

## Telecommunications Development v.2.1

Telecommunications is an infrastructure element essential for the functioning of a robust society. It is necessary for governance, commerce, health, education, recreation, and the myriad of other activities contributing to a healthy environment.

Under-developed societies cannot afford telecoms and without telecoms, a society cannot develop. Affluent societies can afford telecoms and their prosperity grows.

Affluent societies have telecoms largely because the prospect for profits motivates entrepreneurs to invest in facilities and provide services. There is no incentive for anyone to provide services in a poor country where few can pay for them.

It takes money to supply services. In rich countries private firms generally obtain the needed capital. In poor countries subsidies from within or from outside the country are needed; most of this funding comes from international aid organizations obtained from contributions by donor countries.

International aid hasn't contributed greatly to the establishment of sustainable services. It tends to support existing service providers, thereby impeding free market forces and restricting competition. Further, it has a history laced with waste and corruption. Further, the funding organizations are generally distant from the users, so there is a disconnect that is difficult to overcome.

The incentives for development that exist in an affluent society can be mimicked in a poor one. This can be done by giving the subsidy to the users, not the service suppliers. If users can purchase services as in rich countries, then potential suppliers will raise the capital, build the facilities and make needed services available. In order to do this, the following factors need to be considered:

- An indirect means of granting the subsidy is needed because giving consumers funds to purchase services would have little bearing on how the money is spent. Food stamps exemplify an attempt to restrict the use of a subsidy for its intended purpose, but they can still be sold to others for cash to buy non-food products. In this case, a workable technique would be to sell "phone cards," (or, more likely, "data cards") at a fraction of the price for the services provided. For example, if the price for a phone call was ten cents per minute, a card worth 100 minutes might be sold for \$1.00, one tenth of the value of the calls. (Or, possibly an hour of 1.5 MB/s service for a tenth of the going price, whatever that may be.) The cost to the consumer, whether it is ten percent or some other fraction of the price charged by the supplier, must be set to make it affordable.
- The agency that administers the subsidy would pay the telecommunications provider the full price on the basis of service actually delivered. Because telecoms systems maintain comprehensive data on all traffic handled, it should be

relatively easy to track this information. The cards could be sold by the local service company, by the subsidizing agency, or through other channels. A major task is to determine the fair price for service and the cost to the users. This determines the amount of subsidy and involves many factors. This process resembles that of regulatory agencies required to maintain fair conditions in monopoly markets. It is complex and challenging but should be less difficult than administering other types of regulatory controls.

- If entrepreneurs are to be attracted, firm prospects for a successful business must exist. This implies a reasonable risk and return on investment, requiring assurance that capital expenses can be amortized over a standard period and that operating costs plus a reasonable profit are covered. The subsidy needs to last for five to ten years to ensure sustainable services long enough to attract investors. We assume (hope?) that, once a community receives the telecommunications and other services it needs, it would prosper to the point where subsidies are no longer required.

A long-term subsidy requires long-term, or continuous financing. Conditions in the telecommunications industry make this very easy, at least technically. In fact, continuous subsidies have been used for nearly a century in the United States. In the early 1900s growth of telephone services in the Western U.S. was stimulated through subsidies administered by the Rural Electrification Administration. The funding mechanism has been stable for many years, helping ensure development of dependable services. Substantial subsidies are still supporting telecommunications services in parts of the United States, notably rural Alaska.

For service to be regular and dependable, funding for it should be regular and dependable. The international aid bureaucracy is not accustomed to this type of support, tending to give or lend specific sums on a project basis. Further, international aid, as classically given, is complex and very indirect, involving many stages of collecting and transferring money and control. Taxes are collected from the public and after many stages of appropriation, transfer and granting, do they reach aid agencies where huge amounts of overhead are expended deciding what and how to use the funds. Many bureaucratic steps are involved, each extracting its percentage so that the final recipients get only a fraction of the initial funds. A more direct approach would be to collect funding from within the international telecommunications industry, which has continuing revenues of hundreds of billions of dollars annually. This would be similar to the system employed in the United States where funding is from within the industry and not through external taxes. Funds for international use would have to be obtained from countries foreign to where they are used, adding an element of difficulty, but not an insoluble one. Skeptics point out that new organizations will be needed to implement such a scheme, but the overall simplicity and directness of this approach seems much less complex and inefficient than present means of granting aid. An international, cross-discipline subsidy was created by the G-8 at its Gleneagles, Scotland meeting in 2005; it resolved to support the fight on AIDS in Africa with a tax on international airline fares. Five nations: France,

Brazil, Britain, Norway and Chile have implemented this plan and are levying fees on international fliers at this time. This sets a precedent for cross-border funding that helps support an intra-industry plan for telecommunications development.

A very small tax on existing service would generate substantial revenues if employed on a global basis. It's unrealistic to assume this could be done, but it provides a reference for speculation. Using from 2003, it is seen that a 0.1% tax on revenues would yield \$1.37 million; taxing main lines \$1/year would bring in \$1.21 million; and, a \$1/year tax on mobile subscribers yields \$1.33 million. The percentages used above are only a fraction of those being paid today in the U.S. The customers of one company in Alaska pay \$3.11/month for Universal Service Charges alone, the subsidy that supports high-cost regions. In California, one urban customer pays \$18/month for various subsidy fees, local and federal taxes. Thus, customers are already accustomed to paying these additional fees and would, hopefully, accept further small increases for the development of telecommunications in developing nations.

The following three charts present revenue and other data showing the magnitude of the industry. They are relatively old at this time, and there has been substantial growth, especially in mobile use, since then. They were derived from ITU reports for the year 2003.

### Telecommunications Revenues – 2003

<b>Telecom market revenue, US\$ Billions</b>	
Services	1,070
Equipment	300
<b>Total</b>	<b>1,370</b>
<b>Telecom services revenue, US\$ Billions</b>	
Telephone	455
International	68
Mobile	414
Other	200

## Other Telecommunications Data - 2003

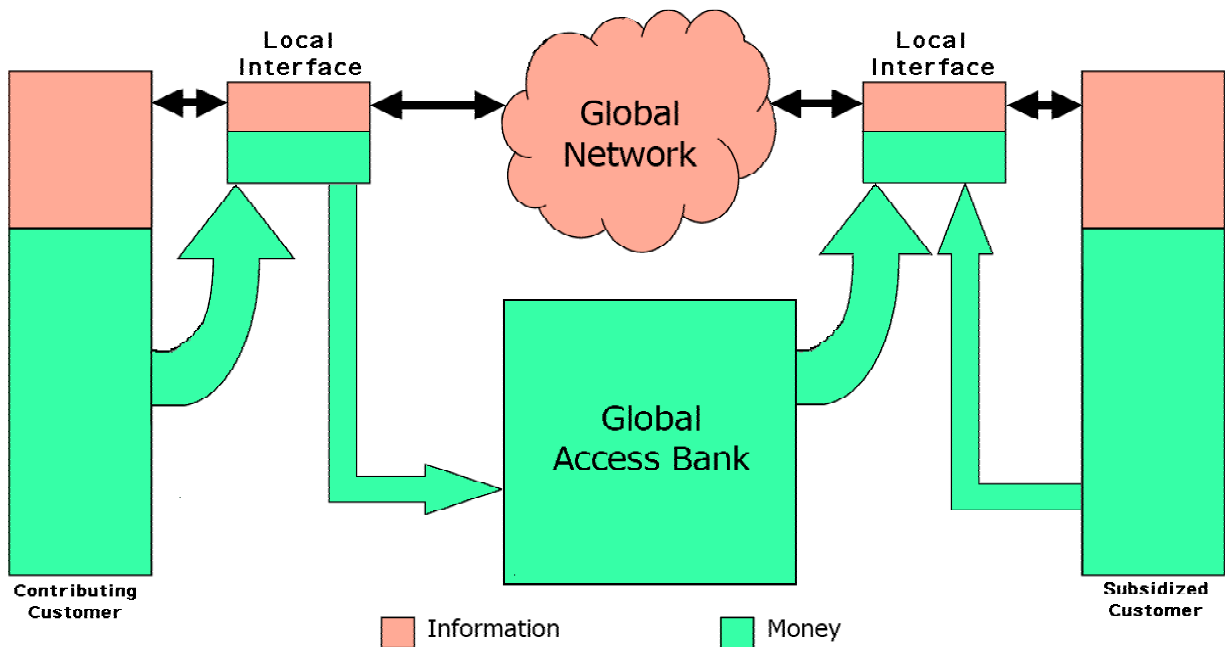
<b>Telecom capital expenditure, US\$ Billions</b>	
<b>Total</b>	215
<b>Other statistics</b>	
Main telephone lines (millions)	1,210
Mobile cellular subscribers (millions)	1,329
International telephone traffic minutes (billions)	140
Personal computers (millions)	650
Internet users (millions)	665

## Possible Sources of Subsidy Funds

	<b><u>Indicator</u></b>	<b><u>Multiplier</u></b>	<b><u>Income</u></b>
<b>Total Revenues:</b>	\$1,370 B	0.1%	\$1,370 M
<b>Main Lines:</b>	\$1,210 M	\$1/year	\$1,210 M
<b>Mobile Subscribers:</b>	\$1,329 M	\$1/year	\$1,329 M
<b>International Traffic Minutes</b>	\$ 140 B	\$0.01/min	\$1,400 M

Because the global telecommunications network is interconnected in order to give seamless transmission of digital data, whether used for voice, text or images and to also generate billing information from these data, it is a trivial task to collect additional revenue for subsidizing development programs. The following figure shows how this might be done. The upper portion is a highly simplified diagram showing information flow between a representative customer on the left and one on the right. The lower portion shows the flow of funds from the user on the left, one of many who are contributing to the fund that is being used to subsidize users on the right, shown as a single block for clarity and simplicity. This example shows the LECs (local exchange companies) administering funds as part of the normal billing process, taxing the donors and sending subsidy income to a bank for distribution to the needy users. Alternative techniques could be employed; for example, it might be better to have the subsidized user purchase his “phone card” from the bank instead of the LEC. This would be shown on the diagram by running the arrow from the Subsidized Customer block to the left, directly to the bank. Finally, the bank would pay the subsidized LEC (on the right) the difference between the price of service and the customer’s ability to pay.

### GAP Funding Mechanism



Before a test of the concept can be run, studies, planning and development will be required. Candidate regions where conditions show great need for and benefit from improved telecommunications, along with a stable political environment need to be defined. Sources, means for collecting and holding revenues must be designed. The system for selling discounted services to users, measuring and validating services delivered and paying the carrier has to be developed. With some agreement that the concept is worthwhile, plus modest financial support, we should be able to motivate their completion by a number of disciplines. Some promotion, negotiation and cooperation on an international scale will ultimately be needed, but a well-developed plan is first needed, one that can be done by relatively few participants working toward a clear goal before too much publicity makes it uncontrollable.

Although the GAP concept originated in the context of an international subsidy, it can be demonstrated on a small-scale basis with relative ease. A sample region needs to be defined, where telecoms services are deficient and the political and economic climate would not threaten the project's success. It might be feasible to obtain foundation funding to guarantee a small project long enough to amortize investments and avoid facing the taxing of users issues. With foundation support, many other tasks could be funded.

No serious effort to answer any of these, and many more, questions has been made. A coordinating body is needed. Is this within the purview of the IEEE?