Chapter I

Concepts and Theories of GIS in Business

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Abstract

This chapter looks at the concepts and theories underlying the application of GIS in business. It discusses the role of information technology in business generally and how GIS is related to other business systems. Different views of GIS use are introduced and the chapter suggests that decision support applications of GIS are more relevant to most businesses than purely operational applications. Porter’s value chain approach is used to assess the potential of GIS to contribute to management. GIS is seen as an emerging technology that will increase importance in business in the future.

Introduction

Information technology (IT) has had a powerful impact on the business world in the last 50 years. IT has facilitated the transformation of business and has allowed new business forms to come into existence. This transformation has reflected the potential of IT both as a cost saving mechanism and as a tool for supporting business decision-making. New developments such as the Internet and mobile applications have an important ongoing impact on business, continuing the process of transformation started by the punched card 50 years earlier. Geographic information systems (GISs) are an area of IT application with a significantly different history from other types of information system. GIS-based applications are now becoming widespread in business, playing a role that reflects both the similarity of GIS to other forms of IT and the distinct characteristics of spatial applications.
Origins of Geographic and Business Use of IT

Business use of information technology started in the 1950s in payroll, billing and invoice processing applications. These applications exploited data processing techniques that had been previously used by government agencies such as the U.S. Census Bureau. GIS has its origins in the use of IT for geographic related activities in North America in the same period. These early applications were typically government orientated, such as transport planning in Detroit and Chicago and the Canada Geographic Information System (CGIS) (Coppock & Rhind, 1991).

Early business applications of IT employed relatively simple processing that could be automated using the comparatively crude computer technology of the period. One example was payroll processing, where only four or five simple calculations were required for each individual. This computerization of simple numeric processing was an automation of clerical work, analogous to the automation of manufacturing in the earlier part of the 20th century. The high cost of computing in this period meant that this type of application was mainly confined to large organizations with a high volume of transactions. While these early data processing applications were relatively unsophisticated, they had a significant impact as they concerned activities critical to business. Data processing techniques allowed these critical operations to be performed faster, more accurately and, above all, more cheaply than manual methods. Despite the relatively high cost of computing at this time, significant cost reductions could be achieved by this automation of the clerical processes required for the day-to-day operation of all businesses. Consequently, early business applications of IT had a widespread impact on routine accounting operations, but were initially much less important in other departments of the organization. In a similar way, the early applications of geographic computer processing were only of interest to the small number of companies involved in map-making, surveying or similar geography-based activities. For example, in the oil industry GIS had a role in exploration at an early stage, but would not have been used in marketing in this sector until much more recently. Many early private sector organizations provided consultancy services or GIS software to the public sector. One example would be Tomlinson Associates, set up in 1977 in Ottawa, Canada by Roger Tomlinson, one of the pioneers of GIS. Another example of an early GIS commercial organization would be the Environmental Systems Research Institute established in 1969. This later became ESRI, which is now the main player in the GIS software market.

Development of IT Towards Decision Applications

As IT became more capable and less expensive, business use of computing moved from the automation of clerical processes to decision support applications. This change exploited the superior interaction made possible by time-sharing computers, and the developments in data organization made possible by developments in database management software. The data available in organizations was initially used to produce regular reports in the form of a Management Information System (MIS). The introduction of improved user interfaces in the 1970s facilitated the introduction of Decision Support
A Multiple Natural Hazards Assessment Model Based on Geomorphic Terrain Units
www.igi-global.com/article/a-multiple-natural-hazards-assessment-model-based-on-geomorphic-terrain-units/106920?camid=4v1a