GIS Worlds – Creating Spatial Data Infrastructures

By: Ian Masser. (Redlands, California: ESRI Press) 2005. 312 pages,

For URISA members who would like to get up to speed on international sources and perspectives on spatial data infrastructures (SDI) – what are they, who creates them and how, what are the development trends, and which issues underlie their establishment – this book offers plenty of information.

There could not be a more qualified person than Ian Masser to put together the book that reviews and evaluates almost two decades of SDI evolution and growth worldwide. As the immediate past president of the Global Spatial Data Infrastructure (GSDI) Association and a former president of the European Umbrella Organisation for Geographic Information (EUROGI), as well as through his academic positions, Professor Masser gained a wealth of knowledge and experience to share about SDI developments around the globe.

GIS Worlds is clearly written and well organized into four main themes – SDI diffusion, evolution, implementation, and institution building. After introducing the origins, meaning and the local - national – global hierarchy of SDI, the author applies the ever-useful diffusion of innovation framework to differentiate between the innovative and early efforts in building SDIs and those that followed. The U.S. audience is probably well familiarized with the National Spatial Data Infrastructure (NSDI) initiatives under the guidance of the Federal Geographic Data Committee (FGDC) and its many related stakeholders across the U.S. geographies and sectors. In addition to the U.S., Masser includes 10 countries as SDI early adopters and innovators – Australia, Canada, Indonesia, Japan, Korea, Malaysia, The Netherlands, Portugal, Qatar, and United Kingdom. He

recognizes the diversity of this group in many respects – from their context (size, economic status, political organization and driving forces of SDI developments) to their established scope, status and resources devoted to SDI developments. In Japan, for example, the concern for handling earthquake-related emergencies was the main motivation for building the national SDI; in Indonesia and Malaysia, the centralized control over land resources and their utilization, was the key stimulus and facilitator of the national infrastructure.

Profiles and comparative evaluation of Europe, the Americas, Asia and Pacific, and Africa follow, with two case studies from each world region – Czech Republic and Finland, Chile and Mexico, India and Nepal, and Ghana and Kenya, respectively. The SDIs are characterized as belonging to one of two main categories and their subgroups: 1) national data-producer led, with and without user involvement; and 2) non national data-producer led, with and without formal mandate. Further, the developments are classified into operational, partially operational and not operational. Funding is the key issue emphasized in the case of emerging nations, where the government resources are scarce and both the politics and economy are unstable. Overall, the national SDIs introduced in this group labeled as "early majority" are built in less affluent countries that cannot afford the risks that the innovators and early developers can. This majority involved in or planning for SDI developments, however, represents a significant number of countries – over 100 by 2003.

SDI evolution is illustrated with a case study of the United Kingdom, which reveals interesting institutional setups and

transformations that often accompany SDI developments, as well as the influence of a broader regional context and policies – in this case the European Commission's INfrastructure for SPatial InfoRmation in Europe (INSPIRE) initiative. The complexities of SDI implementation are then illustrated with three cases of multilevel SDIs in the United States, Australia and Canada. The three federated systems display a vast diversity of stakeholders and arrangements sensitive to local interests, needs and circumstances. In the U.S. case, the author zeros in on one of the most successful (if not the most successful) examples of joint multiparty ventures in sharing core data sets – MetroGIS, a stakeholder-governed cooperation among seven counties in Menneapolis-St.Paul metropolitan area. The other local examples from Australia and Canada also tell about the variety of setups (external or within government) and driving forces (e.g., data or E-services). Finally, the purpose, evolution and structure of the EUROGI and GSDI Association are presented as SDI institution-building entities at the regional and global level, respectively; EUROGI representing over 20 national geographic information organizations and their members and GSDI representing over fifty national members worldwide.

Painting an accurate and comprehensive picture of the status of SDIs around the globe is aided with qualitative but systematic assessment and insight about the past and the future. Hard questions like the meaning of the global SDI (building or diffusion), the requirements and benefits of the SDI's capacity-building character in developing countries, and measurement of its success and value, are tackled too, although not extensively. The numbers on SDI adopters are taken with caution, noting the difference between a full-blown SDIs and other SDI-related but uncoordinated or ad hoc developments that may or may not become operational over time. The SDIs are presented as evolving from a product-to a process-oriented model that emphasizes decentralized use and sharing of data; and from formulated to implemented SDIs through governance and multi-level participation. The technological change is also taken in consideration, particularly the role of geospatial portals like the U.S. Geospatial One-Stop. Cultural factors and implementation issues are also pointed out as important considerations in building of multilevel systems and institutions. Finally, the call for more comparative and context-driven research on the human and organizational side is well taken.

If Masser's *GIS Worlds* gives us a fair assessment of *reality* of SDIs around the world, it is necessary to mention two of its complements: *Developing Spatial Data Infrastructures* edited by Ian Williamson, Abbas Rajabifard and Mary-Ellen F. Feeney (2003, CRC Press) who move *from concept to reality* and *Geospatial Data Infrastructure – Concepts, Cases and Good Practice* edited by Richard Groot and John McLaughlin (2000, Oxford University Press) who focus primarily on SDI *concepts*. The book by Williamson et al. resulted from an International Symposium on Spatial Data Infrastructures convened in November of 2001 by the University of Melbourne Centre for Spatial Data Infrastructures and Land Administration. Although 15 countries were represented at the

Symposium, the contributors to the book are predominantly Australians (21 out of 25). But, indeed, there is plenty to learn from them. Australia New Zealand Land Information Council (ANZLIC) and SDI developments are exemplary, featured in Masser's book too as a primer of the successful effort to coordinate and integrate multilevel institutions and data. The cases of the state of Victoria and the city of Geelong are described in depth and offer many learning points for others who seek a functional and useful SDI. To me it tells that an SDI does not happen by accident or by chance; on the contrary, it requires a strong vision, specific and tangible objectives, and their backing with a full commitment of human, organizational, and financial resources. There are other commonalities with Masser's book, including their reference to multinational systems as regional (which may be confusing for those thinking of regional at a sub-national scale), and subscription to a hierarchy as an organizing approach to SDIs. Williams et al. also move across all levels – from global to local and include some of the same cases in their empirical sections. The Australians, however, devote more attention to their regional bodies, like the Permanent Committee on Geographic Information for Asia and the Pacific (PCGIAP), which provides an alternative institutional model to EUROGI. The perspective that pervades the book, tends to agree with the presence of many stakeholders and the key role of government, land administration sector in particular, but emphasizes probably a bit more than Masser's book the role and involvement of the geospatial industry. Williams et al. also make an important connection to the use of SDIs in supporting economic, environmental, and social objectives and decisions. Finally they tackle some of the technical issues, including referencing, administrative boundary design, and location based wireless services.

Groot and McLaughlin's book is probably the most academic, comprehensive, and theoretical, although it closes with four well-chosen cases – modernization of land information service in New Brunswick, Canada; geospatial data infrastructure in North Carolina; Public Sector Mapping Agencies of Australia; and the Dutch clearinghouse for geospatial information. The book resulted from a collaborative effort between the University of New Brunswick and the International Institute for Aerospace Survey and Earth Sciences (ITC), with majority of contributors from the Netherlands. The topics include legal issues, quality management, standards, spatial referencing, photogrammetry and remote sensing, system architectures, spatial data models, visualization tools, funding, cultural factors, and human resources. For those who are primarily interested in the conceptual side of SDIs and their enabling technologies, this book would be the starting point.

GIS Worlds is an excellent follow up on these previous two books which broke the ground of SDI-related major press literature. The three books are complementary with many overlapping subjects and cases, but offered with different perspectives, depth and intention – from more pragmatic to conceptual and evaluative. While I generally recommend browsing through all three, I highly recommend Masser's book for its readability and timeliness in presenting what the author correctly recognizes as a highly

dynamic field. The truly international, comparative and evaluative nature are its main values, although the physical attractiveness is not to be neglected – nice page layout, inserted vignettes on SDIs in many countries, and pictures and information on some of the key individuals give an order and add a human face to what appears to be a complex and challenging task.

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