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Geographic Information and the commercial property market

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Introduction

This paper aims to set out how the UK arm of the worlds largest commercial property company uses Geographic Information Systems (GIS) /Geographic Information (GI) to make business decisions on a day-to-day basis. This paper addresses the existing status of GIS in the property industry and how GIS is currently used. This paper also looks at problems that arise with the use of GIS in the property industry and how they can be overcome.

The majority of the data that a property company holds whether it is in spreadsheets or database format is based on some sort of geographical location be it an individual building or a shopping centre for example. Therefore there is considerable value in mapping this data and this paper looks at how this can be achieved. This paper also examines the training and education that is needed to use GIS to its full potential.

However there are issues that sit on the other side of this debate, issues such as data ownership, data location and the cost of undertaking a corporate GIS policy. These issues and others will be presented in this paper. This paper explores where and how GI/GIS benefits property organisations and the likely trends in the future.

Existing Status of GI/GIS in the Property Industry

GIS is still relatively unused within the property industry. Basic mapping packages such as Promap or Goad have been available for many years, but more broadly based mapping facilities have only recently begun to emerge in surveying practices and property organisations generally. There is a pressing need to educate surveyors and other property professionals in the use of GI/GIS; showing them how it works and how it can benefit their day-to-day business activities.

The majority of property professionals who have recently studied for land and/or property degrees will have some understanding of GI/GIS and the benefit it can bring. This knowledge can be brought to their day-to-day business, improving their internal and external project work.

The main two mapping packages that have been traditionally used within CB Richard Ellis and by surveying practitioners are:

- **Promap**

Promap is used extensively by surveyors and others to delimit the boundary of individual properties and is based on Ordnance Survey Landline/ Mastermap data. It shows the outline of various individual buildings as well as showing their location in relation to their surrounding features. The version of Promap that CB Richard Ellis has is a pure mapping system, it can only show buildings and surrounding features, it has no data associated with it and data cannot be imported into it. It cannot allow interrogation of data or allow meaningful analysis to occur. For example it cannot show all the buildings in a certain area that are over x ft² and have planning permission for development.

- **Goad**

The electronic Goad system shows trading locations and the retail units that are located within them. This is more than just a mapping system because it allows you to select certain retail units that meet your criteria and highlight them. The version that CB Richard Ellis uses cannot allow you to import your own data, and undertake meaningful analysis using this or any other data.

Some surveying practices including CB Richard Ellis have higher-level GIS/mapping packages from suppliers such as MapInfo, CACI or Experian, all with demographic modelling and drivetime capability. The majority of these systems are located on single machines in various departments around the firm, rather than a true corporate mapping/GIS system, accessible by the majority of employees via company's intranet. More recently, pay as you go systems have emerged and along with the capability of web mapping, this could change the face of GIS within the property industry.

Why use GIS in the property industry?

There are a variety of reasons why GIS are used in the property industry.

1. Once all the data is geographically referenced and mapped, multi dimensional analysis can be undertaken. This allows the database to be queried and the user to ask pertinent questions such as "show me all locations within a 60 minute drivetime of an international airport, where there are existing conference/hotel facilities?" or "show me all developments in the South East owned by company X and have and have pre-lets of Y already signed up".
2. GIS can also provide a graphical representation of hard to visualise data. It is a lot easier to view a map than a series of numbers or pieces of text in a spreadsheet or database. The old euphuism that "a picture is a thousand words" is especially true in this case.
3. Also, GIS can allow you to "set the scene" with a client, it can help the surveyor explain to them the location of a site especially if the client does not know the area. For example "The site is 20 minutes from junction 10 of the M1". In which direction? Is it close to a dual carriageway etc? This is all very simple and basic mapping but it is useful in "setting the scene" for the client.
4. If a demographic package is being used then catchment areas, drivetimes or any other geography (postal sectors, Enumeration Districts, Output Areas) can be used and the relevant Census, expenditure or retail characteristic data can be analysed. If a surveyor is looking at a potential site for a retailer or if they are trying to let a unit to a retailer then this type of information derived from the GIS is indispensable.
5. GIS is a useful tool in the armoury of property analysis, it is not to be used in isolation, but as part of a strategy to get the most out of the company's data. GIS can be used by users to reveal new aspects about the data they have. These new ideas might have been missed if GIS was not used.
6. If a corporate GIS is implemented then departments need to find out what data the company has access to. For example one department might not know what data another department has access to but this data could be of relevance to them and could help them with a job or a client.

What are the Issues involved in using GIS in the property industry?

There are a variety of issues that need to be addressed if the value of GIS is to be fully tapped by the property industry.

1. One major issue is data ownership, people are very protective of their data, often for very good quality control reasons. This however can lead to data obstruction for others. It also can promote a "cottage industry" mentality that can be damaging to large organisations. If other people are given access to their data, then this could free up some of their time to undertake other client and project work.
2. In terms of the corporate systems such as Promap, there needs to be some sort of central control. Also, if the company has a demographic system, data sources need to be stored centrally -(due to licensing restrictions). However the most valuable data to the company is often located in many different

departments over the whole firm on individual hard drives, in personal directories, on individual CDs etc. So a key issue is to try and find out what data the company has and where it is located.

3. When it is known what data is available, the issue of integrating the data needs to be addressed. What is the common link between these datasets? Is the address accurate or does a building on a corner have two names depending which road it is viewed from? Is there a unique number for each record/building from a centralised "job numbering" system? These are major issues in getting a true corporate GIS implemented.
4. There are issues in accessing data at certain scales. As a lot of the data a property companies holds is based at building level, there is a need to access Ordnance Survey Mastermap data. At the time of writing it is very costly to purchase OS Mastermap data but the cost is expected to come down in the near future.
5. The cost of undertaking a corporate GIS can be quite prohibitive. Once an audit has been completed, there is the cost of implementing relational database creation, purchasing any additional geographical data needed, plus the software to allow access, possibly over an intranet. In addition there is the cost of employee training and education.
6. To obtain the required budget, companies will have to be persuaded that GIS will provide a return on what can be a very substantial investment. It has to be proved that there is benefit in analysing data in a geographical format and this can be hard to do. If GIS was used on a particular pitch or job, the winning the pitch or job cannot be pinned down to the use of GIS. One of the potential ways that a return on investment can be achieved is using GIS to make employees more productive i.e. by producing a faster report or a better pitch quicker and with more useful information than previously, and in doing so, frees up their time to undertake more fee earning work.
7. A clear company policy has to be developed with regard to the issue of GIS due to employees wanting to take the analysis and system further without thinking through the cost implications, copyright and other relevant issues.

How do CB Richard Ellis use GIS/GI

CB Richard Ellis uses GI/GIS in variety of situations around the firm and some are explained below with examples. As mentioned one of the simplest maps that could be of use is a basic location plan (see Figure 1 - Plymouth and Environs). For example if an American client was looking to purchase a building in Plymouth then this location plan could be emailed to him and they would get an idea of where Plymouth is located. How far it is away from the UK motorway network? Where is Exeter is in relation to Plymouth? What is the general site and situation with regard to the area the client is interested in?

Figure 1



Another situation where GIS can be used is looking at office relocation. Figure 2 shows a “Spider diagram” between employee’s home locations and their office; this was for a blue chip client who was looking to relocate in the South East. It shows that the majority of employees come from the West but the client thought most of their employees came from Essex or Kent. This shows how a GIS or basic mapping package can bring a new slant on some existing preconceived ideas.

Figure 2



CB Richard Ellis also uses GIS/GI in the analysis of demographics that are based on a drivetime or a catchment area. Catchment areas can be derived from a variety of sources such as drivetimes, the National Survey of Local Shopping Patterns or other household surveys. Within CB Richard Ellis, routines have been designed to allow certain employees to derive demographic data based on a drivetime or a catchment area. Figure 3 shows a typical 30, 60 and 90-minute drivetime around Swindon Outlet Village, this type of map is used along with the demographic/expenditure data by agents to determine what characteristics these areas have. This information can then be used in their negotiations with the client. The type of data that is derived is shown in Figure 4.

Figure 3

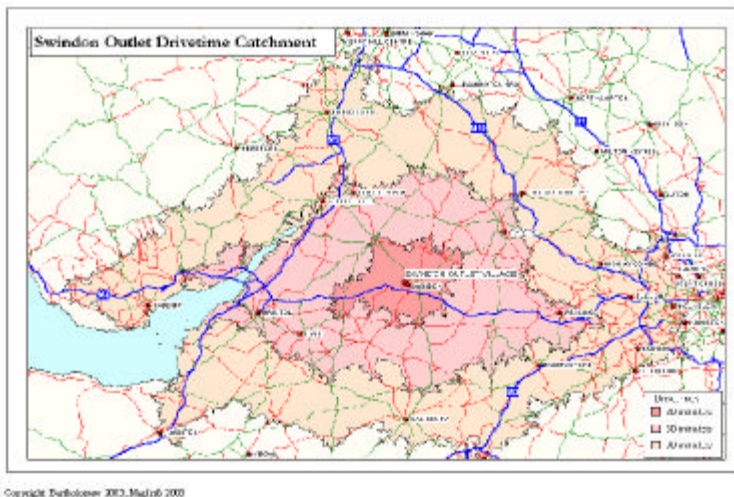


Figure 4

Calculation Data Cover
 Analysis Report
 Project: Housing
 Property File: 02 4300 Project
 Assessment City:

Category	Value	Area (%)	Index	Z Score
Population				
2011 Census Data/Statistics				
Population counts				
Age				
Age 0 - 4 years	10002	0.50	89	-1.04
Age 5 - 14 years	13345	0.66	87	-1.75
Age 15 - 24 years	22420	1.12	85	-2.56
Age 25 - 34 years	23027	1.15	89	-3.29
Age 35 - 44 years	31004	1.55	89	-2.34
Age 45 - 54 years	19309	0.96	89	-0.87
Age 55 - 64 years	10323	0.51	90	0.23
Age 65 - 74 years	11000	0.55	90	0.24
Age 75+ years	8881	0.44	91	-0.53
Household counts				
Composition of type of household				
Social class AB	3122	0.15	87	-0.41
Social class CD	19282	0.95	78	-4.05
Social class CE	21228	1.05	105	-28.45
Social class DE	20719	1.02	128	-40.28
Abroad born	15	0.00	28	-13.98
Car availability				
Households with 0 cars	28248	1.38	124	-42.90
Households with 1 car	28188	1.37	89	-2.47
Households with 2+ cars	8393	0.41	70	-38.26
Households with 3+ cars	1340	0.06	35	-25.49
Tenure				
Owner-occupied	37381	18.35	85	-21.28
Rented from a housing organisation	828	0.04	89	-25.79

MapInfo Housing Analysis Report
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 C:\Program Files\MapInfo\MapInfo\MapInfo.exe

Based on the above principles drivetimes can be taken a stage further. Figure 5 shows drivetimes around a site but it also shows food stores around this location. This is useful in that it shows which competing food stores are within certain drivetimes of an existing store. This type of data can be used for rent reviews or comparable analysis. The data derived from this type of analysis can be seen in Figure 6 .

Figure 5

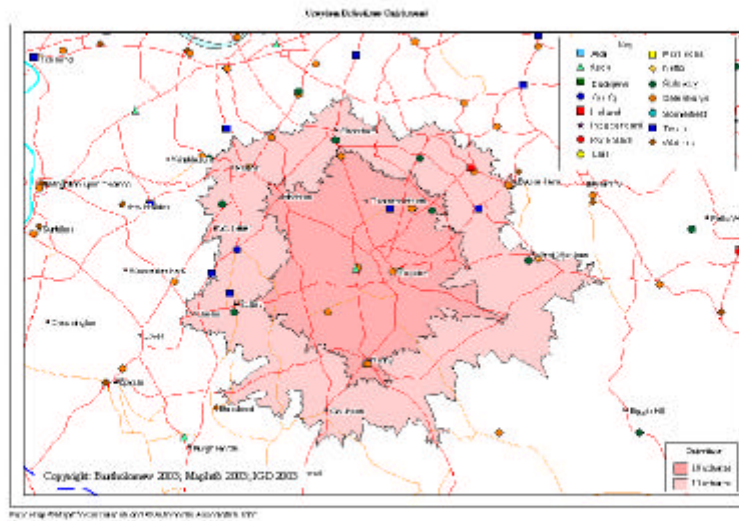


Figure 6

SUPERMARKETS REPORT							
Fascia (Telephone)	Address	Site Type	Size (sq ft) Trading (Gross)	Ch'outs	Car Spaces	Petrol (Sunday Trading)	Opening Date
Asda (01793 400481)	Howick Square Market Centre SWINDON Wiltshire SN1 1LE		4733 (1470)	N/A	4		1983
J Sainsbury (01793 530777)	4 Brunel Place Retail Centre SWINDON Wiltshire SN1 1LP	A	15496 (13367)	N/A	858	N (N)	1993
J Sainsbury (01793 628255)	Gallow Road Stoken St Margarets SWINDON Wiltshire SN1 4DF	C	42913 (15420)	N/A	606	Y (N)	1997
J Sainsbury (01793 420040)	Ashton Road Seton Road SWINDON Wiltshire SN2 7TH		38807 (29600)	34	506	Y (N)	1998
Mark Snow (01793 487250)	47-48 Cowdenish Square Park South SWINDON Wiltshire	C	2228 (11400)	7	200	N	1993

Analysis using GIS does not just have to be about demographic or retail data, it can be about any type of data. Figure 7 shows how a GIS was used to determine which type of conference locations were within a certain drivetime of Heathrow Airport and what the characteristics of each of the conference locations were. Each location has a number linked to a schedule that could contain cost, number of rooms, AV equipment or any other information that is available.

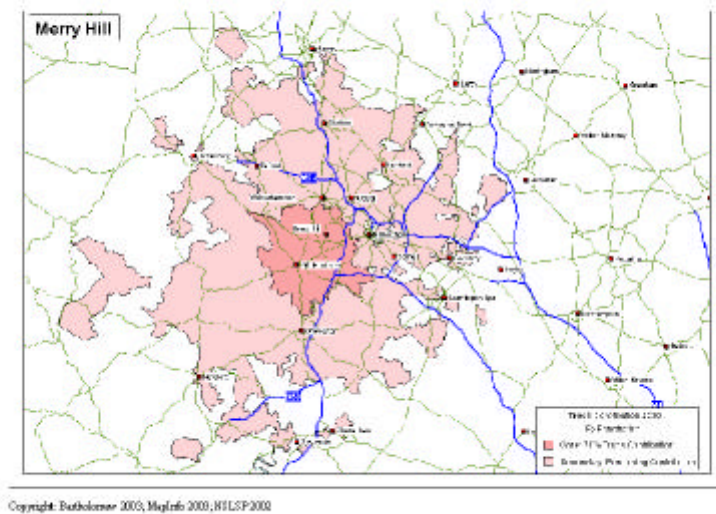
Figure 7



Another main area where GIS is used within CB Richard Ellis is in the use of catchment maps derived from the market leading National Survey of Local Shopping Patterns. This is a National Survey programme undertaken by CB Richard Ellis and defines the true non-modelled catchment of trading locations around the UK. It can be used to calibrate gravity models, define overlapping catchments and war zones, determine dominant zones in various areas and accurately define core/secondary/tertiary trade areas.

The basic catchment map is shown in Figure 8 and this accurately shows the area where the core and secondary trade contributions come from. The core area is defined as where 70% of the locations trade comes from and the secondary area is the remaining 30%. This would be a great starting point for a marketing campaign by a shopping or town centre manager or a retailer. They could start looking at the definitive catchment area with regard to their marketing budget, advertising campaigns or any other factor that needs an accurate catchment definition.

Figure 8



If lifestyle characteristics are taken into account in this catchment area, then the type of people that are expected at the store/centre could be determined. Again this would be very useful to marketers or centre managers. This catchment data can also be linked to in centre surveys to create highly accurate shopping patterns and competing centre datasets.

Derived from the catchment map above, figure 9 shows dominant catchment zones around Hereford. These zones refer to areas where the individual trading locations are dominant. Each postal sector in Hereford's catchment is analysed and the top trading location by penetration rate is taken as the dominant location in that sector. The sectors that have the same locations are then merged and dominant zones are created.

In figure 9 the large area in the middle shows the area where Hereford is dominant, the other surrounding zone show where other trading locations are dominant.

Figure 9

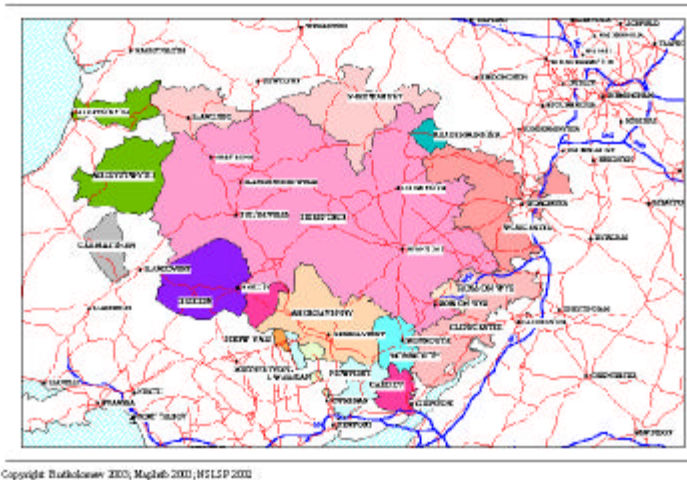
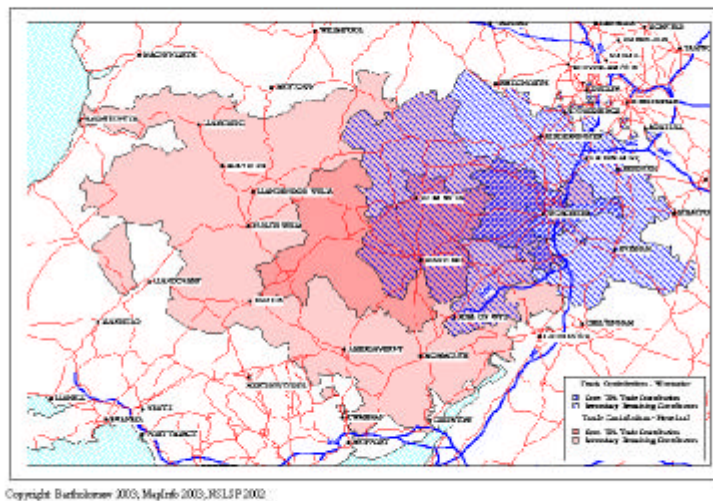


Figure 10 shows the possibilities that arise if comparisons are made between two competing centres such as Hereford and Worcester. The darker pink and crosshatched blue regions show their respective core areas and it can be noticed that there is no overlap between them. The other coloured regions show their secondary areas and the overlap that occurs between them. This can be defined as a “War Zone” between the two locations i.e. this area shows where there is potential for new customers to start using one centre as opposed to the other.

Figure 10



The above examples show how mainstream GIS can be used in a property company, but there are many other areas where GIS can be and is being used but due to confidentiality they cannot be demonstrated.

Where can GIS go from here in the Property Industry?

Until recently there has been no organisation that acts as a conduit between property organisations and the GIS industry. In January 2003 this was rectified in the formation of a series of Special Interest Groups (SIG) in the Association for Geographic Information (AGI), the Society of Property Researchers (SPR) and the Royal Institute of Chartered Surveyors (RICS). These three independent SIGs are managed by an umbrella organisation called GIPSIG in which there are representatives from each of the component SIGs. More information about the Property SIG in the AGI can be derived from the AGI website www.agi.org.uk.

It is envisaged that these SIGs will raise awareness in the property industry to the benefit of GIS and how it can be used, but also raise awareness in the GIS industry to property organisations. There is huge potential for property organisations to use GIS for their benefit, it is a case of demonstrating the potential of GIS in property activities.

Conclusions

Currently as mentioned GIS or mapping is used within the property industry but not to the extent that it could be. This is down to a number of factors such as the training issue, the cost of the software/data and data ownership. There is also the problem of where and how the data is stored around the firm, how the data is going to be mapped and merged, and how to prove to people that GIS works.

References

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