



# Harnessing the power of geographical knowledge: the potential for data integration in an SME

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## Abstract

Geographical knowledge has long been used as a basis for decision making in business. Often this has been implicit because of the lack of information systems available to harness the power of the spatial dimension of data. A conceptual framework is presented which facilitates geographical (or spatial) data to be used as the basis of integration. The spatial dimension of the data is used to link, for example, customer sales with delivery. Powerful geographical knowledge is then harnessed in support of the business strategy. This paper reports on research with an small or medium sized enterprise (SME) aimed at developing an information systems strategy. A key driver in the strategy became data integration across the business. The case study organisation is used to illustrate the ideas discussed. Conclusions are drawn to assist the improvement of practice and identify areas for further research. © 2001 Elsevier Science Ltd. All rights reserved.

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## 1. Introduction

Over a period of the last few decades there have been several detectable “fashions” in data integration solutions—corporate databases, data warehouses, Intranets, and most recently enterprise resource planning systems (ERP). However, the trend towards data integration has largely by-passed a key dimension of data that could be used for the purposes of integration. That key dimension is location or spatial data. The vast store of attribute data maintained by ERP applications typically contains up to 80% location data that has not been integrated with any kind of spatial analysis system (Jullens, 2000). Solutions for larger business units are now emerging in the market with the integration of geographical information systems (GIS) and ERP applications.

In the environment of a small or medium sized enterprise (SME) with typically less resource and information systems competencies than larger companies, data integration poses a special

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challenge. This paper reports on a conceptual framework, which facilitates geographical data to be used as the basis of integration. The spatial dimension of the data is used to link, for example, customer sales with delivery. Powerful geographical knowledge is then harnessed in support of the business strategy. A case study organisation is used to illustrate the ideas discussed. This differs from previous approaches to geographic data, which tend to have focussed on the implementation of geographical information systems (Walsham, 1999).

Research undertaken within Bayford Thrust shows that data looked at through a geographic lens provides a focus across business activities. Applications that were too expensive for stand-alone uses were justifiable on the basis of sharing data between traditional functional business domains. Exploiting the spatial dimension of the data proved to be the unifying theme to enable data to be shared.

Bayford Thrust is a small family owned energy business focused on downstream oil, lubricant and fuel card businesses. The company expressed a desire to review their use of information technology and wished specifically to develop an IS/IT strategy, which was related to the newly articulated business strategy. Until 1996, the company did not have a published business strategy. However, following publication there has been significant efforts aimed at increasing business level accountability, the re-engineering of business processes and the personal development of the management team.

Having little expertise in the IS/IT area the company approached the University for assistance. To help manage and respond to the demands for increased IS resources, an appointment was made in June 1997 under the Teaching Company Programme (funded jointly by the EPSRC and participating company). This provided for two appointments of “associates” responsible for IT development within the business and an academic advisor at Cranfield School of Management.

The paper explores the importance of exploiting the spatial dimension of data in the information systems strategy. Scheduling and routing appeared to be strong candidates for the application of IT. Yet on closer inspection it is the linking of customer knowledge to this application that gives the major business benefits.

## **2. The role of IT in the company**

The company has supplied energy products since the 1920s and has grown through product diversification and business acquisition to a company today employing just over 100 people. The business continues under the control of second and third generation of family members with a regionally focused asset, distribution and customer base. Until recently information systems investment was very low and was focused on a key operational sales, order processing and accounting system. Ultimate responsibility for IT rests with the finance director, with day to day running of systems being left to two part-time data processing staff. Modest investment in information technology was sanctioned in early 1997 with a network of personal computers and e-mail facility installed for 25 users at head office. Alongside this investment have come requests throughout the business for new developments including enhanced sales and marketing tools, mobile computing and wider communication links (Greenwood & Grimshaw, 1999).

At a very early stage the board of directors were keen to see a participative approach adopted in which all the management team were involved. The level of expertise those individual managers

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