

## Introduction

Western post-industrial companies are in the process of major changes. This shift is accelerating toward the not always understood concept of the society of information. On an individual level, the omnipresence of the Internet constitutes one of its main realizations. As for public organizations, territorial communities in particular, the concept of e-government is growing. It is based on the increased promotion of the circulation of public information to facilitate citizen access and increase the efficiency of public services. Within private organizations such as companies, information is a more valuable resource today than it ever was. It represents the foundation of a newly wealthy generation. The challenge for companies consists of following the accelerated rhythm of information flow, accelerated nowadays due to the effects of globalization, and to manage this intelligible knowledge.

The whole of society is facing radical transformations. The huge quantity of information that is produced and exchanged, combined with increasingly ubiquitous modern mass communication technologies (cell phones, personal digital assistants, etc.), generates a situation in which information resources constitute a motor for major force for social change.

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Given the relatively recent character of these informational and technological changes, the societal context is still in a phase of intense movement. It is still quite difficult to provide a revealing description of these changes. In this context, the social and human sciences have a fundamental role to play in understanding the complexity and the impact of the communication and information sciences. Only a “systemic” grasp of human, organizational and social transformations caused by the information age can help us manage the risks associated with the often unrestrained and ill-considered diffusion of technology.

Information is the key component of these transformations. Even though this multi-faceted concept has several very different theoretical explanations, it concerns a large variety of fields. We can define it more specifically as a geographical component that is still being established today, so much so that we no longer speak only of information technologies (IT), but of geographic information technologies (GIT), which constitute a specific sector in IT. This sector is identified by different terms depending on the cultural or disciplinary context: geomatic, geographic information sciences (GIS). The field of GITs has experienced remarkable growth during recent decades, in particular with the arrival of microprocessing, the Internet, and the digital age.

The field of geographic information (GI) is characterized by specific dynamic practices: a large number of practitioners with varying professional backgrounds (land surveyors, topographers, cartographers, geographers, computer specialists, Internet users, etc.); a diversity of companies of different sizes and natures (companies specialized in data acquisition, geomarketing, GIS, image processing, etc.); numerous public organizations (government agencies for natural resources, cadastre, forestry, mining, land management, etc.); as well as a variety of users that increase with the diversification and applications of GI and the democratization of Geoweb and location technologies. This sector, intersecting by nature, also establishes its identity through a very active multi-disciplinary scientific community (universities, academies, institutes, and research centers in various fields including IT, geography, environmental science, etc.). The GI

sector is a very busy community. We will assume here that the GI community constitutes the base of one of the last stages of evolution in the information society, what could be called the geographic information society (GI-soc).

However, the information society is not only a community of common interests and practices with systematic access to information as a common denominator. In more fundamental terms, it corresponds to the in-depth reconstruction of the operating methods of post-industrial Western companies as a whole, as centered on information use. Information in this society becomes the preferred engine of social relations, the source of wealth production, the basis for reorganization of legislative and regulatory bodies, as well as changes in governmental methods and the way democracy itself works. In practice, this information society can be expressed as a series of very concrete disruptions involving the post-industrial landscape of the developed world.

The liberalization of telecommunications, the spectacular development of the Internet, and the multiplication of company mergers in IT, media, and telecommunications are, for example, revelations of a single phenomenon, the advent of the information society. By its very nature, the information society ignores traditional boundaries and limits.

Yet, the GI-soc is the product of a much bigger phenomenon than a simple expansion of related interests. In fact, over whole decades of history we ignored, even forgot (consciously or not), about the fundamental role that geography has played in human society. Today, that tendency is reversing itself significantly. For a long time, human societies paid little attention to the spatial, geographic arrangement of people, phenomena, products, etc., and we did not even realize it. Today, though, never have so many maps been produced. Information society as a whole is becoming geographic.

Several arguments can be made to justify and clarify a position that may seem somewhat radical. Some of these arguments can be initially linked to the development of the GI sector, as well as to the

diversification of its fields of application. We have been witnessing a considerable expansion in the use of GI in the last decade. This expansion incorporates all spatial and social levels. It involves all types of public and private organizations, as well as the “general public” (e.g. people consulting dynamic, digital maps over the Internet, deliberate generation of geographic content, etc.). However, this phenomenon resonates on at least two other levels beyond the field of GI.

In more basic terms, we are witnessing a return in full force of environmental concerns, at the fullest extent of the term. The state of our planet is one of the major concerns of our modern societies (even if concrete actions are often put off. In 1992, during the United Nations conference on environment and development that took place in Rio de Janeiro, Brazil, Agenda 21 officially recognized the fundamental role of information (GI in particular) in the improvement of decision-making as involves social, economic, and geographic matters. This is in recognition of the need to bring back to the forefront geographic concepts (especially location).

In addition, the development, and especially the exponential escalation of the use of IT (“smart” phones, GPS, personal digital assistants, etc.) creates problems in distribution (manpower, products, services, etc.). The development of an information society comes with the democratization of IT through mobile and recreational uses. During the last few years, this process of democratization has accelerated with the development of Geoweb 2.0 and mass practices in positional technology and GPS navigation. The effect of virtual maps such as Google Earth is real. New technologies and new formats have become more popular (Application Programming Interface, Keyhole Markup Language, etc.); new practices have emerged (user-generated content, deliberate production of geographic GI, crowdsourcing, cartographic mash-ups, geotagging, geocaching, etc.); and new practice communities have emerged (neogeographers). This phenomenon demonstrates the diversity of products and service providers with geographic content, with potential users multiplying and their geographic location forcibly sought. An increasingly

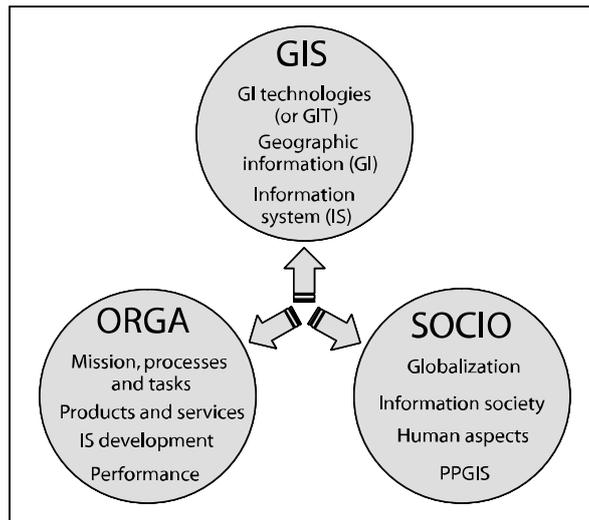
diversified number of private companies use positioning data to support tactical or strategic decisions (e.g. the positioning of goods at Wal-Mart branches through Radio Frequency Identification technologies, or the use of real-time determinations of fleet locations for transportation companies), or offer such services to other companies (spatiotemporal analysis of new markets, positioning of new stores, Application Programming Interface, Keyhole Markup Language, and Radio Frequency Identification).

The development of the GI-soc is, in any case, a recent phenomenon and one that is altogether difficult to define. What are its characteristics? What are its similarities and differences compared with the information society in general? What are its key challenges? What is the contribution of GITs, GISs and, more generally, GI for individuals, organizations, and society? How far will states and governments go to reach their citizens through the help of participating GISs (public participation GIS or PPGIS)? What forms of social interactions are being created among GIS practices, individuals, and organizations? At this point, there are still more questions than answers. However, these questions can form the structure through which the organizational aspects of GISs are analyzed.

This book is based on the simple acknowledgement of our lack of knowledge of this “geographic information society”. The difficulty in understanding its challenges is based on three aspects in particular: (1) the relative newness of the information age (as a concept, as social reality, as well as an object of study); (2) the relatively small number of research studies involving this specific subject; and, finally, (3) the problem with understanding the subject because of its “multi-disciplinary”, eclectic nature.

These questions suppose that knowledge in fields as varied as sociology, administrative sciences, IT, geography, and geomatic sciences, among others, can be brought together with different cultural points of view. To help us understand the organizational and social

dimensions of GISs, this book will propose different angles of attack, summarized by the following diagram.



**Figure 1.** *Overview of the basic concepts of the book*

This figure illustrates the fundamental interactions among three systemic levels: (1) GISs (geographic information systems, in the overall, broad sense of the social and technical aspects of the system); (2) organizations (private and public, more or less structured as associations or groups of citizens); and (3) societal systems (incorporating the human aspects of the system). Note though, that this distribution is entirely imaginary. In practice, distinctions between these systems are not always well-defined. But the identification and consideration of these three levels and especially of their interrelations will help us to effectively cover the questions asked in this book. This figure guided the authors in the choice of which subjects to cover, as well as in the authors we would invite to write on these subjects. This approach made it possible, from the very first, to structure the chapters of the book in the most consistent and balanced way possible.

This book is meant to address anyone with a basic knowledge on GIS design, implementation, and use. It proposes a deeper understanding of the less technological dimensions of GIS development. Part I sets the stage with a global and historical perspective (Chapter 1) of the evolution of the GI-soc from an American/English point of view. It also constitutes a report on the changes that have occurred in business brought about through the development of geomatics (Chapter 2) and builds an explicit link between IT in general and GI in particular (Chapter 3). Part 2 gives the reader a better understanding of the challenges and problems with the implementation, diffusion, and use of GISs in organizations. More specifically, the organizational and social roles and values of GISs are covered in Chapter 4, whereas Chapter 5 provides a report on the adoption and uses of GITs in organizations. The matters of using GIS as a project control method are addressed in their organizational dimension in Chapter 6. Chapter 7 concludes Part 2 with an analysis of the approaches that businesses have developed to use GIS. Finally, Part 3 invites the reader to explore the various organizational and social aspects of the implementation and use of GISs, providing a thematic dialog in which the reader can participate. A case report of a few provincial government agencies in Canada that use GIS is the subject developed in Chapter 8. The use of GIS by local communities in Britain are analyzed in Chapter 9, followed by communities and citizens' associations in the United States in Chapter 10. Finally Chapter 11 concludes with a discussion of inter-organizational challenges in GIS with the help of French and American-English case reports.

We believe this collection can be the foundation for reflections that are necessary to better understand the various dimensions and challenges of the GI-soc. It is vital that this subject, as complex as it is, is understood if we wish to build the future of GIS in a rational manner. We believe that this book constitutes a forward step in the necessary evolution of our knowledge.