

Chapter 9 Implementing GIS

How can I make GIS work for me?

A geographic information system is an information management tool that helps us to store, organise and utilise spatial information in a form that will enable everyday tasks to be completed more efficiently. Since its rapid growth over the last two decades, GIS technology has become a vital element for us to maintain and integrate information. GIS software, and the hardware required to operate it, has become much more affordable and easy to use. This has resulted in the ability to develop a GIS without making large investments in software, hardware and the support staff that were once needed to implement it. With the implementation of GIS, we see dramatic improvements in the way we access information, execute responsibilities and respond to requests from citizens, potential developers and other clients.



Figure 9.1
A working GIS

A working GIS

A working GIS integrates five key components: hardware, software, data, people, and policy and procedures (Figure 9.1).

Hardware and software

Hardware is the computer on which a GIS operates. Today, GIS software runs on a wide range of hardware types from centralised computer servers to desktop computers used in stand-alone or networked configurations.

GIS software provides the functions and tools needed to store, analyse and display geographic information. Key software components are as follow.

- Tools for the input and manipulation of geographic information
- A database management system (DBMS)
- Tools that support geographic query, analysis and visualisation
- A graphical user interface (GUI) for easy access to tools

The affordability of desktop computers with increasing computing power and decreasing cost of software has resulted in widespread use of desktop GIS.

Data

Data are one of the most important and costly components in implementing GIS. The database is the longest existing part of any GIS implementation. Building the database takes the most time, costs the most money and requires the most effort in terms of planning and management. Implementing a GIS

requires adequate emphasis on database planning and choosing the right information base for the particular applications of an organisation.



Most GIS applications in a particular area require a common set of spatial data (Figure 9.2). However, these data are often possessed by different organisations. A lack of adequate data-sharing mechanisms means that different organisations are involved in collecting the same data; thus, wasting resources and time. This duplication of effort is also a result of insufficient or inappropriate standards in data collection. The major obstacle in the re-use of data is the lack of awareness or willingness among organisations to share data. GIS as a technology will only be viable and cost-effective if data are readily available at an affordable cost.

Figure 9.2
Data and GIS
applications

People

GIS technology is of limited value without people to manage the system and develop plans for applying to real-world problems. GIS users range from technical specialists, who design and maintain the system, to those who use it to help them perform their everyday work. GIS is a truly interdisciplinary field; it requires varied backgrounds of expertise depending upon the applications. It requires input from computer and information technology experts for the system support and from domain specialists for application-specific models and analyses.

Policies and procedures

A successful GIS operates according to a well-designed plan and business rules that are the models and operating practices unique to each organisation. GIS exist in the context of application within an organisation. For example, in the case of municipal applications, the GIS will have different functional requirements from a GIS required for agriculture or land-use planning.

Besides the technical components such as hardware, software and databases, the institutional framework and policies are also important for a functional GIS. The interest and willingness of decision-makers to exploit GIS technology, and the organisational set-up for collecting spatial data, analysing it and using the results for planning and implementation form an important component in a GIS.

Choosing the right GIS for a particular implementation involves matching the GIS needs to the functionality demanded by the type of application required by an organisation.