

Overview
by
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Good evening.

My name is Lloyd Etheredge. I am a Trustee and Project Director at the Policy Science Center, a nonprofit foundation founded at Yale Law School in 1948.

Several years ago I was a member of Joshua Lederberg's working group, supported by UNESCO, that developed a framework for the future of international scientific communication. Two expert advisory committees (for the ITU and our own advisory committee) have suggested that purchasing cooperatives could help to assure affordable access to Internet-related services, especially in developing countries. Our foundation has been making an assessment of feasibility.

This evening I would like to ask your advice about a preliminary draft (Tab 2) based on this work. I will discuss this draft and then, more briefly, a proposal (Tab 3) for a startup package that brings everything - the cooperative and must-have applications - to life during the next 18 - 24 months.

I. Overall Design

Purchasing cooperatives are a theoretically compelling idea. But as a practical matter, three questions arise. Can they be organized:

- 1.) To assure the lowest available prices for Internet-related equipment and services?;

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- 2.) To elicit widespread confidence in the operation of the cooperative?;
- 3.) To provide enough benefit so that they justify the work (to somebody who can act on the idea) to get them organized?

A. Purchase of Equipment

Contractually, a cooperative could work. Leading companies *are* willing to write contracts with clauses that assure the lowest available price. This guarantee is essential if a cooperative is to appeal to major organizations.²

Contracts also can be written as performance contracts to fit the decentralized decision making of a cooperative: a supplier will link a price to an estimated rate of sales. The actual rate of sales is compared at negotiated intervals - for example, every six months - and the company has a right to renegotiate the price if there is a substantial deviation.³ There is no need for a cooperative to organize purchases up-front or, itself, to undertake legal obligations to purchase fixed quantities.

Politically, a cooperative would want to carry products from several vendors and countries. Our solution is that, in principle, any company could list its product and price on the cooperative's Web site, provided it is willing to offer the lowest available price pledge. A key requirement should be that members of the cooperative, themselves, want to buy the vendor's product. There also might be additional conditions that a cooperative would require: for example, evidence of quality and reliability, willingness to provide 800-number international technical support, mechanisms for dispute resolution, bundled software, etc.

As a first step, a good idea is probably to focus on entry-level packages and expand the range and variety of products after the basic business is running smoothly.⁴

² We have discussed this with representatives of Dell and Gateway 2000, among others.

³ All contracts have to be negotiated and there are many details and options - the shipping costs, the languages in which bundled software and technical support is required, warranties, etc. - that will affect the price. The contracts might be attractive for direct-sales manufacturers (e.g., Dell, Gateway 2000), but companies with international dealership networks also could include small fees for their local dealers in underdeveloped countries to handle purchases under the contract.

⁴ The cooperative could become large in annual sales through its contracts, but should not become a new bureaucracy. Basically, the cooperative's central office should remain small, negotiate contracts, and

At first, the cooperative's contracts would be used for purchases by its members on behalf of their own programs in underdeveloped countries. But, then, its members can become agents for institutions in developing countries: for example, if UNESCO wants to make the lowest available price options available directly to universities in Nigeria, it could do so. If the Soros Foundations (that already are major purchasers of Internet capacity for health and science in Eastern Europe and the former Soviet Union) want to join and add their purchasing power and expertise, they could do so.

The cooperative could, rather quickly, become one of the larger purchasers of computers and bandwidth. It would need a good management team.

In this light, a small technical clause in the contracts of the World Bank and UN agencies, to permit recognized NGOs to use the price negotiated by your organizations for purchases on behalf of health, science, and education in the Third World, could open the door to a revolution. With these open-ended contracts, if UNDP is able to negotiate a price for its programs in India at 35%-45% less than locally-quoted prices, CARE or a local hospital with any tie to the Aga Khan Development Network or a designation from WHO could see the price on the Web site and use it.⁵

- Politically and economically, it also is worth mentioning the long-term advantages that a purchasing cooperative could assure for small and startup companies in many countries who, in the years ahead, may offer good products at good prices to local, regional, or international markets. A coop Web site could bring their products to the attention of interested purchasers, and they would not require the advertising budget of the large companies that now control most of the market share in advanced industrial countries.⁶

B. Purchase of Internet Connections

A cooperative also would be worthwhile to purchase inexpensive Internet connections,

run a Web site: the flow of paperwork should be directly between vendors and purchasers.

⁵ For scientists, it would be worthwhile for UNESCO to invite the International Council of Scientific Unions (Paris) which is an umbrella organization for scientific societies, and hundreds of thousands of scientists in all countries; and for WHO to create an umbrella for physicians and public health workers in all countries.

⁶ It would be attractive to assure markets for companies that wish to sell in the underdeveloped world and use 8088, 286, 386, 486, and lower-end Pentium processors.

especially to take advantage of changes in the market. Here are three strategies:

1. Collective Purchasing from LEOs

There is an attractive option on the horizon as the new low-earth-orbit (LEO) and other satellite nets start to become operational next year. [Iridium already has several dozen satellites in orbit, in test mode.] The world will launch more communication satellites in the next five years than have been launched in the forty years since Sputnik.⁷ Many will offer point-to-point global communications, anywhere to anywhere without asking permission. They can leapfrog many of the terrible problems in underdeveloped countries, ranging from government bureaus that restrict control of information to poor or nonexistent telephone communications, that were discussed at the Global Knowledge meetings in Toronto.

The LEO s could provide another opportunity for the underdeveloped world because the LEO satellites are too low to be in a stationary orbit. To build enough satellites to serve peak capacity demands of the advanced industrial nations, companies necessarily spend billions of dollars to build substantial capacity that is unused as the satellites pass over the underdeveloped world. If the capacity doesn't secure revenue on *this* pass over the underdeveloped world, the possibility of revenue is lost forever.⁸

If you are a single clinic in rural Africa, or a local school in Latin America, you probably have to pay commercial rates at about \$4/minute. But if there is a cooperative that can make wholesale purchases for nonprofit institutions on a large scale, then there might be real savings, especially for Internet digital connections at a small fraction of this cost.^{9 10}

⁷ John Montgomery, *Fiber in the Sky*, Byte, (November, 1997), pp. 58-61, 64, 66, 68, 70, 72. Forecast at p. 64.

⁸ For technical reasons, major systems are often designed to have two (and sometimes three) of their satellites overhead at all times. Thus, for any arbitrarily selected site in Africa there will be, at any time, at least two Iridium satellites overhead, mostly doing nothing - and securing no revenue.

⁹ What will be the price of this magical universal service? Surprisingly, on a per-bit basis, every company I talked to said it will be probably not much more than what you're paying for your land line services. That may seem like a pretty amazing statement, considering the investment required to get some of these systems running - Teledesic, for example, is forecasting a \$9 billion start-up charge . . . But Teledesic president Daggatt thinks it's reasonable. It's a very high-capacity system. And unlike a wire-line network, where all the capacity of the infrastructure is rigidly dedicated to locations and users regardless of whether they are actually using it at a given moment, Teledesic offers bandwidth on

And the possibilities for negotiating should grow as more systems are launched.

2. Contracts with Private Data Networks

A second option - again, not open to individuals - is to purchase unused capacity from the many private data networks. One example is SITA, the nonprofit cooperative in Paris that operates the world's airline reservations network. Essentially, it is in every country. Wherever there is an airport or on-line reservations terminal, there is a dedicated 24 hours/day data link. And there is substantial unused capacity in the Third World.¹¹

Recently, SITA's Board voted to seek revenue by resale of its spare capacity. It is now used by several UN agencies (e.g., UNDP, High Commissioner for Refugees).¹²

There are many other private data networks that are global, or nearly-so, and open to discussion of selling spare capacity. They can do this so long as they remain a private data network selling to organizations - not to individual consumers. A cooperative would be a necessary agent.

3. Purchases from Governments

A third option is to purchase spare capacity from such government sources as the US Information Agency. For example, USIA has a global television channel, WorldNet, that

demand, where the system capacity used is limited to that required by a particular user and a particular application at a particular moment. . . . Other system operators agree. Savatiel [Karl Savatiel, Vice President for Broadband Systems at Lockheed and President of Astrolink] says, 'The price can compete with underutilized T1s, like 25 percent utilized T1s. Astrolink will be in the range of 20 to 25 cents per minute for 64 Kps, but remember that you only pay for what you use. . . .Cyberstar's Maehl [Ron Maehl, President of Cyberstar]. . . sees Cyberstar's service coming in at about \$20 per month for basic service. However these are wholesale prices and the charges to individual end-users (i.e., without purchasing cooperatives) could be much higher. *ibid.*, pp. 70, 72.

¹⁰ There is a competitive advantage that any computer company would have in securing initial footholds for science, education, and health in the developing world. Once a good relationship (with the lowest available prices) is established, it becomes attractive to stick with the company for upgrades, expansions, etc.

¹¹ There are technologies (e.g., wireless modems) that eliminate difficulties of local telephone systems within a radius of 20 - 30 kilometers.

¹² It is my understanding that SITA also is open to contracts that would involve expansion of their system, as a non-profit entity, for health, science, and education for underdeveloped countries.

operates 24 hours/day outside the US with downlink sites at 300 locations worldwide, every Embassy and Legation. The programming budget for WorldNet has been cut sharply since the end of the Cold War and there is abundant unused capacity.

USIA's system is not highly interactive: It is a legacy from the past era of international relations when America was in transmit mode. But it should be easy to purchase spare capacity on WorldNet's satellite transponders (e.g., INTELSAT) for part of a global Internet backbone for health, education, and science *if* there was a cooperative, with recognized standing, with which USIA could make a deal.

As well, *if* there was a core package of must-have programming - Internet programming and applications that are so beneficial, so widely, for health, science, and education that everybody would want them - *then* it actually becomes attractive for the USIA and many others to donate the global bandwidth as a foreign policy or philanthropic initiative.¹³

In other words a purchasing cooperative - but especially a purchasing cooperative made-up of leading institutions in this room, with a degree of moral standing to be creating must-have applications that benefit health, science, and education in all nations - actually might not have to purchase much of the global bandwidth for a startup package.

C. A Working Model

Finally, I want to bring good news to your attention. Seventeen years ago three visionary foundations - also current members of your Global Knowledge sponsors network - Carnegie, Ford, and Benton - saw the benefits of purchasing cooperatives for nonprofit institutions. They founded TCN (Telecommunications Cooperative Network) to purchase long-distance and related communication services for nonprofit (mostly, domestic US) institutions. The idea has worked splendidly for 17 years and TCN now has 5,000 members and a great deal of experience. They are certainly available as a model. They might add (overnight) 5,000 organizations to the purchasing power you are able to leverage, and

¹³ The leverage of Internet technology is extraordinary: The prototype 1 hour Global Grand Rounds colloquium at Yale Medical School (the first implementation of the Lederberg Report) results in about 5 - 7 megabytes/week of compressed digital files for audio, slides, and text. USIA's Worldnet is a standard 30 frames/second analog system with a capacity of at least 7.5 megabytes each second. Thus, roughly, 1 regularly-scheduled weekly global research colloquium requires only about 1 second per week on this (one of several) US government system. Ten minutes per day of USIA's unused capacity would deliver 4,200 1-hour global research colloquia each week to local Internet service providers worldwide. Etc.

might be helpful in other ways.¹⁴

Let me turn to a discussion of a startup package:

III. A Startup Package

To get a purchasing cooperative - and everything else - moving quickly, several pieces need to come together. Right now, it does not make a great deal of sense to invest in programming and resources for the Third World, that depend upon the Internet, until the Third World has basic infrastructure and low-cost connectivity. And it is difficult to make a compelling case, in the Third World, to invest in hardware and fight for affordable Internet connections until there are resources on the Internet that can make a real difference to meet their first priorities.

The startup package is outlined at Tab 3. It includes two ideas.

1. Must-Have Applications

The first idea is "must have" applications - i.e., that are so beneficial, so widely, that once created everybody will want to have them.

If there truly are such applications, they would get everybody's attention. And there would be an attractive synergy: they would help to bring together the founding coalition for the purchasing cooperative and line-up customers.

The Lederberg Report recommended five initial projects. At Tab 3 you also will find sample pages from a Web site at Yale Medical School that is the first regularly-scheduled global research colloquium. Each week, it brings current information about developments in emerging infectious diseases to several thousand researchers and public health workers in

¹⁴ It might be attractive to put this new cooperative solely in the foundation world. But a founding coalition with a wider set of institutions in this room also might be attractive: 1.) the World Bank has a comparative advantage in leaning on governments in the Third World to assure competitive prices and straighten-out inhibiting tariffs - and both of these are, as the Toronto conference demonstrated, sources of considerable frustration and blockage; 2.) UN agencies have a special standing that permits them to purchase global bandwidth at net-net prices; and 3.) INTELSAT rates, and especially the creation of a global Internet backbone for health, science, and education, are determined by a political process in which the World Bank and UN agencies would have a special standing to be heard.

140+ countries. And there is opportunity for Email discussion with presenters.¹⁵

I bring this pilot project to your attention because it is a model for other must-have projects that are under development.¹⁶ For example, I have included in this section a must-have startup project from MIT (pending with UNESCO) to improve the teaching of foreign languages worldwide, especially by the use of new technologies. It would begin on the Yale Medical School model, using MIT and two partner universities (in Europe and Latin America) as capture points. In turn, it could be a prototype for similar projects in a startup package. Many elementary and secondary school subjects in the world are generic (high school chemistry, algebra, reading, etc.) and would benefit from research, shared resources, and teaching aids.¹⁷

And also, at the World Bank, the Vice President for Sustainable Development will be

¹⁵ The pilot project has been supported by UNESCO, WHO, and the Sprint and Lounsbery Foundations.

¹⁶ For example, we are beginning to work with WHO and other institutions to develop a core group of Global Grand Rounds Channels that would involve the world's leading medical schools, on a rotating basis, in providing the latest information to physicians worldwide. In the United States, the National Institutes of Health will shortly begin two global colloquium series using this model: the Director's series of weekly lectures in basic biomedical research, and the Clinical Center Grand Rounds, with the best and latest ideas in the practice of medicine. Both series are already funded to bring leading researchers from many countries through the NIH campus and - like the project at Yale - they provide efficient capture-points for researchers, physicians, and students to be connected to what is occurring in their fields without constraints of distance or money for travel.

The Lederberg Report suggested that the impact of selected projects on the rate of scientific innovation might be spectacular, and this is one of the propositions that is being tested.

¹⁷ Concerning distance learning: a good idea for a startup package is provided by The Teaching Company in the United States. They identify superstar teachers, based on teaching awards at leading colleges and (now) high schools. The teachers are invited to give a series of their lectures to audiences at the Smithsonian Institution in Washington, DC. The lectures are taped and sold. It might be an attractive part of a startup package to develop the idea and make the course lectures of other outstanding teachers available without charge on the Internet.

Teaching courses at a distance requires higher bandwidth than is now available to most users of the Internet. These may not be the best projects for a must-have startup package. A key issue in distance learning is the social relationship, and the possible weakening of student motivation without the immediate relationship to a teacher. Colloquia series for research professionals or graduate students with a career commitment may be more effective. Or supplementary programs like Sesame Street or Vice President Gore's GLOBE project that now links several thousand elementary schools in 55 countries in projects with American environmental scientists.

starting two similar projects. The first will make the professional research colloquia at the Bank concerning sustainable development available worldwide. The second will develop state-of-the-art global colloquia to accelerate agricultural research, especially applications of biotechnology, and related technology transfer.

Must-have programming is going to drive the acquisition of Internet-based technology for health, science, and education in the Third World. I hope that your institutions can develop the list.^{18 19}

2. 100,000 x \$200 = \$20 million

The second idea for a startup package is that 100,000 x \$200 = \$20 million. This is a large sum - or very little - depending upon where you come from. (From where the World

¹⁸ There are three features of this EIINet example that might be desirable features for other projects in a startup package:

First, it is not wildly enthusiastic about technology or seeking to put everything on-line. It meets a specific need for specific people. It is problem-oriented and provides current information, and state-of-the-art science, in this medical specialty to people who can use it. It is being done in a field in which people are passionate about being effective and everybody is aware of basic measurements of the problems they are trying to solve [e.g., the AIDS epidemic is an example of an emerging infectious disease, as are *Ebola* outbreaks (etc.)].

Second, it gets beyond the do your own thing and post it instinct of many Web sites. It is interactive and building working relationships for international cooperation and joint medical research.

Third, it maintains quality and has an element of prestige. The invitations are, in a sense, peer-reviewed and it is considered an honor to be invited to give the global briefing for your colleagues.

¹⁹ Before leaving the discussion of startup packages, let me illustrate how they are being organized in these first implementations of the Lederberg Report. For example, the benefit of the startup at Yale Medical School will be expanded because the Clinton Administration has recently agreed to develop, and pay for, high-capacity global Internet links among research centers for emerging infectious diseases. In turn, these can become elements in a hub-and-spoke system for efficient development of advanced applications (e.g., videoconferencing or telemedicine.)

A second startup recommended in the Lederberg Report, for malaria research, also is underway. This time, the pieces are being assembled in reverse: Harold Varmus at the National Institutes of Health announced in June, 1997 that NIH would pay for Internet links among all of the world's malaria research centers. An advisory committee with substantial representation from African researchers and public health professionals will help to design the programming and on-line resource packages.

I also have included in the briefing material (at Tab 3) a recent news story reporting the NIH decision to eliminate inhibiting charges for the Index Medicus and related databases: the usage rate has jumped tenfold and now is at a rate of 60 million hits/year. It is beginning to revolutionize the daily practice of medicine worldwide - and it could do a great deal more if your organizations can create the cooperative and begin to get the basic equipment and affordable bandwidth organized so this must-have application can be available to physicians, researchers, students - and individuals - everywhere.

Bank comes from, it is very little.) The recommendation is that a core group of partners move boldly and put 100,000 entry-level Internet systems into the Third World for health, science, and educational users during the next 18 - 24 months.

I think this would capture imaginations, create a critical mass, and make it easy for any international organization or foundation to use Internet connectivity as a growing part of its international programs.

Our advisers at MIT estimate that the manufacturing cost in the computer industry is about 15%-25% of list price. If we think of the new network computers from Oracle, Apple and others as retailing at less than \$500, they would cost about \$125 to manufacture. Thus, I have suggested \$200 per system - and a package to acquire 100,000 at this price would give the manufacturers of network computers, overnight, a global beachhead, in their war with Microsoft, for controlling the future of health, science, and educational applications for most of the world. And it might provide a critical mass of users to begin what has been (normally) exponential growth in global multimedia applications.²⁰

The startup purchasers need not be only the World Bank or foundations or development agencies. There are recent, bold billionaires who seem to enjoy stirring-up things globally, whether it is George Soros who is underwriting Internet links for science and medicine in Eastern Europe and the former Soviet Union. Or Ted Turner, who has not yet said specifically how his \$1 billion will be spent. And \$20 million is within the roundoff error of the net worth of Larry Ellison at Oracle. Etc. [And, just to mention that under American tax law 50% of any gift can be deducted, so \$20 million to put 100,000 entry-level systems into the Third World and begin revolutionizing the daily practice of health, science, and education worldwide is actually \$10 million.]

[At this point, I simply want to bring to your attention the material at Tab 4, for your later reading. Unless we are smarter, and can work together to organize new sources of revenue, it may be difficult to pay for the exponential growth of Internet-related infrastructure, and services. People with good ideas will need to struggle, forever, to get funding.

Tab 4 outlines how we can do better, using models that have been developed at MIT

²⁰ Manufacturers of Microsoft-based systems also would be solicited for their best offer of entry-level systems for a startup package.

(and are being used in the later stages of MIT's proposal) and the Industrial Liaison Program in Japan. Having a purchasing cooperative for equipment and bandwidth provides an institution that might, in cooperation with other institutions, solve these problems along the lines sketched at Tab 4.]

IV. Conclusion: Three Questions

Let me conclude with three questions:

- Would cooperation along these lines be in the best interest of your organizations and your goals in the Third World?
- How could these ideas and draft be refined and developed further?
- What should happen next?