1.3 billion Swedish kronas, where 900 millions were the profit derived from the sale of data and services in 2001. This case shows that the business model applied produces incomes and profits for the organization, and supposedly contributes to the Sweden GDP.

The cultural change

If we assume that complex problems do not require complex solutions but solutions with knowledge, we have to accept that such knowledge should be derived from information of multiple, accurate and compatible sources, that is enriched by diversity.

Then, we have to review and modify our present perspective, changing to a new organizational culture that may guarantee our capability in accomplishing the demands of the rising economy of knowledge. Also, we need to attract and retain experts in the key programs of production in order to assure that organizations be ready to give an answer to future requests.

What is Mexico doing?

Since 2004, the National Institute of Statistics and Geography (INEGI: Instituto Nacional de Estadística y Geografía) has formally embedded in its objectives the establishment and building of the Spatial Data Infrastructure of Mexico (IDEMex: Infraestructura de Datos Espaciales de México).

So that the IDEMex may achieve a complete development, the strategy of obtaining a government mandate along with the resources for its continuity brings clear advantages. The success of that strategy is closely related to an efficient and timely public service through a transparent access to the public to the government information, where the results of the mandate and the user satisfaction may be appreciated.

Also, the IDEMex expects to achieve a higher integration of producers and users of geographical information, admitting that some actors are more important than others and the commitment of the parts is not necessarily the same. Besides, this means that each actor must recognize the importance of his/her role and the responsibility in the collective work for the IDEMex development.

For the successful future of the IDEMex, the vital need of an increasing awareness of the decisions makers in considering the spatial data and information as a natural resource that has to be managed and coordinated according to national interests is highlighted, and in consequence all the participants must collaborate in this respect, depending of their responsibilities.

Nowadays, there is an obligation and a necessity of designing strategies for the construction of a successful future for the IDEMex and Mexico, including the study and consideration of the best practices and changes in the way that some other countries are dealing with such themes as privatization, free market, and the increasing globalization of the production, analysis and distribution activities of the spatial data and information.

Measuring the impact of decisions based on geographical knowledge in the economy of any country demands an extensive and intensive research, that initially, is characterized for an unbalance: more questions and gaps, than certainties and indicators.

According to a study of The Economist, a decisive factor to place Mexico among the five bigger economies of the world in 2040 is the adequate financing of its most important activities. As already seen, at least in the case of Great Britain, the sustained investment on the official geographical information agency, the Ordnance Survey, has allowed the generation of measurable and improvable wealth.

The importance of the use of spatial data, information and knowledge in the economy, development and well-being of any country will have an evident impact, as in those ones where instead of waiting for the future, they decided to design it.

Is spatial data special?

It is sometimes suggested that spatial data is just another form of data that can now be maintained in a data base and that in reality there is nothing “special about spatial”. Nothing could be further from the truth. For example spatial data is not the same as integer, alphanumeric or symbolic data for a number of reasons. These are: spatial data is scale dependent: do I query for 37.3N 45.2W...or?

spatial queries are endemically computationally expensive: how does one efficiently query for such position or, even harder, distances, angles, etc., between locations? These types of queries are different from, for example, symbolic queries, as “locations” or “distances, angles” involve more than the actual numbers to include the underlying topology to search (there are implicit values between explicit numbers) and defined measures: a data model.

The data model is essential, particularly when associating spatial terms (location, relations, etc.) with an ontology. For example, optimizing where to locate a hospital given population densities, topography, transport data, etc., demands different kinds of spatial data information. No single data model applies to all situations.

Integrating spatial data with other data types requires additional data types. For example, associating symbolic representations of locations (place names, etc.) is quite a different data structure than the reverse. So, while it is correct that spatial data can now be included and manipulated in large data bases along with textual data, understanding the collection, management, manipulation, integration, use, presentation and querying of spatial data is complex. The complexity and need to understand spatial data has been a
central driver in the development of one of the oldest professions – land surveying – and one of the oldest disciplines – geography. Historically even hunter-gatherer societies used topologically correct mappings to communicate spatial information. Such spatial depictions are the essence of aboriginal paintings in Australia. Humans simply think spatially.

Urbanisation and the start of civil society meant that there was a need for spatial information which was less ‘relative’ and more ‘geographic’; less symbolic and more quantitative. The result was the development of maps of cities and countries, which supported early cadastral systems for property ownership, infrastructure management and tax, as well as supporting trade and defense. These maps, which first appeared over 8500 years ago, exhibited consistent scale and orientation in order to meet the needs of government. These needs have continued to the present day where we see spatial data infrastructures (SDIs) supporting a wide range of economic, environmental and social objectives. Spatial information is now acknowledged as a key infrastructure and enabling technology in supporting modern society, in delivering the “triple bottom line”, supporting good governance, being critical in defence, promoting efficiencies in business and in recent times supporting such things as e-government and our emerging virtual society.

The disciplines of surveying and geography are built on the spatial paradigm. Today almost every piece of data has a location, with the ability to assign a location to all natural and human activity having transformed the way modern societies manage both the natural and built environments. The result is that the traditional views of surveying and geography are coming closer together as they support the creation and maintenance of a virtual world.

The enabling science, technology and infrastructure provided by spatial information (SI) are transforming the way governments do business. However it is important to remember that SI is not an end in itself – it is an enabling infrastructure.

This infrastructure, often termed a spatial data infrastructure as mentioned previously, is not just about databases. It is about linking people to data with a range of policies, technologies and standards. One of the biggest challenges facing the spatial information discipline is how to raise the level of awareness about the importance of this key infrastructure.

In order to capitalise on the potential SI offers a modern society in delivering the “triple bottom line”, requires bringing together expertise in measurement science, GIS, ICT, land management and administration, natural resource management, law and public policy. In particular it is not possible to deliver sustainable development objectives unless we can consider the interaction between the natural and built environments. This requires bringing together natural and built environmental data in order to model both physical and human processes and presenting them in a usable manner for analysis and use by decision and policy makers. Such use, integration and analysis present many problems and challenges.

For example spatial data presents particular issues when we try to integrate it with alphanumeric data. Spatial data is a very different type of data as compared to financial data for example, which has a specific data model and type – there are no choices with financial data while there are almost unlimited data model and data type choices with spatial data.

A specific data model and data type needs to be chosen for every piece of spatial data. There is a wide range of choice about the geoid, projection, accuracy and precision, and scale. Further, there are a whole range of uncertainty and fitness for use issues arising from the range of data types available, and from complex choices about data integration, aggregation and generalisation – and if not done with great care and expertise the results can simply be nonsense.

Spatial querying is also another very complex area with such technologies as a “spatial Google” still over the horizon. Again spatial querying relies on many assumptions about the data model and data type.

This almost takes us full circle to how early humans required topological pictures to understand their world – today we are no different in that a good picture or map or 3D visualization will always be easier to comprehend than pages of textual data generated from a data base.

In summary spatial data describes the location of objects in the real world and the relationships between objects. It provides both an infrastructure and enabling technology for modern society. It is recognised as fundamental for wealth creation, good governance, good decision making and supporting “triple bottom line” objectives.

Simply “spatial data is a special type of data” and requires a dedicated commitment and strategy in order to capitalise upon this enabling infrastructure and technology. As a result of the interest in the Australian Government’s Department of Agriculture, Fisheries and Forestry (DAFF) on the topic, Brian Lees, Reader in Geography, Australian National University and Ian Williamson, Professor of Surveying and Land Information, University of Melbourne (at this time a Visiting Fellow, ANU) presented a Bureau of Rural Sciences Seminar on Friday 12 November, 2004 titled “Why is spatial special?” where the ideas in this section were explored further. The presentation can be viewed at http://www.affa.gov.au

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