the several dozen different communities where LINCOS units have been tested.

THE MEDIA LAB LINCOS PROJECT

LINCOS stands for `**l**ittle **in**telligent **co**mmunities'[7]. It was developed as a joint project with the Costa Rican Foundation for Sustainable Development, with the goal of being a prototype for the 21st century community center. Build on used commercial containers this high-end telecenter provided a mobile solution that can bring first-class educational material, medical advice, business communications, and the arts to every family by use of wireless communications technologies.

The LINCOS approach relies mainly on the communities ability to organize it self around the telecenter and the services it provides. Different units in different communities have shown the LINCOS' flexibility and capacity to respond to different needs and situations, and in most of the LINCOS settings services related to education and communications have been of great demand. In terms of hardware, software and pedagogical approach, the LINCOS project has been quite successful.

However in most cases sustainability has become a serious problem, as after a few months the organizational weakness of the community it serves starts to reflect on the unit's economic sustainability. To overcome these sustainability issues and to have a higher impact in the community we must also introduce a change in the relationship between the unit and the local business community as well as in the way we introduce these digital technologies in the community.

Hardware, software, business ware and human ware

We envision progress in a community as the result of more effective relationships among its members and their positive influence in the general quality of life. We provide to those leaders with enough support to help them recognize themselves as a network and as an informal group or clique of important actors within a bigger network. Therefore, when beginning work with a community, we look first to identify of the community structure, the key actors and their formal and informal links to the rest of the community.

We begin the process by looking at the business community, looking for the main business clusters, as they are a visible and influential network that already has in place mechanisms of coordination, a common language and similar goals and values. In addition, these members usually have the potential to play important roles within other social network.

Communication within this core group is then strengthened with digital tools. Social strengths, such as negotiation skills, leadership, conflict resolution, team building, interpersonal trust, etc., must be developed along with support for adoption of digital tools. Ideally, local organizations... local business schools, business people and NGO's... should be the source of this kind of training.

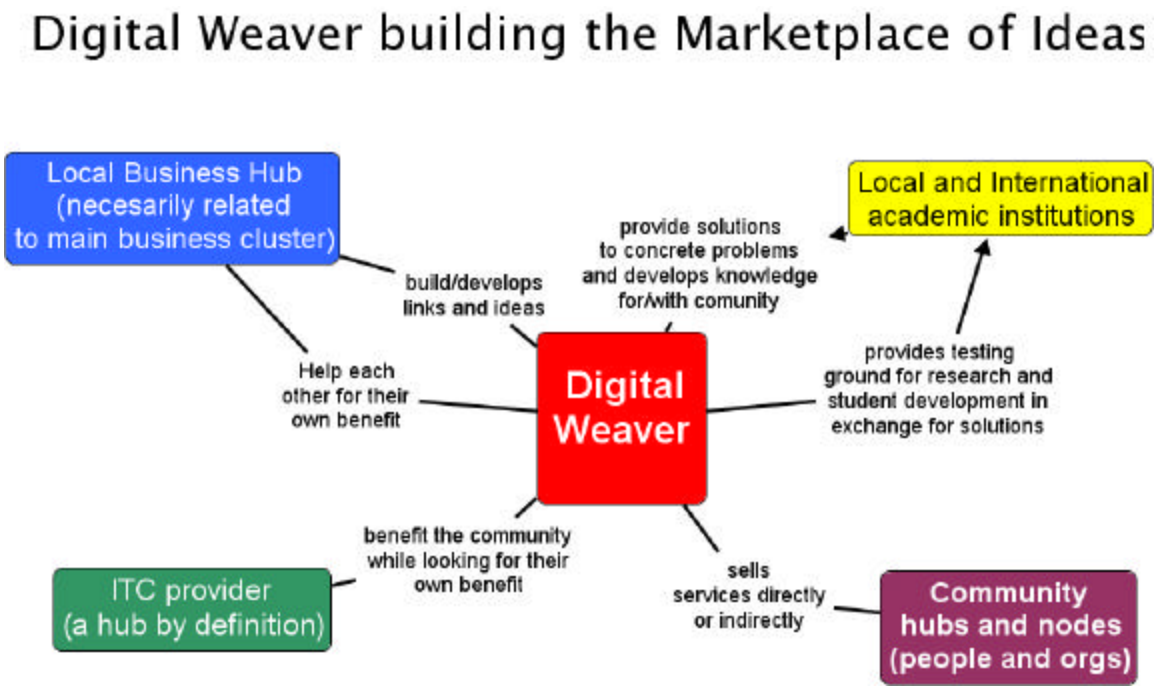
The motivation to start using digital tools should be addressed at an early stage. We encourage the core group to quickly get on-line and promote the skills to use this new media to communicate among themselves. Finding the right tools is important because rural entrepreneurs might have different and special demands on the design and abilities of their communication tools.

We are emphasizing use of mobile devices with access to the Internet through 802.xx rather than the usual desktop computer, as most of the work of these people is not at a desk. We also encourage other types of text messaging exchange when available through cellular telephone coverage, as this type of coverage is becoming common and relatively cheap in many developing nations[8]. Note that specialized software can exchange text messages among all of the different types of devices available to the community.

The adoption of these new digital commications tools brings with it the need for the infrastructure and technical support. In our operations we deploy a WiFi network to provide 802.11b-standard wireless access to the Internet; the advantage of such a network is that it can serve as a low-cost platform to enable new types of businesses and services. The LINCOS unit plays the main role as provider of technical support for the users and for the maintenance of the communications infrastructure.

THE DIGITAL WEAVER

Based on survey, ethnographic and documentary research we help the community to identify possible uses of different digital tools and promote them within the community. To do so, we also introduce an external agent that we call the "digital weaver", a young professional / entrepreneur that catalyzes change by promoting new digitally-enabled businesses that can be adopted by local entrepreneurs. These new businesses serve community needs, and also contribute to the economic sustainability of the LINCOS unit.



The "weaver" interacts with the local business and partners with some of them to create new ventures, using the newly available technology and community needs. The weaver is also a link between the community leaders and local and international institutions, giving them richer resources to solve their problems and attend to their needs. The weaver builds links among people in the community and at the same time promotes new small businesses. These new businessses are supported by the LINCOS platform and provides an income to the unit by renting services and equipment. Such businesses could be related to the community at large (like movies and other entertainment) or selling different services to the local business (like webpage design and publication, office support like voicemail, fax, photocopies, merchandize materials, etc).

THE SANTA MARIA EXPERIMENT

Santa María de Dota is a well-established and integrated rural community in the southern mountains of Costa Rica. It has less than 4,500 people and has clearly defined sub-groups such as organized coffee growers, women associations, church members, etc. Their main economic activities are based on coffee production, processing and commercialization. Being coffee growers is part of their collective identity and a source of prestige as their coffee is recognized as one of the finest in the world. Ecotourism is starting to be considered as an alternative business, given the low prices of coffee and the difficulty of penetrating the agricultural markets of the developed world.

The MIT Media Lab has established a consortium called Digital Nations[9] with sponsors in different parts of the developing world. In the Central American region INCAE, which is the leading business school in Latin America, is the sponsor and an active participant in the Santa Maria project[10]. Working with them, with Santa Maria's business and community leaders, and with two Costa Rican NGOs (Entebbe and CEMEDCO[11]) we are working to test and develop the Marketplace of Ideas concept.

The first task was to understand the structure of the social network. Once all the stakeholders had agreed that Santa Maria would be a good place to conduct this research, a set of interviews were conducted among a random sample of community members, using the `snowball' methodology to establish who to interview next. In this method we ask people about who plays important roles within the community when they are trying to solve problems, and what decision makers were known and respected by the people, we ask them about their main concerns and what organizations were active in addressing these concerns, the different organizations they were involved with, and what studies about the community that they knew of. The answers to these questions are then used to identify new interviewees, thus ensuring that no segment of the `social influence net' is left out of the survey.

With this initial research we were able to identify a subgroup of about 700 hundred small producers (15% of the population) that were responsible of 80% of the total community income and among them 20 leaders that were the most influential. A sample of 122 producers shows a community profile that highlights the challenges that must be faced if

rural communities in middle income countries are to meet the Millennium Development Goals[12]. A sixth of the producers never completed primary school, 45% completed 6 years of primary education, 12% percent completed high school and 15% attended tertiary education. This means that literacy is not a barrier in this community and there is a good chance to promote written short communications.

The average age is 48 years, and in the interviews most of them feel that their generation is to old to use computers, but some of them consider it as an opportunity for the youth. As an average, they have two kids living in their household and the average age is 16 years old. One fifth of their households already have a computer at home that are in occasional use by their kids but no one has access to the Internet. It is important to mention that computers have been in ubiquitous in Costa Rican schools for at least fifteen years and dial up service to the Internet have a moderate cost, so it is surprising to find zero connections in place.

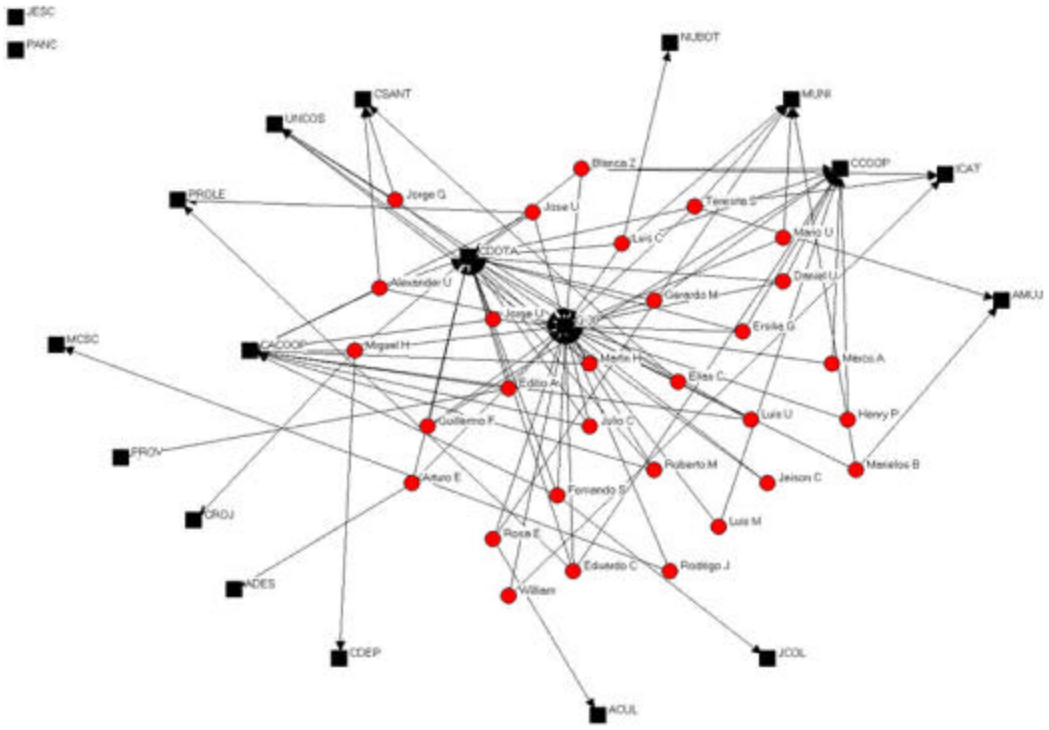
A preliminary exploration of their social network showed a very different structure when they were asked two different questions. When they were ask about people with whom they talk to seek for advise in different matters that are not related with production or commerce, their answers were limited to very few people, most of them close family and with almost inexistent links to other producers.

When asked about who they seek for information or advice related with their business it was surprising to find that only two names were mentioned frequently. One name is mentioned by 69% of the producers the other by 20%. Again, there was almost no links to the other producers. These hubs are sociometric stars. If communications are verbal and more than two-thirds report the same source of advice, how frequent could such interactions be?

These survey results confirm the hypothesis that there is a very poor flow of ideas through direct contact among the producers: almost everyone lives in semi-isolation, communicating almost exclusively among those of closest kinship. At the same time they show a few important hubs that hold the various social networks in place. Consequently, any attempt to use technology to strengthen this community must include these `hubs', should not be perceived as a threat to their position. We do not know if past localities chosen for LINCOS units had the same structure, but it is clear now that it would have been a good idea to have taken social network measurements such as these before designing any intervention in a community.

The core group

Working with this sample methodology we were able to identify a total of 30 community members that hold important places not only in the subgroup of coffee growers but in the community as a whole. We were also able to find 20 organizations that are considered important for the well-being of the community members. The next figure shows the network that they form, the red circles are persons and the black boxes are organizations:



It shows that this 30 “hubs” are member of the board of most of the organizations that are addressing problems that are important to the community.

Since resources are always a limitation, focusing the initial efforts on these 30 is important because they have the potential to have a direct impact in the rest of the community through the organizations with which they they work. By promoting and helping them to adopt the use of digital technologies, we hope to begin to improve communication and collaboration within the enitre community.

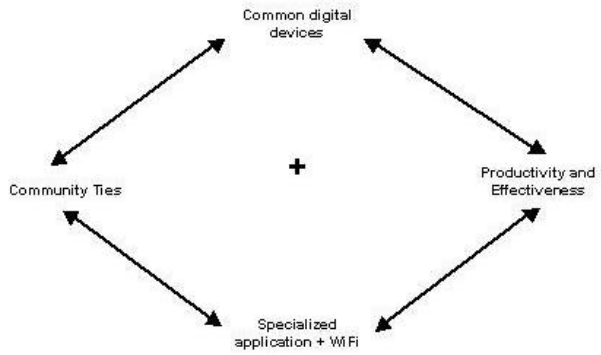
Santa María´s Digital Weaver

Santa María´s Digital Weaver is a young and qualified entrepreneur with a good personal contacts within and outside this community. This weaver will use LINCOS, the WiFi infrastructure and different digital tools as a platform to strengthen and enhance existing social networks. In order to have the highest impact on community development, his natural partners must come from the core group. This project should also contribute to build a business climate that fosters new entrepreneurs or new business ideas among existing businesses.

Some of the small business that may flourish in Santa Maria are related with the distribution of weather information, entertainment (movies, music, etc), support for small local business (the `Kinkos' model), e-business for the bigger distributors of agricultural supplies, technical assistance through mobile technologies, communications services for those who's relatives are working in the US, and alternative ways for money transfers, as well as all sorts of solutions related with coffee commercialization, ecotourism and other economic activities complementary to coffee exports.

The tools

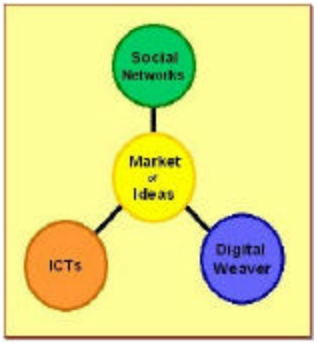
We hope to provide access to ICTs and different services to the 30 members of the core group. We are building a specialized software application that should allow them to distribute seamlessly text messages to the other members of their network regardless the digital device that they might posses. We expect the propagation of the use of these tools among key community players and its adoption by an important proportion of the 700 coffee growers and their families.



Members of the core group are putting together efforts to establish special lines of credit to help the families to buy mobile computers, PDA's WiFi enabled and cell phones. They are also establishing a trust to provide small scholarships to those that do not have the money but want to buy training related to the development of social skills or the use of digital tools.

The sustainability issues

Because this core group is composed of entrepreneurs and people with access to different businesses and organizations, they provide the necessary economic support and at the same time are the first consumers of the new services that are going to be provided within the new platform. In Santa María, the biggest three companies are picking up the bills related with the overhead and operational costs of the LINCOS unit and one of the core group members already established a firm to become a provider of electronic equipment and accessories to the community. LINCOS will then sell technical support, training and will rent its facilities to the different initiatives that will arise from the digital weaver and from the community.



In summary, we believe that this new, unorthodox approach to community work and to microeconomic development --- using Social Network analysis to guide deployment, digital tools to enhance social connectivity, and the digital weaver to promote a better and richer marketplace of ideas --- is a promising method to enhance the usefulness and sustainability of telecenters that are currently being installed in many developing countries.

Acknowledgement: Many people are contributing to the development of LINCOS and the Marketplace of Ideas project and listing their names would be an impossible task but at least, we want to express our gratefulness to Jose María Figueres founding member of LINCOS and Digital Nations and appointed UN Secretary-General's special representative on information and communication technologies for his enthusiastic support of these ideas, Dr. Roberto Artavia, president of INCAE and Professor Arturo Condo and Dr. Ana María Majano, Co-Directors and research assistant René Zuleta of the Latin American Center for Competitiveness and Sustainable Development for their continuous support in research activities and field work, Emeritus Professor Leda Beirute and Prof. Luis Fernando Mayorca from CEMEDCO for their savvy support on community development and Dr. Juan Barrios, director of Entebbe for his lifelong commitment to bring the benefits of ICT's to the underprivileged communities of Central America and the Caribbean. Last but not least to Roberto Mata, general manager of COOPEDOTA and community leader Rodrigo Jimenez for their brave leadership closing the digital divide in Santa María de Dota.

[1] World Economic Forum (2002) Competitiveness Report.

[2] Hardy, A., (1980) `The role of the telephone in economic development', Telecommunications Policy, Vol. 4, pp. 278-286.

[3] G. Casapulla, F. de Cindio and L. Ripamonti. Community Networks and Access for All in the Era of the Free Internet in Leigh Keeble and Brian D. Loader. Community Informatics: Shaping Computer-Mediated Social Relations.

[4] Scott, John. (2000) Social Network Analysis. SAGE Publications Ltd. Reprinted 2003.

[5] Wasserman S. and Faust K. (1994) Social Network analysis: Methods and Applications. Cambridge University press.

[6] www.media.mit.edu

[7] www.lincos.net

[8] Rheingold (2003). Smart Mobs. Perseus Publishing

[9] www.dn.media.mit.edu

[10] www.incae.edu

[11] www.entebbe.org and www.cemedco.org

[12] A discussion on the difficulties that telecenters or information kiosks have to overcome in less developed rural settings could be find in Sood, A.D. (2003) "Information Nodes in the Rural Landscape" .I4D Information for Development Vol. 1 No. 1 May – June 2003.