



Santiago Borrero
Secretary General, Pan American Institute of Geography and History (PAIGH)
e-mail: santiago.borrero@alum.mit.edu
web: <http://www.ipgh.org.mx>

Spatial Data Infrastructures (SDIs): Bridging the Digital Divide

RSIS Conference participants:

I like to start by expressing my sincere appreciation to the organizers of this event: CERN, especially to its Director General and conference leader, Mr. Luciano Maiani, ICSU, TWAS and UNESCO. It is my desire that the conclusions of these two days of work will shape the role science must play at WSIS deliberations and, more importantly, the role of science during the implementation phase that follows the Summit.

In the context of today's Knowledge Society, I come from a very distant place, the Developing Nations.

Nonetheless, the reflections and recommendations I am about to share with you are based upon the empirical knowledge gained from years of exposure in Colombia as the senior executive in charge of mapping, land information, geography and from working in the area of Information and Development with non-governmental organizations within the region and across the international community.

Allow me now to begin by taking advantage of a situation that some of you could judge as merely anecdotal:

The day I started to prepare this intervention, the initial thing I did was to check the "Guidelines for Speakers" provided by the organization. The first instruction reads as follows:

Click [here](#) for information on how to get to CERN.

By clicking here, I was immediately connected to a basic map of Geneva, with a zoom capacity that allows the user to easily identify the location of CERN and the facilities where this plenary session is taking place, the information also provides – even where CERN Fire Department is exactly located.

This is geographically referenced information and it is an important kind of information. In fact, this type of information is available for the majority of developed regions and is relevant to many –endless- applications. The term spatial is often used interchangeably with the word geographic.

But, then I thought, what if this event would have taken place on the other side of the Digital Divide, for instance, Mogadishu (Somalia), Ho Chi Min City (Vietnam) or La Paz (Bolivia)? Most probably there would be a significant difference in terms of the geo-referenced information available.

There is a completely contrasting situation if we look for more detailed and complex data. There are many developed cities, for instance, Hamilton, Canada or Melbourne, Australia, just to mention a couple, in which the user can have relatively easy access to high-quality property ownership and topographic information that allows for review and to apply data about a specific neighborhood, square by square, parcel by parcel, even linking each lot to property rights.

The opposite situation is found in many urban areas where such digital location-based information is not existent or not available to the community, not to mention the many cases in which this situation is also the consequence of not having secure property titles or not having recognized property rights at all. Property ownership and rights has been a major factor responsible for the political instability of many developing countries.

Some of you may not agree with these examples or, as I have heard from colleagues working on international development, are of the opinion that having such databases and the corresponding information infrastructure, is a luxury that costs too much for the poorest societies, at a time in which they must attend to other priorities and fulfill basic needs.

However, the facts are:

- (a) Developing a nation's information and communication infrastructure is significant, but equally important within a nation's development strategy and its opportunities for progress, is the need to carefully pay attention to information content, including geographic data that better describes each nation's territory and its resources. This is important for governments, as there is a direct relationship between economic options and improved geographic information and for each citizen in terms of education, participation and democracy, by empowering ordinary people to participate in decision-making.
- (b) Today it is a truism that no matter if there are large or few digital datasets available: developed and developing nations understand that their geographic data must be accessible, documented, structured and reliable. Otherwise, such information in practice is non-existent because it is unavailable.
- (c) This is especially true for Developing Nations as they need to expand their knowledge base not only locally, but accessing the information accumulated by the leading economies, either via international cooperation, technology licensing, or foreign investment. Often, this includes information on the developing country itself.
- (d) To avoid even more isolation and a wider technological gap, every Developing Nation must design, advance and *sustain* actions encompassing the policies, organizational remits, data, technologies, standards, delivery mechanisms and financial and human resources, required to ensure that all those working with data are not impeded in meeting their objectives.

It is my belief that spatial data infrastructures at the local, national, regional, and global levels provide the integrating synergy required in – Bridging the Digital Divide.

In terms of geographic information, this is commonly referred to as the “*Spatial Data Infrastructure- SDI*”, a concept advanced by the Global Spatial Data Infrastructure (GSDI) since 1996, that promotes complementary policies, common standards for the development of interoperable digital geographic data and technologies to support decision-making and global access to geographic information. Of course, the prerequisite being that relevant basic geographic information must be readily available.

As a consequence, the concepts and the processes by which Spatial Data Infrastructures are built today are an essential part of geography all around the world. From local to global levels and vice versa, as promoted by Global Spatial Data Infrastructure (GSDI), International Steering Committee on Global Mapping (ISCGM), International Organization for Standardization (ISO) Technical Committee 211, Geographic information / Geomatics, International Federation of Surveyors (FIG), Pan-American Institute for Geography and History (PAIGH), International Cartographic Association (ICA) and other international organizations. SDI is changing the way geographic data is being produced, organized and analyzed, and has greatly facilitated the broad and dynamic exchange of ideas, leading to a better understanding of natural and cultural diversity, impacting decision making, territorial planning and sustainable development.

After six years of work, there are more than 20 global SDI initiatives, 15 at the regional level, with more than 65 nations with documented infrastructures and many more at the state, city, local and corporate levels.

If this is the case, then, what are the barriers blocking the development of spatial data infrastructures in Developing Economies?

First, there is need to realize that to establish and more importantly, to sustain Spatial Data Infrastructures is not an easy task in developed or developing nations.

Technology itself does not ensure the successful use and application of digital data. For instance, case studies are indicating the existence of a significant gap between the technology tools available and poor levels of geographic data use due to low availability of specialized human resources and, to some extent, the quality of technical assistance.

The crucial reasons are institutional, political, cultural and economic.

In India – organizer of the forthcoming 7th Global Spatial Data Conference, Hungary, Mexico or Chile, the national organization responsible for geographic information is already internationally oriented, well immersed in ICT, stands out as a key organization for institutional development and innovation, corresponding to societies in which the use of geographic information is expanding, as there is a growing consciousness that information is only important if it is accessible to users.

In other countries, the vast majority are still characterized by high and inefficient production costs, lack of standards, data quality problems, poor documentation, problems affecting data maintenance and hardware and software updates, increasing data obsolescence and frequent basic data production slopes.

A substantial amount of new thematic data sets is available yet, often compounded by unstructured data, distracting the government from the production of basic information with national coverage. There is even a deceptive way in which low quality data is sometimes used to formulate relevant policy. Very frequently, policy-making scenarios appear to be more impressed by the quality of the presentations rather than the quality of the underlying data.

Culturally speaking, particularly, there is a problem of attitude: A history of isolation, ill-defined ideas, language barriers, and financial challenges.

The political component is quite influential. Policymakers everywhere make relevant decisions without complete information. Yet in emerging regions, due to the chronic absence of core geographic information, the risks taken are even higher. Geographic information is not playing a better role in the decision-making process, and specialized entities have been marginalized because of reduced budget allocations. Most nations have not formally adopted a national policy concerning use of geo-information, including the ways in which it should be used to promote wealth and development according to local needs.

Then, what should be done?

In conclusion, what are the lessons I have learned from SDIs that I can extend at large in order to narrow the digital divide?

1. A revised approach to capacity building

In developing countries, there is always the initial need for capacity building. The programmes funded by many of the multilateral bank loans include substantial funding for education and quality training. Thereby providing vast opportunities for facilitating technology transfer and ultimate self-reliance for the developing communities. Yet, capacity building is in many ways a much-abused term in need of rehabilitation. The words “capacity building” are so often mentioned in the implementation document out of the World Summit for Sustainable Development (WSSD) that may imply everything and nothing - at the same time.

In SDI development, there is need to adjust the concept and the methodology for capacity building, as often, there is a total absence of *sustained* financial, organizational and human resources efforts.

2. International Technical Cooperation: A demand for improved cooperation, coordination and integration of initiatives.

Advances on the information and communication technologies are reachable to everyone, however, within this realm, there is a proliferation of similar organizations, initiatives and projects that are making the whole process inefficient and, evidently, not at all – well articulated. There is a lack of sufficient cooperation, coordination and integration actions to achieve the goals of each one, avoid duplication of investment and increment the benefits. The principal goals of cooperation are to take advantage from proven practices and exchange of experiences.

3. Need for National information Policy

Policy makers still need to be coached as to why the linking of geographic data infrastructures across local, national, regional and global levels are fundamental to maximize economic, social, and environmental benefits from geographic information. Many of the current difficulties will only be resolved if, at the highest level in governments, there is *sustained* interest and deliberate intervention in developing sound policy to organize the information sector as such.

4. Need to strengthen the institutions addressing information problems

Although multilateral organizations may decide to promote data-sharing, ultimately, in terms of "how to share" data to reach everyone in society, there is a direct responsibility of the recipient nation, and this aspect requires or will be optimized if SDI conditions are available.

5. Be practical

Low cost technology, enabling computing with geographic data, donated, public domain or open source - geographic information systems (GIS) software for general use, develop 'easy to see and understand' decision support aids for politicians - in local languages - and pay attention to the needs of the disadvantaged community.

We all know that geography has been historically a common language. In this age, however, to facilitate this way to share the earth and connect us all, the successful integration of information systems, technology, and infrastructure within nations and regions requires the introduction of standards and interoperability.

While there may be more information technology and infrastructure becoming available, users do not have the availability and access to better geographic information about the local vicinity, their own country or the region. Information technology, infrastructure, and connectivity do not necessarily equate to information access and a real bridging of the digital divide.

I trust those representing the interests of geographic information will take a lead in the developments and outcomes of the World Summit on the Information Society (WSIS), as the future of the developing nations is in many ways linked to its ability to collect and share geographic information that is accurate, long-term consistent and reliable.

I thank you for your attention.

Geneva, 08 December 2003