

Meeting Customers' Needs – An Outsider's View of the Performance of a National Mapping Organisation (Ordnance Survey)

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Summary

The paper is presented as a staff appraisal might be, but focuses on performance of Ordnance Survey from the customers' viewpoint. It examines the impact of changes in the external environment in which the National Mapping Organisation operates, under four broad headings, social, technological, economic and political. It concludes that although currently performing well, there are a number of structural issues that the organisation needs to consider in order to continue to prosper in a rapidly changing business market. Areas for action include fostering better public/private partnerships, reconsidering its role in sales and marketing of value added products and examining remuneration and staffing policy.

Introduction

I feel a deep sense of responsibility writing this paper. The conference is in many ways unique. Dedicated to discussing the particular challenges of running National Mapping Organisations (NMOs), it is a rare chance for their leaders to 'look up from the coal face'. Although the organisers have invited many eminent outsiders to attend, only a few have been given the opportunity to present. It also poses something of a dilemma for me personally. As an ex-employee of Ordnance Survey (and of the Survey Department of the Republic of Seychelles), now on the 'outside' with a large GIS company, it could be viewed that I have one or two obvious 'axes to grind'.

One of the most important parts of my current role at ESRI (UK) is undertaking regular staff appraisals. Perhaps, because this was uppermost in my mind when I sat down to write this paper, I decided to structure the presentation as a performance review of our NMO, Ordnance Survey (OS). ESRI (UK) staff come into contact with many OS customers every day. To provide an objective and balanced appraisal, I therefore contacted a number of those customers, particularly individuals with a wide knowledge of the industry, to ask their views. Although not directly quoted, I have attempted to represent their insights wherever possible.

An effective performance appraisal accentuates the positive. Inevitably however, more space is devoted in the paper to those things that are perhaps worthy of change than the many good points. It is also more of the 'let's look at next year' than review of past achievements. For 'last year's' report, I would recommend the excellent article by David Rhind (Rhind 1997) in *Framework for the World*, the book which was spawned by the 1995 conference.

Although the focus of the paper is Ordnance Survey, it seems to me that many of the comments are equally applicable to other countries, reflecting the trend towards globalisation evident in all business sectors.

Structure

Appraising an organisation needs different criteria to those suitable for appraising an individual. To provide a framework I've used a technique, which I learnt while at Ordnance Survey, for analysing the impact of change on an organisation, known variously as PEST or STEP. STEP is an acronym of the four external impact types analysed:

- Social
- Technological
- Economic
- Political

Social change

Social impact can be interpreted widely and concentrates here on human resource and business issues.

All organisations are about people. My belief is that if you can bring together the right people, those with a positive attitude, commitment and intellect, and equip them the right tools, including training in 'soft' skills as well as vocational techniques, the organisation will be successful.

Rewards

The problem for OS is shared with many other NMOs – how to attract and retain the best staff?

In general, civil servants are not as well rewarded as those in the private sector. One has to be careful because inflation-linked pensions, long holidays and other advantageous conditions of employment can improve the attractiveness of the public sector. However, let me take an example: a software project manager, with perhaps 5 years total post-graduate experience, working in GIS development can currently command a salary of £35,000 – £40,000. The salary for an equivalent post in Government would be in the range £25,000 – £30,000 that is, around 25% less.

What is the effect? New graduates can be attracted by the kudos of working for Ordnance Survey. An American colleague of mine suggests that England has three great institutions – the Queen, afternoon tea and Ordnance Survey. The new graduate stays 2 or 3 years, acquires excellent experience, but also in all probability a partner and possibly a property. Salary becomes more important, (try telling the average 25 year old about the value of their pension) and so they are inevitably lured into the private sector.

The result – a dearth of the highest quality middle managers in the public sector.

Skills mix

The professional background of most NMO staff often exacerbates the problem. Cartography, surveying and GIS, as with other professions, attract a certain type of individual. Generalising greatly, we tend to have excellent attention to detail, be self-sufficient and not particularly materialistic.

Although these are all excellent qualities for many roles within the NMO, they are not, I would venture, the best raw material for sales and marketing staff or those involved in contract law.

Let's look more closely at sales and marketing. Today, between 10% - 15% of Ordnance Survey staff are involved in activities which can broadly be described as sales and marketing. At ESRI (UK) I am fortunate to work with some of the best sales and marketing people in the business. I have enormous respect for their professionalism. However, the excellent sales person is a very different animal from the surveyor – extrovert and super self-confident, they are driven by the thrill of closing a sale and the commission that comes with it.

Therein lies the nub of the problem for Government agencies. Put in the 'straight-jacket' of Government rules and regulation and without the potential to earn more than the Chief Executive, if she or he has a good year, the salesperson loses motivation.

A few years ago, Hewlett Packard, a huge organisation with an excellent code of ethics and highly professional culture, decided to move the sales team in one Division from being commissioned to salaried staff. Within 6 months the scheme was abandoned, sales had slumped and a number of their most successful sales staff had resigned.

Solutions

Tracing back to cause, I believe both rewards and staff mix reflect the structure and purpose of the organisation. Potential solutions are likely to be long-term and require redefinition of the NMO's role. Consider the functions of OS represented as the pyramid in Figure 1.

Most in the industry would agree that the high level functions, particularly activities such as providing policy advice to Government on mapping and GI and setting national standards, should remain within the control of the executive. I would argue that the same applies to the core operational functions, principally management of the National Topographic Database (NTD) including basic scale mapping at 1:1250, 1:2500 and 1:10 000, as well as mapping at 1:25 000 and 1:50 000.

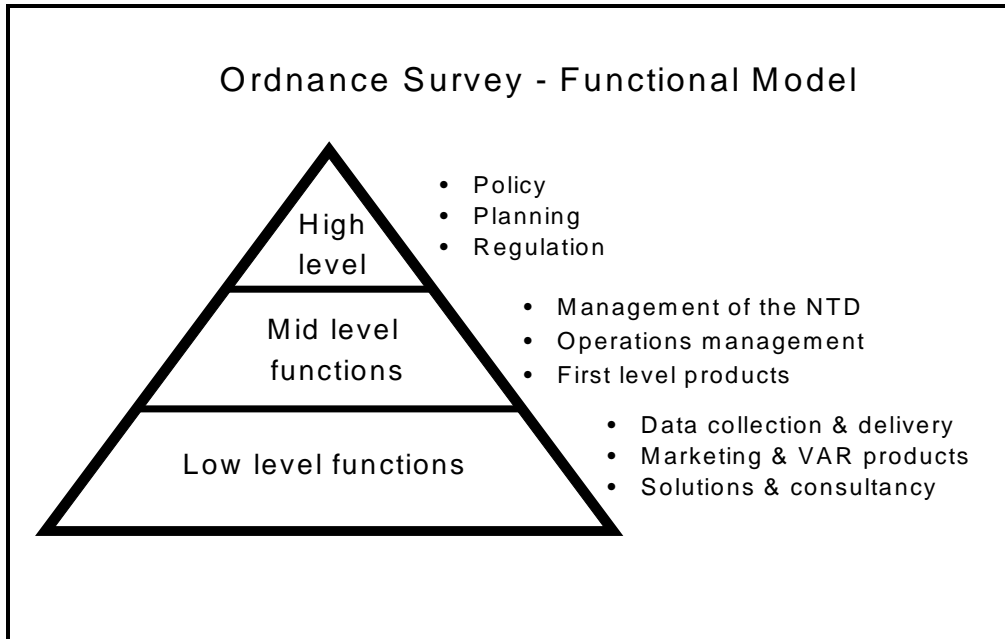


Figure 1: Ordnance Survey – functional model

However, the largest segment of the pyramid, essentially that dealing with the exploitation of the NTD, need not remain within Government. Models exist for this separation of executive from 'enterprise' functions, in New Zealand (Robertson 1997) and closer to home in UK Forestry. The Conservative Government split Forest Enterprise from Forestry Commission in the early 1990s. The Forestry Commission sets policy and regulates the industry; Forest Enterprise competes with private sector companies for contracts let by the Commission.

Does such commercialisation work? I'm sure that minds greater than mine will argue the pros and cons later in the conference, but suffice to say Forest Enterprise have become one of the UK's most successful users of GIS since their commercialisation, exhibiting a pragmatism and clarity of purpose which many commercial firms would envy.

This doesn't solve the problem of reward structures within the executive. For a solution here perhaps we should be looking just across the channel to France. The French have long recognised the need to attract the brightest people into Government service.

The Lycee Administrative in Paris has produced 8 of the last 9 French Prime Ministers. It creams off top graduates from the leading Universities each year and trains them to lead the civil service. Developed by circulation through the upper reaches of Government departments and, crucially through private industry, they provide the quality and mix of management which characterise the most successful private sector organisations.

Could not this form of 'intellectual circulation' be applied to the UK? A smaller 'executive' Ordnance Survey might be better able to attract such top graduates and reward them accordingly. The private sector would be keen to offer such talent long-term secondments to help them understand the commercial world. This theme of public/private partnerships is raised again later in the paper.

Contracts

In my discussions with customers, both in the UK and abroad, one recurring theme is the frustration caused by protracted contract negotiations with NMOs. There is a feeling that NMO staff given the responsibility of dealing with complex legal issues do not have the experience, or the necessary empowerment, to be able to negotiate contracts quickly.

In recent months ESRI (UK) have had a number of major clients for Internet projects, who, frustrated by the speed of contractual progress with OS, have gone elsewhere for their mapping data.

I should stress that this is not a case of commercial companies having unrealistic expectations. The current pace of change in our business dictates that a good idea needs to be brought to market quickly, because someone else has almost certainly got the same idea.

In March this year, ESRI (UK) acquired NDIG, a major player in provision of land and property systems to the UK local authority market. The legal and technical teams, including both Managing Directors, concluded the majority of the deal in one 48-hour session. The firm hosting the negotiations provided beds for the participants to sleep in shifts to allow the work to continue through the night – it was a bizarre experience but by no means unusual.

If, as planned in the UK, NMOs become the contracting organisation for large on-line service franchises, such as NLIS, a number of issues have to be addressed. The planned model contracts are unlikely to be acceptable to large corporates without negotiation.

Almost 1/3rd of the Invest to Save budget is allocated to legal fees for preparing these model contracts. Would it not make sense to create a dedicated corporate legal team? It also seems to be essential that such a team be empowered to make decisions, otherwise the whole process risks grinding to a halt.

Technological impacts

This is an area where OS has achieved enormous progress in the last few years. The completion of the computerised National Topographical Database (NTD) has been a mammoth undertaking but, as a result, we now have undoubtedly one of the most comprehensive digital databases in the world. The GIS industry has also benefited by virtue of the introduction of products such as the geocoded postal address database (ADDRESS-POINT™) and structured national road network (OSCAR®). We are fortunate to have had a CEO at OS with the vision and energy of Professor David Rhind in this respect. I am glad that Geoff Robinson, coming from a distinguished career in the Information Technology industry, looks set to continue this leadership.

However, the pace of change in technology continues to be staggering, so it is worthwhile reviewing how some of the major changes will impact the business of NMOs.

The industry is generally agreed on three key technological trends over the next 5 years:

- The Internet becoming *the* delivery mechanism for GI;

- Domination of the market by a smaller number of global companies, increasingly distinguishing themselves by the quality of their **solutions**, combining software, data and services; and
- Convergence of all vendors on open, interoperable software architectures based on:
 - all relational databases, integrating multi-media, spatial and textual data;
 - component software, based largely on the Common Object Model (COM) supported by Microsoft;
 - cross-platform languages, such as Java; and
 - industry-standard data models.

I'd like to look briefly at how each of these may affect NMOs.

Internet

For many of our newer markets, financial services, tourism, and the media for instance, the Internet is their interest in GI. The Visa website <http://www.visa.com/>, is thought to be one of the most widely visited mapping sites in the world, providing a map display of ATM locations in the proximity of an entered address.

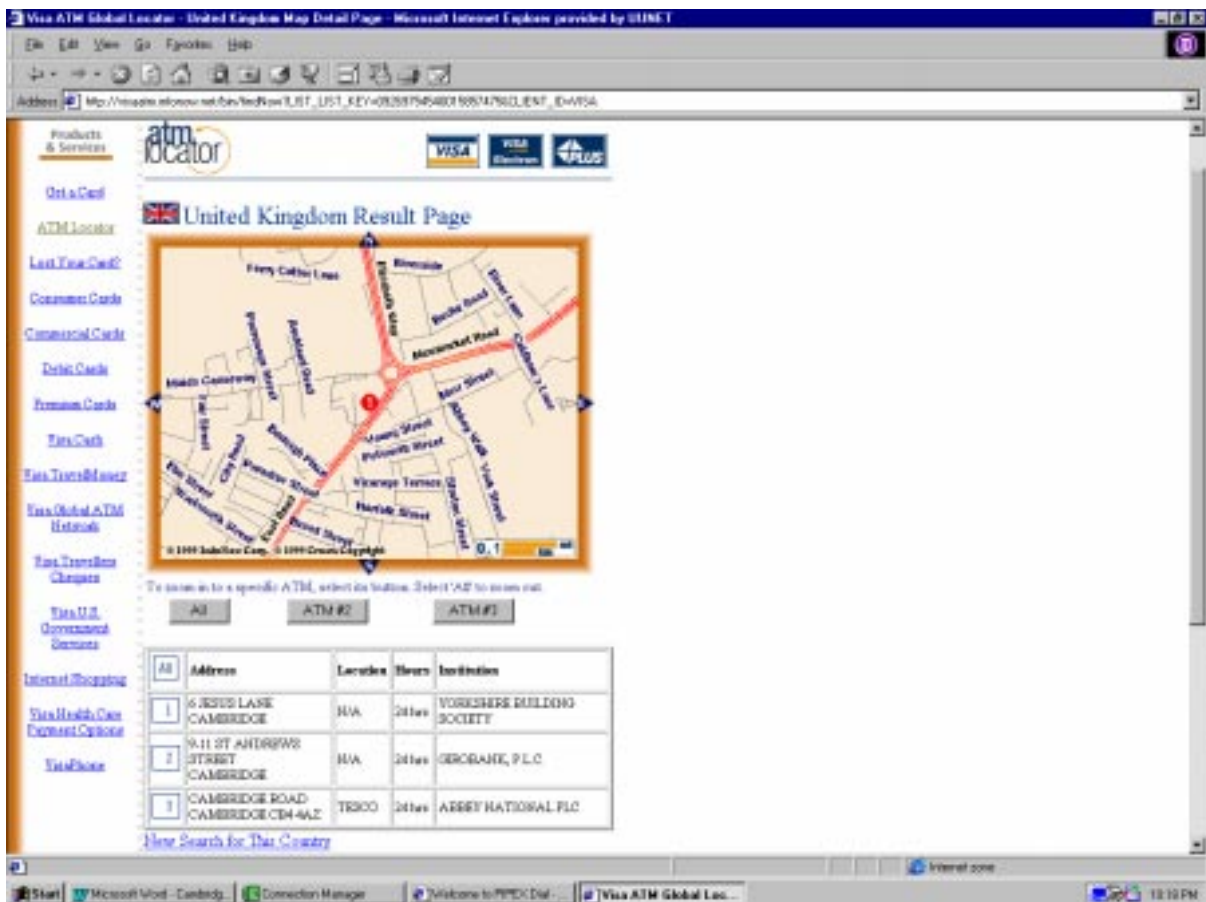


Figure 2: Visa Website: ATMs closest to St. John's College

Such sites pose a challenge for many NMOs. The key requirements are a comprehensive geocoded address database, detailed up-to-date large-scale mapping and high quality cartography, provided at an extremely low and royalty-free unit cost.

Clearly, OS has done a deal with Infonow (the Internet Service Provider for Visa) – note the Crown copyright notice. One can imagine however, that should all users choose such a 'payment on-demand' service, the affect on OS revenue would be, at best, unpredictable.

Perhaps this explains the statement (Hansard 1999) that the OS Management Board has concluded:

'that it will be unsustainable to maximise profit as a long term goal'.

Instead they propose to:

'maximise the utilisation of data and mapping while still making a small profit to cover trading fund obligations'

This an excellent and long overdue commitment by OS which most in the commercial world will warmly applaud.

One-stop software solutions

The move towards solutions, one-stop shops where a customer acquires software, data, and the services to assemble a complete system, is a business response to the need to change rapidly. Although undeniably a dull read, Business @ the speed of thought (Gates 1999), does include a number of good case studies which clearly show that the ability to change very quickly will characterise successful business in the next decade.

GIS software organisations, like ESRI, are responding in a number of ways. They are moving into on-line data brokering by setting up E-Commerce services, such as ArcData On-line <http://www.esri.com/data/online/index.html> where a wide variety of national and international datasets can be purchased and delivered electronically. Services in general are also becoming more important, 30% of ESRI (UK) and almost 50% of Oracle revenues were derived from this source in 1998.

I would suggest this trend will force NMOs, especially those with more diverse routes to market, to radically review their channel strategy. Within the foreseeable future, OS will need one website for data browsing, with File Transfer Protocol (FTP) capabilities for data download (and perhaps with a mirror site for resilience), to be able to service the needs of all its customers.

Technology convergence

The convergence of all the major vendors on the system architecture illustrated in Figure 3 will reduce the number of technology issues on which NMOs will need to focus.

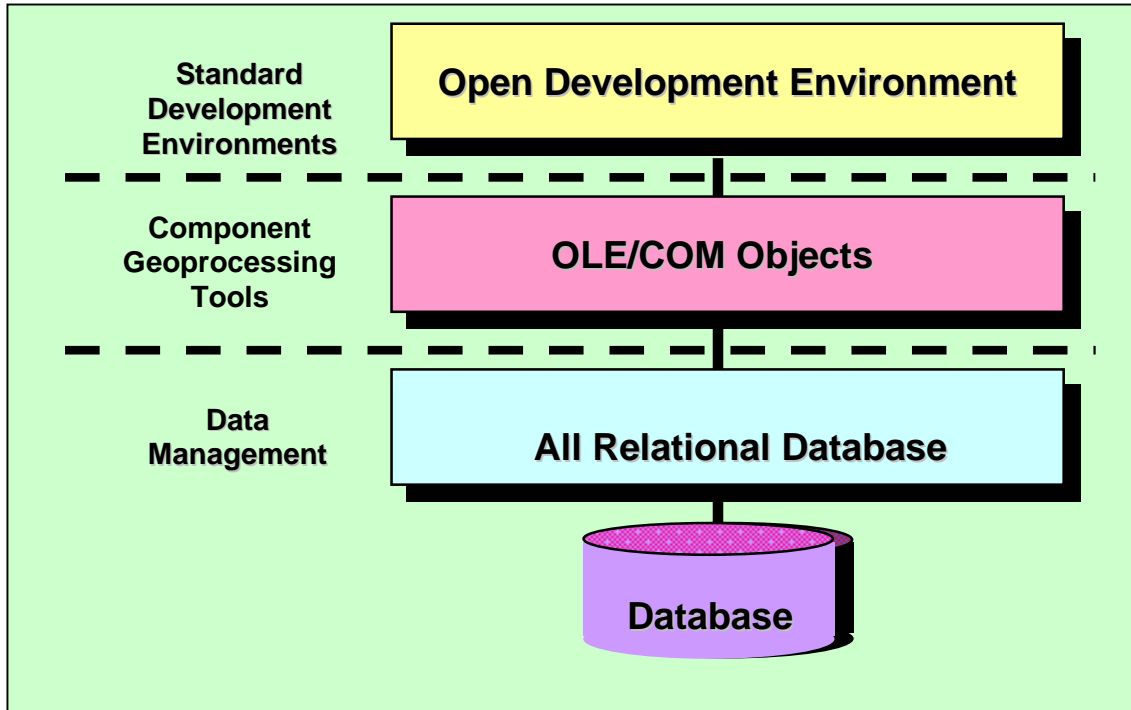


Figure 3: Generic Software Architecture

GI is becoming part of mainstream IT. Handling GI is becoming increasingly easy using Object-Relational Database Management Systems which enable efficient integrated storage and retrieval of both spatial and text data. Interoperability, driven by Microsoft and Sun/Oracle is reducing the need for organisations to standardise on one product family. Open Development Environments (ODEs) enable programmers to build systems from components that fit together in well defined and flexible ways. Even in the area of data modelling, many industries are creating standard schemas, such as UK's BS7666 definition for land, property and address data. These standard data models enable system designers to build databases that make data sharing within and across organisations a reality.

One might conclude from the above discussion that there are no significant technological challenges left for GI. This is far from the truth.

Yes, we probably know the components it takes to build the large, complex, IT infrastructure such as the UK National Land Information Service (NLIS). However, I am not sure we fully understand the 'stresses' and 'strains' that the infrastructure will need to endure. Again, this can best be achieved by forming a joint public / private sector team, rather than one organisation trying to figure it out. If the Treasury can entrust interest rates to such a team, surely we can invent a suitable structure which yields a "neutral" framework into which many competitors can slot solutions?

Economic

If one looks at computerised records of the essential geographical data to economic development – topographic mapping, demographics and the main cadastres, then the UK is almost uniquely well served. So availability is good, but accessibility remains a major issue. In some cases this is because of price, a point I return to later, but in others because of 'red tape'. There are many Government datasets, which are still not accessible because, I would contend their owners are concerned about their quality. Perhaps if they were to make them available with suitable caveats, usage would, over-time, lead to improved quality.

Bill Gates is not often far off the pace when it comes to looking at where the information economy is going. It is often quoted that there are now only 10 Countries with a Gross Domestic Product (GDP) greater than Microsoft's.

Tracking his strategy over the last few years reveals some interesting facts. Autoroute was an early acquisition, indicating recognition that transport and travel are key geographical considerations in our day to day lives. More recently the launch of MapPoint in the US, a \$109 product, which bundles modest GIS functionality with a number of huge databases, indicates a deepening interest in the GI market.

How long will it be before a UK MapPoint appears? It may already be taxing the brains of senior managers at OS. The danger for NMOs is that if the price is not right, and that price will need to be uncomfortably low, then such private sector initiatives will bypass the NMO entirely. Organisations like Microsoft will create or acquire their own, probably less comprehensive, lower quality but cheaper datasets.

The table below, illustrates the current position in relation to three 'reference' geographical datasets. One can argue the details, some of which are included in the more detailed breakdown in Appendix 1. The overall picture is however undeniable, – UK data is over priced.

Product	United States	United Kingdom	Netherlands
National administrative boundaries	£3 100	£7 500	£1 190
Detailed national road network	£36 980	£80 000	£9 000
1:250K national topographic map	£243	£5 700	£6 100

Table 1: Comparative costs – Geographical reference datasets

Political

When I worked in Seychelles, we had no television, so I read books. One of the pieces of non-fiction I enjoyed most during that time was the *Crossman Diaries* (Crossman 1979). Dick Crossman was Minister of Housing in Harold Wilson's cabinet of the late 1960s and his diaries were remarkably frank about the reality of political life and the workings of Government. The entry dated Tuesday 5th April 1966 reads:

'.... Just at this point Fred Peart came into my private office. He wanted to ask whether I would mind if the Ordnance Survey went back to the Ministry of Agriculture. It was something I rather wanted for myself, since I liked the idea of these maps getting done in my Department. But here was my friend Fred saying 'I was a Geographer at University' and complaining that OS shouldn't be torn from its traditional position in the Ministry of Agriculture. And as I am an easy-going, good natured person I said yes.'

What does this tell us? NMOs, weren't and I contend still aren't, more than a tiny blip on the politician's radar. The strategic direction of OS and its retention, in what (even then) appears an inappropriate Government Department, was clearly decided in a short exchange with minimal debate. The position of the NMO in the UK is possibly even less significant than in most of the rest of the Commonwealth. Mapping is only a minor player in the UK land market due in greatest part to our general boundary land registration system. Furthermore, despite having exported the idea to other countries, an integrated UK Department of Lands, bringing together topographic mapping, land registration and valuation agencies seems as unlikely as ever.

NMOs therefore have to swim with the tide, hitching onto political initiatives where and when they can. However, much more use could be made of the private sector in saying what NMOs want to say but, because of their position as civil servants, can't. This returns to my theme of public/private partnership.

In the UK there seems to be a general suspicion within Government Departments of the private sector. It seems such a contrast to the United States. At the time of the Mississippi floods in 1995, the Federal Government found itself unable to assemble the information necessary to meet the needs of the emergency services. They enlisted the help of the private sector. Many private sector organisations, including ESRI, provided software and manpower to help compile an extraordinarily spatial database in a remarkably short time frame. The realisation of the unpreparedness of Government to respond to such civil emergencies was arguably one of the main spurs for the National Spatial Data Infrastructure (NSDI) initiative.

The UK equivalent, the National Geospatial Data Framework (NGDF), is floundering because of the lack of a mechanism for input from all stakeholders and risks becoming regarded as a cartel of data providers. In the two years from its formation 3 of the original 9 working groups never met and had to be disbanded. However, one working group, that concerned with metadata services, has illustrated what can be achieved with truly inter-organisational cooperation. Aably chaired by Les Rackham from OS, the group contains representatives of public and private sector bodies. The private sector representatives, including Intergraph and ESRI (UK), whilst recognising the competitive positions, set these aside for shared objectives. As a result, ESRI software was demonstrated at Intergraph's offices and guidelines developed by Intergraph were endorsed by ESRI (UK). It was a truly refreshing experience – perhaps it worked because it was technically (rather than politically) led?

Conclusion

Ordnance Survey is in pretty good shape overall. It is often in a no-win situation. It can never please all of its customers all the time.

There are areas for improvement.

Fostering true public/private partnership, although often talked about with best intentions is seldom achieved in the UK. This would be top of my list of objectives for OS in the next few years and NLIS offers an excellent opportunity in this respect.

The pace of change, technological and economic, will force NMOs to consider different business models, perhaps divesting themselves of functions such as the sales and marketing of value added products.

NMOs will face greater competition. Consequently, the cost of data, paralleling what we have witnessed in the software industry, will need to move sharply downward.

Finally, and perhaps most importantly, NMOs need to find better ways to reward their staff to avoid the brain drain into the private sector.

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Appendix A

Geographical Reference Datasets

Country/ Provider	Data	Product	Nominal Scale	Price
UK Ordnance Survey	National Administration boundaries	1) OS Boundary-Line™ – Counties 2) OS Boundary-Line™ – Districts 3) OS Boundary-Line™ - Wards	1:50 000 1:50 000 1:50 000	£1 000 £2 000 £7 500
UK Ordnance Survey	Detailed National Road Network	Ordnance Survey OSCAR® Asset- Manager Ordnance Survey OSCAR® Traffic- Manager Ordnance Survey OSCAR® Route- Manager	1:50 000 1:50 000 1:50 000	£80 000 £60 000 £20 000
UK GMSL	Detailed National Road Network	GMSL OSCAR® Roadnet Derived from OS Routemaster	1:50 000	£12 500
UK Ordnance Survey	National Topographic map data	Ordnance Survey Strategi® – Vector only.	1:250 000	£5 700 (yr1) £2 280 (yr2)
UK Bartholomew	National Topographic map data	Bartholomew GB Maps – standard files Vector & Raster Bartholomew GB maps – all layers	1:200 000 1:200 000	£1 000 £2 500 (offer June '99)
UK Automobile Association	National Topographic map data	AA Automaps – Vector & Raster standard AA Automaps Vector & Raster all layers	1:200 000 1:200 000	£1 000 £4 200
United States GDT	National Administration boundaries	Dynamap – - States - Zipcodes - Blocks	1:24 000 1:24 000 1:24 000	£250 £616 £3 100
United States GDT	Detailed National Road Network	Dynamap/ 2000 -includes all admin geographies	1:24 000	£36 980
United States ESRI inc.	National Topographic map data	ArcUSA 1:2M ArcUSA 1:2M provides maps for the lower 48 US states and counties, rivers, roads, cities, and so on. Also has 1990 and earlier demographic attributes for states and counties.	1:2 000 000	£243

Country/ Provider	Data	Product	Nominal Scale	Price
United States Horizon Technology	National Topographic map data	Sure!MAPS RASTER	1:250 000	£16 000
Netherlands Geodan	National Administration boundaries	Census-districts (CBS) Municipal Boundaries	1:50 000 1:50 000	£1 190 £690
Netherlands NavTech	Detailed National Road Network	HPLS3	1:50 000	£9 000
Netherlands Geodan	National Topographic map data	Road network, point. locations, postal code	1:250 000	£6 100

Notes:

- i) Information Sources – www.datastore.co.uk or other published price lists.
- ii) Research undertaken in May 1999.
- iii) All prices are for a single user and exclude VAT or delivery.

