Applied Research Through Partnership: The Experience of the Yorkshire and Humberside Regional Research Observatory

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Abstract

Ten years ago, a Regional Research Observatory (ReRO) was established to provide 'clients' in Yorkshire and Humberside with a single point access to a region-wide data and analysis service. The Observatory's portfolio covered activities relating to applied research and consultancy, intelligence, education and training, publications and networking. The first part of the paper explains the concept of the Observatory as it was initially conceived as a form of partnership across all the universities in the region, outlines the structure of the organization that was created, explains the arrangements for operating the Observatory as a partnership initiative, and exemplifies the outputs and achievements during the first half of the decade.

In order to facilitate its regional monitoring activities, ReRO constructed a Regional Intelligence Centre (RIC), a customised geographical information system in which to store key data sets and generate a range of statistical indicators for the region as a whole or its constituent parts. The second part of the paper explains the structure of the RIC and its contents. It argues that the main advantage that derives from the construction of such a centre is the value that is added to raw information through data handling and integration, through skilled interpretation and through the provision of new information, maybe in the form of forecasts of what is likely to happen in the future, as well as analyses of what has happened in the past.

The third and final part of the paper explores some of the key issues and difficulties relating to the operation of the Observatory and considers some of the reasons that have accounted for its loss of momentum in the last few years. This has occurred over a period of increased political attention to regional administration and planning in the UK, exemplified by the creation of Scottish and Welsh Assemblies and the emergence of Regional Development Agencies and Regional Assemblies across England. A retrospective evaluation demonstrates a number of lessons that have been learnt and provides a number of useful guidelines to those attempting to establish similar structures elsewhere in the developed world.

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Introduction: The Proliferation of Observatories

Whilst the term 'observatory' has a longstanding association with the world of telescopes and astronomy, the 1990s in particular saw the emergence of 'observatories' in a wide range of different contexts associated not only with monitoring the physical environment but also with encouraging partnership and networking amongst organizations concerned with the health and performance of cities and regions.

Some examples illustrate the diversity of sectors within which observatories are now operating and the type of functions that they are performing. At an international level in the field of *urban development*, for example, a worldwide information and capacity-building coalition has been established by the United Nations Centre for Human Settlements (UNCHS) to help implement both the *Habitat Agenda* and *Agenda 21* at the national and local levels (http://www.undp.org/un/habitat/guo/guoguide.htm). A global urban observatory has been created, together with national, regional and local observatories. At the regional level, for example, various bodies including the regional offices and commissions of the UN, international umbrella NGOs, and networks of research and training institutions have established Regional Urban Observatories (RUOs). These RUOs have been set up to hold regional consultations on common problems, including trans-boundary issues; to sponsor regional workshops on the development and adaptation of region-specific tools, guidelines, methods and indicators; to organize, in conjunction with other partners, national best practice competitions and exhibitions; to contribute to development and dissemination of training materials in languages of the region; to coordinate training for trainers in national and local capacity-building institutions; to assist partners with the collection, compilation and analysis of indicators data and best practices; to facilitate the sharing and exchange of lessons learned among partner countries and cities; to coordinate regional urban research programmes; to identify regional correspondents and focal points for technical cooperation and research;

and to produce a biennial State of the Region's Cities report, including comparative analysis of indicators. (http://www.urbanobservatory.org/network/ruo.html).

At a national level, networks of regional observatories have been established in areas such as *health* and *innovation.* In the UK, for example, the Northern and Yorkshire Region Observatory (http://www.pho.org.uk/framesource/regions/network.htm) is one of several regional observatories concerned with identifying gaps in *health* information; bringing together existing data sets and presenting them in accessible, attractive ways to a variety of audiences, including the public; and facilitating the use of data by those agencies whose activities impact on the health of local communities. In the context of *innovation*, regional observatories has been used, for example, to facilitate co-operation between various local actors and teams responsible for the implementation of Regional Innovation Strategies in the regions of Northern Portugal, Galicia, Castilla y León and Asturias within the framework of IBERIA-NW, co-financed by TecMinho and the European Commission's DG XIII Innovation Programme. Here, the observatory concept is primarily regarded as a resource to be used by the innovation and technology support organisations, not as a direct support mechanism for companies; and should provide information and advice to help enhance decisions about policies, investments, projects, programmes and initiatives but not provide direct day to day support for the tasks of each support organization (http://sarmento.eng.uminho.pt/tecminho/iberia-nw/uk/oquee.html).

The current emphasis at the European level on the development of the European Spatial Data Perspective (ESDP) has been associated with the encouragement to establish observatories to assist *spatial planning*. Although much of the dialogue between EU institutions has been focused on the creation of European observatories to assess the conditions across EU regions, the development of local observatories has been driven by concrete local needs and a strong commitment by political decision-makers and the public. One EU programme involving 63 local partners in 11 member states is the TERRA programme (European Commission, 2000) that was conceived as a laboratory for testing new approaches to and methodologies for spatial planning. Various projects within TERRA developed their own observatories. So, for example, COASTLINK

(http://www.telecotrans.es/coastlink/) specifically investigated the role of coastal observatories as an instrument for data integration and management, DUERO-DOURO was the first attempt to build a single database for the whole of a river basin, covering two countries; and LORE developed the concept of a network of observatories which attempt to accomplish various functions from data collection to the development of local forecasting systems.

These selected examples serve to illustrate that there is now an abundance of experience in a wide range of different sectors associated with setting up observatories and establishing good practice. This paper seeks to extend this body of knowledge by reporting on ten years experience of an observatory that was established in the region of Yorkshire and Humberside in the UK to provide customers or clients with single point access to a region-wide data and analysis service designed to support the management of *regional development*. The paper begins with an explanation of what this observatory is, how it functions, and what types of output it produces. The second part of the paper outlines the information system created to store and handle the observatory's data, whilst the third part discusses some of the main issues that have been confronted over the last ten years, as the environment in which the observatory operates has changed.

A Regional Research Observatory for Yorkshire and Humberside

The Yorkshire and Humberside Regional Research Observatory (ReRO) was launched initially as a joint venture between the School of Geography at the University of Leeds and the Centre for Urban Development and Environmental Management (CUDEM) at Leeds Polytechnic (later Leeds Metropolitan University) in 1990. The aim was to create a network of research centres, or 'Associate Research Units' (ARUs) as they became known, each offering a range of skills and expertise in data collection and processing, problem-solving, strategy formulation and policy analysis. Such a network was regarded as being advantageous in that research teams might be assembled at relatively short notice from different ARUs with the skills and local knowledge required to respond to any particular request for research from the public or private sector. Thus, the aim of ReRO was to provide the region of Yorkshire and Humberside with comprehensive

information and research services that would facilitate the processes of economic, social and physical development and assist those responsible for the formulation of local and regional policies and plans.

Yorkshire and Humberside is Britain's third largest region with a population over five million and containing an immense diversity of topography, landscape, economic activity and culture. In 1990, the region was divided into four sub-regions, two of which were the former metropolitan counties of West and South Yorkshire containing nine metropolitan district local authorities. The other two sub-regions, North Yorkshire and Humberside, were shire counties with upper tier county councils and a lower tier of rural district councils. The extent of the region and the boundaries of the constituent local authorities are shown in Figure 1, together with the locations of the region's current universities.

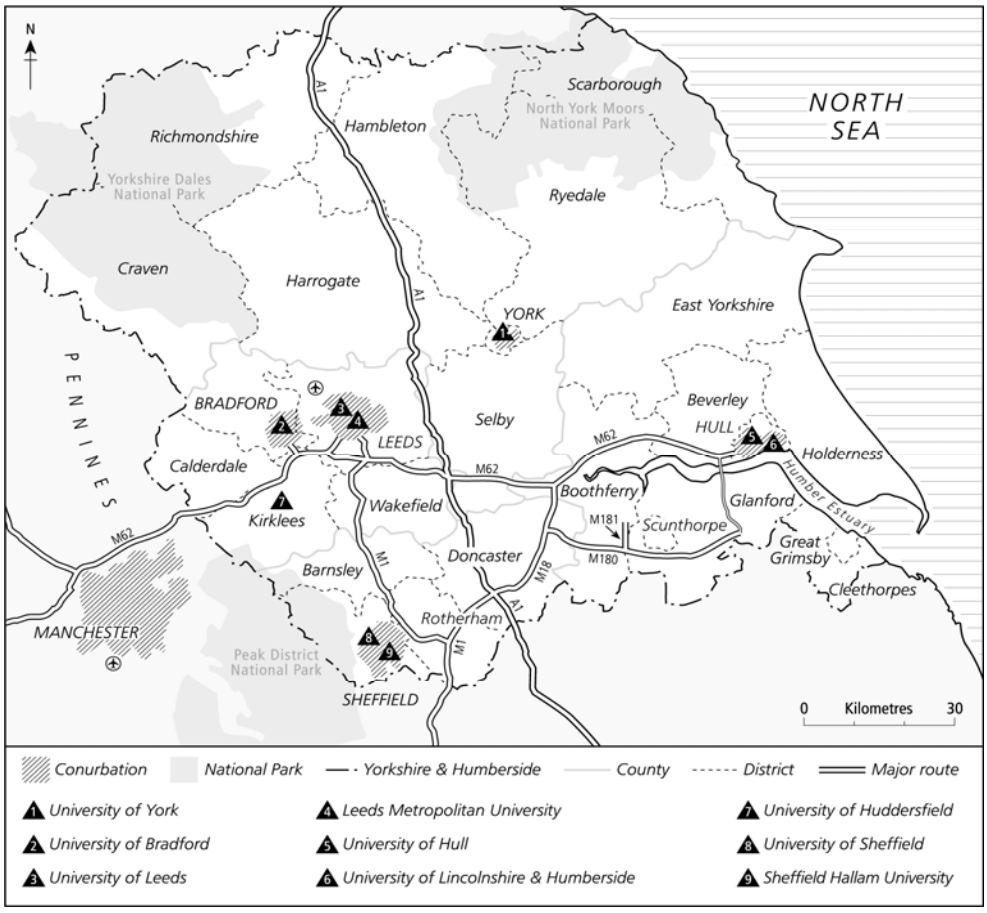

Figure 1: Local authority boundaries in 1990 and university locations

Progress in constructing the region-wide network of ARUs was rapid. Two further units, the Policy Research Unit at Leeds Polytechnic, and GMAP Ltd, a spin-off company from the University of Leeds providing businesses with intelligent information systems for strategic management planning, became part of the network at the outset. Research units from other universities in the region joined the network in due course, including the School of Geography and Earth Sciences at the University of Hull, the School of Social and Professional Studies at the University of Lincolnshire and Humberside, the Regional Office, University of Sheffield, the Policy Research Centre (PRC) and the Centre for Regional Economic and Social Research (CRESR) at Sheffield Hallam University, the Institute for Transport Studies at the University of Leeds as well as groups of researchers at the Universities of Bradford, Huddersfield and York.

Thus, through its network of ARUs, the Observatory was able to bring together not only subject specialists with skills in data processing, spatial analysis and policy evaluation, for example, but also academics and researchers with a wealth of knowledge and understanding of their own local geographical areas, thus creating a rich base of experience and expertise and a unique resource with which to address the range of strategic, developmental and research issues related to Yorkshire and Humberside.

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The general structure of ReRO is shown in Figure 2. The ARUs represent the formal members of ReRO and, through a Committee of Members, constitute the strategic development body for the Observatory through its annual meeting. ARUs pay an annual subscription for the benefits of being part of the research network. The executive function of the Observatory is managed through the Board of Directors consisting of five senior academics from the ARUs. The Editor of the Observatory's publications is an *ex officio* member of the Board and the Director of ReRO, responsible for management, is an academic from the School of Geography, University of Leeds. The day-to-day management and operation of the Observatory is handled through the ReRO Office that is also housed in the School of Geography. In the early 1990s, the Director was supported by a secretary, a research associate, a graphics design technician and a data manager, all of whom were appointed on a part-time basis.

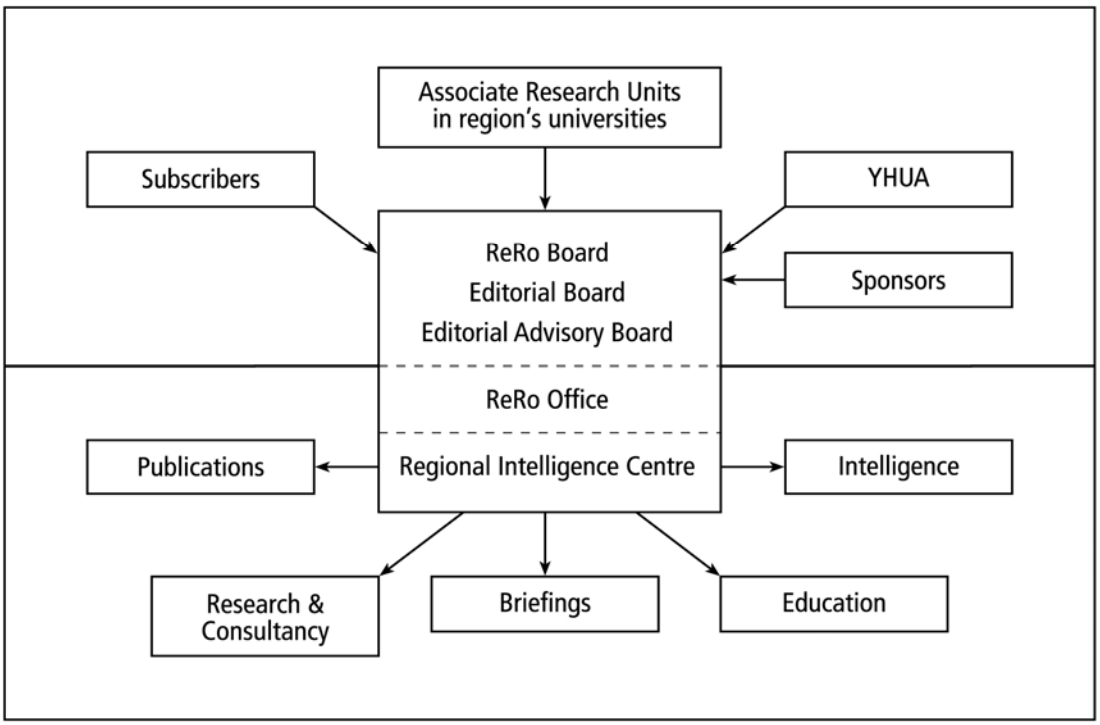

Figure 2: The structure of the Regional Research Observatory

The staff costs, running costs and development costs are financed entirely from subscriptions from the member ARUs, overhead earnings (20%) from research contracts and consultancy work, sales of ReRO publications and a limited amount of sponsorship from companies in Yorkshire and Humberside such as Coopers & Lybrand Deloitte, Barclays Bank, Halifax Building Society and Northern Foods.

Thus, ReRO has a portfolio of activities that can be grouped broadly under five headings:

- *research and consultancy*: through the assembly of multi-institutional and multi-disciplinary teams;
- *intelligence*: through the interpretation and analysis of data rather than mere cataloguing of current data sources;
- *education and training*: through a European initiative to provide a pan-European course in training of regional managers;
- *publication*: through a regular journal and bulletin; and very importantly,
- *networking*: both amongst its member ARUs but also with relevant bodies in the region and beyond.

Let us look at each of the Observatory's activities (bottom half of Figure 2) in more detail. ReRO provides *research and consultancy services* to public and private bodies. The majority of these services are provided through collaboration between one or more of the ARUs and examples of research contracts are listed in Table 1. Work has been commissioned by central government departments, national agencies, regional agencies, local government bodies and private sector companies.

Table 1: Examples of ReRO research contracts

Title of Research Project	**Funding Body**
Regional Textile Database Analysis: Annual Report	Barclays bank and six textile companies
Yorkshire and Humberside Universities: A Potential for the Region	Yorkshire and Humberside Universities Association
Profiles of English Regional Arts Boards	The Arts Council
The Impact of Inward Investment into Yorkshire and Humberside	Department of Trade and Industry and the European Commission
The Role of Leeds in the Regional Financial System	Leeds Development Agency and Leeds TEC Ltd
Research into the Application of Bio-technologies in North Yorkshire	Yorkshire and Humberside Development Association
Regional Technology Plan	The Regional Technology Network and Yorkshire and Humberside Partnership
Research into School Performance	Government Office for Yorkshire and the Humber
Developing a Strategic Framework for Yorkshire and Humberside: Review of Existing Policies and Strategies	The Regional Assembly for Yorkshire and Humberside

Urban and regional planning has substantial needs for information and *intelligence*. Good regional data capture, maintenance and analysis are imperative as a basis upon which to understand problems and to evaluate feasible solutions. Yet there are few guidelines as to which particular demographic, economic, environmental or social variables should be used to measure regional performance. This vacuum has been highlighted by the debates on measuring 'sustainability' that have pre-occupied various organizations in recent years in the UK and elsewhere. ReRO has always placed a high premium both on the collection of data and on 'adding value' to that data. On the one hand, this implies maximizing the availability of computer technology to manipulate, analyse and display data. On the other hand, it also means using expert local knowledge to provide reliable interpretation of the

cross-sectional and time series data sets that have been assembled. The geographical information systems facilities created by the Observatory to handle data are outlined more fully later in the paper.

Since ReRO was established primarily as a research network, *education and training* have not been one of its major activities. However, it has been involved with a pan-European initiative concerned with the training of regional managers, providing two-day seminars for postgraduate students at the University of Paris. It has operated as an agent in the region for placements of overseas postgraduate students (e.g. through the COMETT programme) and has also provided work placements for third year undergraduate students in the School of Geography at the University of Leeds choosing to do a 'Workplace Collaborative Project' option module. The Observatory has also been involved in a TEMPUS project with French and Spanish partners, providing advice to the Transdanubian Research Institute in Pecs on the establishment of regional planning structures and the training of regional managers in Hungary (Buday-Sántha and Hrubi, 1998).

ReRO has always believed that creating the right image has been an imperative. In particular this means conveying that the work undertaken is of high quality and is genuinely independent and unbiased. These features of ReRO activities have been fundamentally important and ReRO has always been conscious of the need to promote this image. Every effort to pursue both these goals is reflected in the two regular *publications* that the Observatory produces, *The Regional Review* and the *Regional Intelligence Bulletin*, both of which are used to disseminate information about research undertaken by ReRO itself as well as other organizations. These publications, described in more detail later, have been well received in the region by those who subscribe, but marketing campaigns to date have not been able to extend the list of subscribers significantly.

As part of presenting ReRO with an attractive image, considerable effort has been put into the development and maintenance of a Web site on the Internet. This has been

achieved by taking a tenancy on the Virtual Science Park (VSP) at the University of Leeds. Whereas physical science parks, located near to or on campus, are a feature of many universities, the VSP meets the strategic goals of a conventional science park, but with reduced costs and independent of the need for co-location. The VSP is a high quality Internet-based environment that employs the familiar physical metaphor of buildings, reception areas, personal offices, and project rooms and reading rooms. The VSP offers access to high quality research-relevant information linked to the appropriate individuals with the ability to translate that information into knowledge for exploitation. Person-to-person contact is facilitated by integrated collaborative working tools including video-conferencing, file transfer, text chat and shared white boards. Virtual working tenancies are provided for businesses, academia and government to work in partnership on collaborative projects, joint research or advanced training. The VSP provides ReRO with an alternative channel through which to offer its high quality specialist services. Registered users of the VSP can visit the ReRO site and other tenancies in order to obtain advice from experts, undertake distance learning or consult specialist information sources. Figure 3 illustrates the reception area Web page of the ReRO tenancy of the VSP from which registered users or guests can choose to access different levels of information. Access is available at http://www.vsp.co.uk/vsp/.

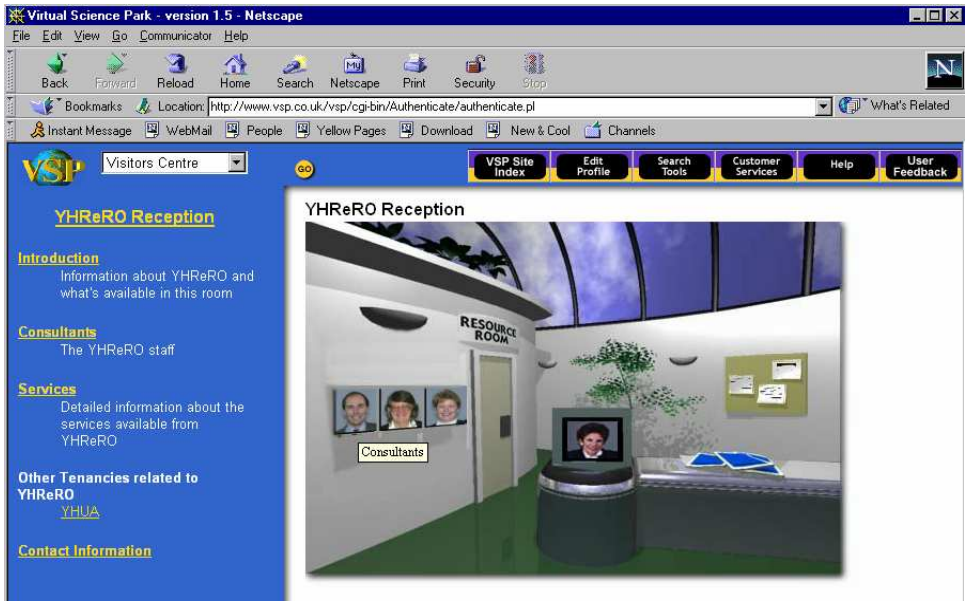

Figure 3: The reception area of the ReRO tenancy in the VSP

Networking within the region has always been regarded as being equally if not more important than maintaining a presence on the Internet. The fact that ReRO has successfully developed and sustained its own network has been seen as an example of good practice and attempts have been made to replicate its structure elsewhere in the UK. There have been direct benefits in working collaboratively with others in the region on specific ReRO research projects but there have also been indirect person-to-person benefits for the individuals concerned in taking forward other research interests and initiatives in collaboration with colleagues in other ARUs. Networking with agencies and individuals outside the university sector has been important. ReRO has worked on research projects with consultancy companies in the private sector (York Consulting, for example) and developed a collaborative relationship with Cambridge Econometrics over the supply of regional forecasts in the initial years. Furthermore, networking with other private and other public sector agencies and individuals has been a pre-requisite to obtaining contributions to *The Regional Review* from those at the coalface of problem analysis and policy formulation or evaluation.

Within the university sector, one of the most significant developments to impact on the Observatory was the creation the Yorkshire and Humberside Universities' Association (YHUA) in 1993. YHUA was established by the Vice-Chancellors of the region's universities to provide a forum to promote the contributions that the universities make, individually and collectively, to regional GDP and employment and to extend the universities' contribution to regional development. The Vice-Chancellors of the nine universities, together with the Regional Director of the Open University, meet regularly to take strategic decisions about actual and potential collaboration. At an operational level, four YHUA working groups were set up to develop projects in a number of areas, for example, collaboration in the provision of high level skills, support for a Regional Innovation Strategy, the development of innovative, shared learning environments (remote laboratories), and a common presence on the World Wide Web. ReRO provided administrative support for YHUA during its first five years and acted as its editorial facility and research coordinator. More recently, in partnership with YHUA, ReRO has prepared and published a document profiling each of the region's universities.

Networking is as important to YHUA as it is to ReRO. The YHUA has developed strong partnerships with other major regional participants - Higher Education institutions and Further Education colleges, Training and Enterprise Councils, Business Links and the Regional Innovation Strategy Sector Boards. In 1998, the YHUA universities set up a Joint Venture Company to assist them in working together on projects responding to regional needs, such as the Objective 2 Action Plan Higher Level Skills, and HEFCE Widening Access projects. Nine of the YHUA universities are members of YHMAN Ltd, a joint venture company that manages the Yorkshire and Humberside Metropolitan Area Network.

Outputs from the Regional Research Observatory

The activities of ReRO are manifest in a variety of forms. Whilst contract research, such as that indicated in Table 1, results in the preparation of project reports for clients, appreciable efforts are made, with the permission of the clients, to transform applied research of this type into appropriate publications in the public domain in order to disseminate findings as widely as possible. A Working Paper series allows material to be made available quickly and cheaply whilst important research reports are transformed into publications of higher quality on an *ad hoc* basis. For example, one state of the region report prepared for a regional agency was edited and published in book form (Stillwell and Leigh, 1995) with financial sponsorship from Yorkshire Electricity. ReRO research has been presented at academic conferences and published in academic journals (e.g. Gore and Stillwell, 1994; Stillwell and Langley, 1999). However, there are two factors that militate against the latter. The first is the time and effort involved in converting applied research into academic publications; the second is that sometimes there are confidentiality restrictions on the work that has been done for clients, preventing circulation of final reports, let alone publication in journals.

On completion, most research projects undertaken by ReRO are reported as short articles in *The Regional Review*, one of the Observatory's two regular publications that appear three times a year (in April, August and November). *The Regional Review* is designed to offer expert and objective commentary on important social, economic, political, and

environmental trends within the region, particularly when underpinned by new research. However, it also commissions articles on issues or developments of major importance, some of which may flag up new areas in which research is needed or may prioritise existing research requirements. The journal attempts to have regular analytical features which focus on issues of immediate concern - business development, labour markets, the environment, the activities of agencies in the region, together with sub-regional commentaries for each of the four constituent sub-regions of West Yorkshire, South Yorkshire, North Yorkshire and Humberside. *The Regional Review* contains 20 pages of articles and commentaries, each of which rarely exceeds two pages in length and many of which contain tables of statistics or illustrative material. On several occasions, a particular topic has been identified (e.g. 'strategy', 'Yorkshire culture', 'environment and business', 'regional governance', 'CoMPRIS/ADAPT', 'gender inequalities', 'spatial planning') and used as the focus for a theme issue for the majority of articles. On other occasions, organizations such as the Halifax Building Society, YHUA, and mtl (Milburn Trinnaman La Court) have been closely involved in planning and commissioning the content or in sponsoring production of the issue. A local newspaper, the Yorkshire Post has provided support by allowing access to its library of photographs and other companies (Barclays Bank, Northern Foods) have supported the publication through sponsorship.

The image and content of *The Regional Review* has evolved over time, as reflected by the way in which the design of the front cover has changed over the last ten years (Figure 5). The Editorial Board have endeavoured to extend the range of topics and individuals making contributions, whilst at the same time preserving a balance between articles reporting applied research of regional relevance undertaken in the university or private sectors and articles about key issues within the region. Early editions of *The Regional Review* contained sections reporting statistical trends. An important change came in November 1993 with the creation of a separate document, the *Regional Intelligence Bulletin*, to provide this information alongside *The Regional Review*.

Figure 4: The evolution of *The Regional Review*

The *Regional Intelligence Bulletin (RIB)* is designed to set out, in readily accessible form, a statistical summary of the key data sets relating to economic and social trends in the region. Each issue addresses a key theme relevant to the region, and identifies major patterns within the region; it also compares the performance of Yorkshire and Humberside with the other UK regions, with what is happening nationally, and with trends occurring at the European scale. The *RIB* provides four pages of essential statistical information for all strategic decision-makers in the region. The first three pages are usually themed and recent topics include ‘house building’, ‘small and medium-sized enterprises’, ‘house sales’, ‘the economic impact of the region’s universities’, ‘The Learning Society’, ‘gender indicators’, the Regional Development Agency’ and ‘regional economic forecasts’. Themes for data presentation and interpretation in the first three pages of the *RIB* are planned to complement articles in *The Regional Review*, whilst the back page provides a set of regular indicators including house prices, unemployment change and migration statistics (Figure 6).

The Regional Review has an Editorial Advisory Board which draws upon a wide range of individuals in Yorkshire and Humberside who meet once a year in November to review the issues of the journal produced over the previous 12 months and to assist in

determining the shape and content of the journal over the forthcoming 12 months. The Editorial Advisory Board meeting is therefore immensely useful for 'brainstorming' ideas and themes, for highlighting issues and events that should be covered by in future, and for identifying key individuals or organizations who might be invited to contribute articles. The decisions of the Editorial Advisory Board are implemented thereafter by an Editorial Board that meets regularly to decide specific content and contributors for each future issue of *The Regional Review* and the *RIB*, to review and referee articles that have been written for each current issue before they are included, and to check the page proofs of the publications before they finally go to the printers. The *RIB* has a separate editor and two sub-editors who provide advice as well as data and commentary. Both the regular publications are produced in-house by the Graphics Unit in the School of Geography using a desktop publishing package before being sent to the Printing Service at the University of Leeds.

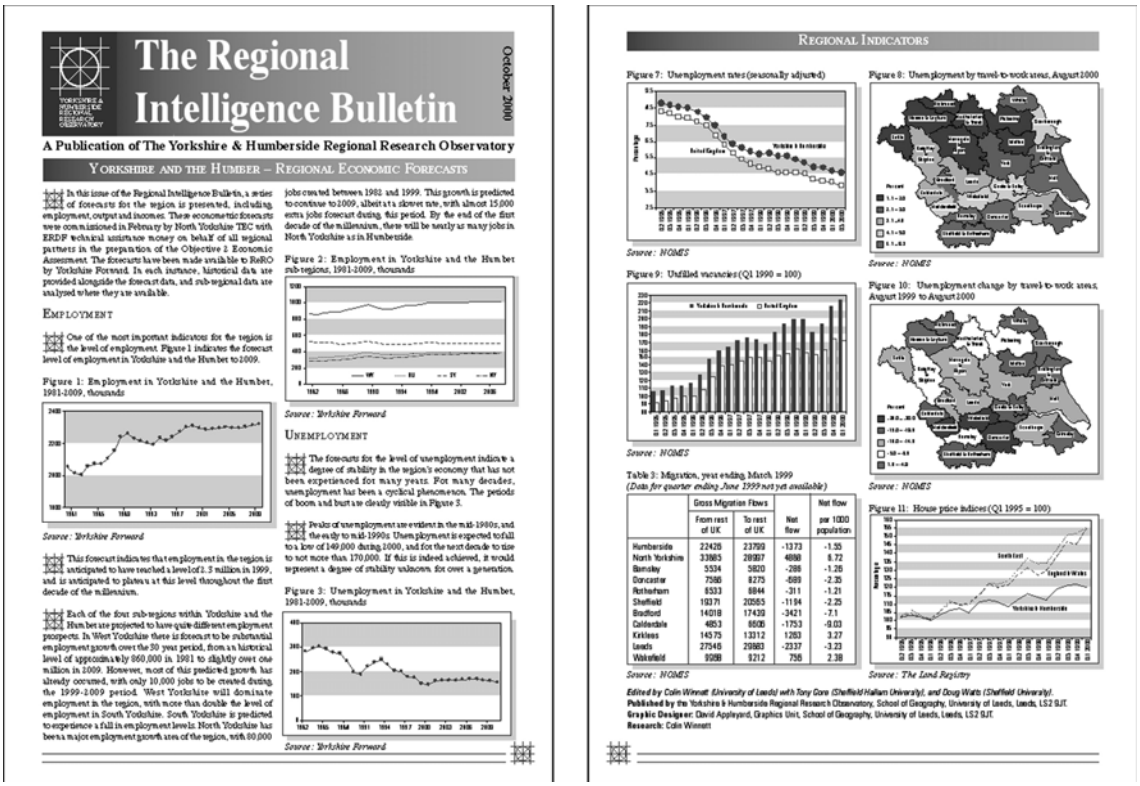

Figure 6: *Regional Intelligence Bulletin*, front and back pages

The Development of a Regional Intelligence Centre

There is a strong argument that authoritative regional and local planning should be underpinned by analyses that focus on the processes responsible for economic, social and environmental sustainability. Frequently, the problems to be confronted have a geographical or spatial dimension. It becomes necessary that the most accurate information is collected and used to support planning, administration and policy-making at all spatial scales. It has become increasingly important in recent years for strategic managers and local and regional planners to have a detailed understanding of the sources and types of data that are available and to have effective and reliable systems (geographical information systems) for handling the data. Yet the proliferation of official and unofficial data sources available for analysis at the local and regional level is bewildering and most data sets are limited by inadequacies in their spatial coverage, level of disaggregation, frequency, completeness and consistency over time. The lack of a comprehensive data source on industrial and commercial establishments in Yorkshire and Humberside is one obvious example of an important data inadequacy, and the changing boundaries of the administrative units is a typical example of the problems confronting time series analysis.

In short, there appears to have been a distinct mismatch between the increasing demand for accurate, reliable information for use in planning at the regional scale and the collection and assembly of data from official and unofficial sources. Despite the growth in data availability, many data sets remain deficient in a variety of ways. A new data provision industry has been created in parallel with an increased demand for research and consultancy services for urban and regional analysis. In this context, and in order to facilitate its research and consultancy activities, ReRO decided to create a *Regional Intelligence Centre (RIC)* with which to capture, store, manage and display geographical information about the region, making use of the state-of-the-art desktop GIS technology. The RIC is a customised GIS in which to store key data sets and from which a range of indicators and intelligence can be provided for specific research projects or for inclusion in the *Regional Intelligence Bulletin*.

The RIC was developed as a collaborative project between ReRO and the School of Geography at the University of Leeds. It encompasses a range of systems and databases and a particular feature of its development has been the symbiosis between the collection, management and use of geospatial data and attribute data. The obvious focus of much of the data collected has been on Yorkshire and Humberside, although other data sets have been assembled to allow comparison between regions and with the national level. The *RIC* thus brings together a range of key attribute data with digital boundary data sets at a variety of spatial scales. This resource facilitates calculation of standard and customised indicators, enables particular sub-sets of data to be extracted by users, and provides mechanisms for presentation of geographical data.

The *RIC* was designed to meet the requirements of a diverse customer base - undergraduate and postgraduate students, academics and researchers within the university sector as well as clients from the public and business sectors with a diverse set of interests. One consequence of the diversity of users' requirements was the simultaneous need for both a breadth of resources and a depth of information to be held in the *RIC*. The strategy adopted was to maintain collections of attribute data that reflected the interests of groups of users covering social data, demographic information, performance indicators, labour market data, health data and property price indicators (Table 2).

Table 2: Key attribute data holdings of the Regional Intelligence Centre

Performance indicators
- Local authority performance indicators relating to the provision of services
- NHS Performance indicators relating to health
- TEC Performance Indicators on attaining national targets for education and training
Social indicators
- 1991 Census of Population
Demographic data
- 1991 Census of Population, population estimates, migration data
Labour market information
- Employment, unemployment series, vacancy series
Business data
- Establishment data, VAT registration and de-registration data
Health data
- Health of the Nation target indicators, Population Health Outcome indicators
Property prices
- Halifax house price indices, HM Land Registry residential property price report

Some of the data sets in the *RIC* are updated regularly as part of ReRO's function of monitoring regional performance; others are deposited following their purchase or acquisition through research projects; most are accessible for student research although care has to be taken that appropriate permissions have been given and copyright is not being infringed.

The digital map collection was assembled as a part of the GEOgraphical Information and Data (GEOID) project aimed to collate and manage both existing digital geographical information and data sets held within the School of Geography and a selection of new key data sets not normally available through established academic data providers. The GEOID system has four components: a Geospatial Data Management Server; a Data Browser and Selection System; a Metadata DataBase Management System; and a Regional Intelligence Centre Data Management System. The relationships between these four components are shown in Figure 7.

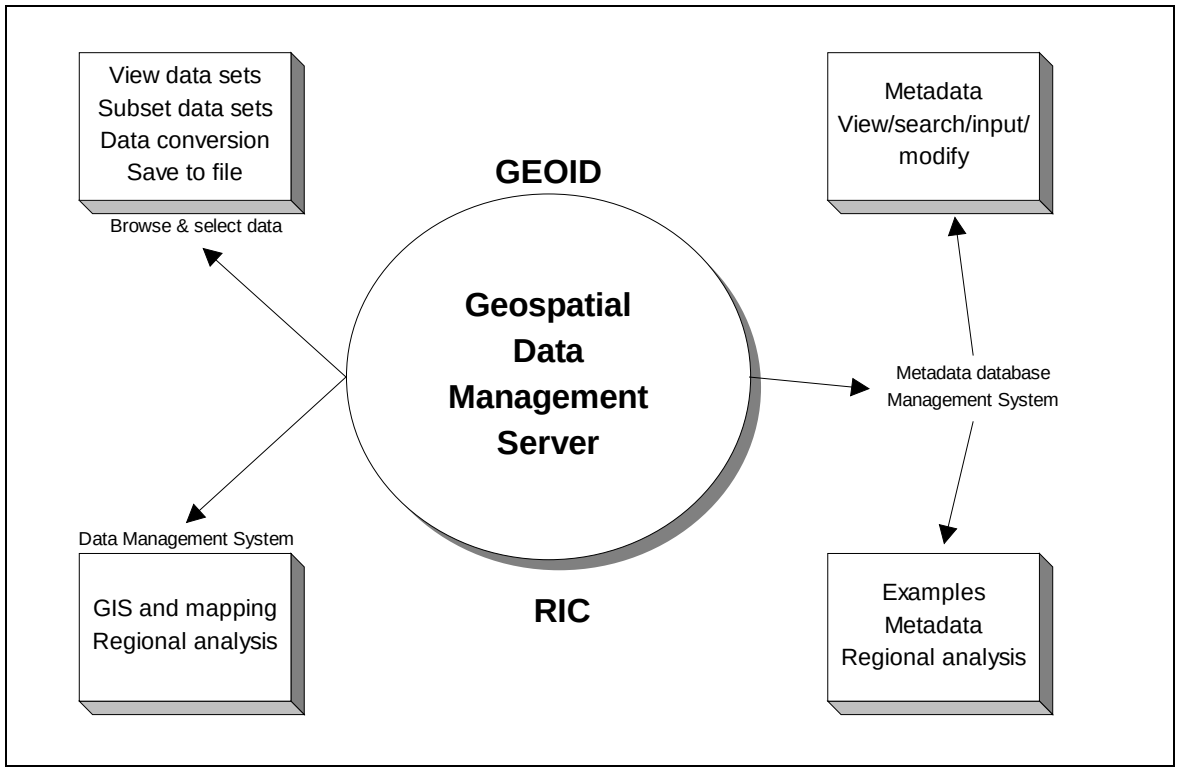

Figure 7: Conceptualisation of the GEOID server system

The *Geospatial Data Management Server* comprises a spatial information system capable of storing, managing, manipulating and presenting data in a variety of different geospatial formats. The system runs the ESRI ARC/INFO GIS and ERDAS IMAGINE image processing packages on a UNIX server. The *Data Browser and Selection System* is implemented via a customised user interface operated within ESRI ArcView software. The system operates on a PC acting as a network client of the UNIX Geospatial Data Management Server. The *Metadata Data Base Management System* operates through a Web environment. For the purposes of the GEOID metadata database, digital geospatial metadata was defined as *"all pertinent information that describes spatially referenced data sets that are stored either on a digital computer system or some other digital storage media which may be either on-line or off-line"* (Almond, 1996). The metadata fields are defined on the basis of the US Federal Geographic Data Committee (FGDC) contents standards for digital geospatial metadata. The RIC Data Management System provides access to both the digital data sets that are provided through GEOID (Table 3) as well as ReRO's attribute data sets (Table 2) which are updated over the course of time.

Table 3: Geospatial data sets provided through GEOID

Digital maps
- Bartholomew Digital Map data Bases, 1995
- OS Sample Digital Data Sets, 1995
- Digital Chart of the World (DCW), ESRI, ARC/INFO Version, 1993
Digital boundaries
- ED-Line Census Digital Boundary Data 1991(DBD91)
- GEOPLAN Digital Postcode Boundaries and Cancroids, June 1996
Digital remote sensing images
- NRSC Satellite Image Data: UK LANDSAT Thematic Mapper™, 1988-92
- SPOT/NRSC Satellite Image Data: UK SPOT Panchromatic (PA), 1987-96
- Institute of Terrestrial Ecology Land Cover Map Great Britain, 1994

The RIC provides a facility for monitoring and mapping trends in the region. Monitoring is often frustrated by the infrequency or unreliability of available data, changes in

boundaries of spatial units or changes in the definition of variables. The Census of Population is one of the most important sources for reliable and comprehensive demographic and social data at a small area scale (enumeration districts or wards) used by local authorities. It provides a very important baseline for understanding geographical variations but its infrequency is problematic. The recent reform of local government boundaries through the creation of new unitary authorities has presented significant difficulties in terms of the computation and monitoring of consistent time series.

A selection of time series data held within the RIC is published regularly in the *Regional Intelligence Bulletin* (RIB). The indicators, published quarterly, are:

- five year time series of regional and UK unemployment rates;
- unemployment rates in the region's travel to work areas for the most recent month;
- percentage point change in unemployment rates over the previous year in the region's travel to work areas;
- five year time series of the level of unfilled vacancies in the region and the UK, with Q1 1990 levels set to a base of 100;
- migration flows between the local authority districts in the region and the rest of the UK over the previous year; and
- time series of house price indices for Yorkshire and Humberside compared with the UK and the South East.

The display of information in graph or map form enables trends or spatial patterns to be visualised effectively. One of the advantages of maintaining a database within a GIS is the facility to alter the scale of the map and to present data at different spatial scales. Graphing trends over time and mapping spatial variations in key indicators are part of the standard toolkit for monitoring regional change and providing valuable insights into the spatial dynamics of development, but it often becomes necessary to extend research through analysis and forecasting, both of which may involve more sophisticated statistical or modelling approaches.

Once information and data have been collected and assembled in a database and have been displayed in map form where appropriate, a further stage is to consider whether analysis can be undertaken with the data or whether it can be used to support procedures for projection and forecasting, many of which are based on historical time series. In some cases, the data may be incomplete or inaccurate and estimation or adjustment methods are required to generate more accurate information. One example of this is the data on inter-zonal migration available from the 1991 Census where cells of the interaction matrix with counts below a particular threshold are suppressed, and it becomes necessary to estimate the complete interaction matrix (Rees and Duke-Williams, 1997)

A range of conventional analysis methods is available within proprietary GIS, including topological overlay, buffering and network analysis (Scholten and Stillwell, 1990). However, there is a wide array of statistical and modelling methods that exist for performing spatial or time series analysis that, in many cases, are not available within existing GIS. Consequently it is necessary to be able to import data into different proprietary packages (e.g. SPSS or GLIM) or into software systems designed for specific types of analysis (e.g. spatial interaction modelling). For regional planning, it is useful to have a variety of data analysis and modelling tools available. At one relatively simple level, it is advantageous to be able to produce statistical indices such as location quotients or indices of specialisation with which to compare the employment structure of different places; alternatively, shift-share analysis provides an understanding of employment dynamics. More sophisticated multivariate methods can be used to identify spatial relationships and mathematical modelling methods can provide solutions to location-allocation and optimisation problems (Clarke, 1990). Intelligent GIS (Birkin *et al.*, 1996) incorporate model-based methods which enable ‘what if’ and ‘what should be’ scenarios to be evaluated. In most cases, the capability of prediction is reliant on the historical calibration of an appropriate model. In an ideal world, decision support systems might be designed to facilitate the use of these techniques by regional decision-makers. Currently, their use is more widespread by strategic planners in the private sector seeking to maximise profits through optimum location of retail outlets sites for service provision

although there are examples of model-based GIS use in public sector planning (Longley and Clarke, 1996; Stillwell *et al.*, 1999).

Although some modelling was undertaken by the joint planning teams created in some regions at the end of the 1970s (Northern Region Strategy Team, 1977), analysis and forecasting to support regional planning in the UK has been piecemeal and ineffective, for the most part. This is particularly so in Yorkshire and Humberside where there have been various rounds of 'state of the region' reporting but relatively little analysis and even less serious attempt at projection and forecasting. One exception is the work undertaken by ReRO as part of the process of preparing Regional Planning Guidance (Government Office for Yorkshire and the Humberside, 1996) in the early 1990s which involved an exercise conducted for the local authorities and the Department of the Environment on updating the 'official' projections of population and households in the region (Yorkshire and Humberside Regional Research Observatory, 1993; Stillwell and Gore, 1997).

Key Developments and Lessons Learnt

ReRO grew steadily during the first half of the 1990s. It never wanted to become, nor tried to be, a commercially oriented company. It retained its prime function as a network of research units in academic institutions. In 1995, some restructuring became necessary in order to provide a more streamlined and effective management system to sustain the level of activity that was being generated. The process of bidding for projects had created some difficulties due mainly to the very short time scale set by many contractors. When ReRO received an invitation to tender for a project, a conscious attempt was made to involve several institutions in the bidding process and each ARU was invited to participate. However, the time available to decide who would be involved in undertaking the research and in drafting the bid was frequently too short, not least because of basic difficulties of getting key personnel to attend meetings and to prepare documents.

A flexible network can be a very unwieldy structure to manage, no matter how co-operative the individuals are in the affiliated units, and the increasing administrative

burden associated with growth was one of several reasons for the loss of ReRO's momentum in the latter half of the decade. It so happened that the Director of the Observatory became heavily involved in the development of a VSP for the University of Leeds at this time and the Editor of *The Regional Review* became the Chairman of the School of Geography. At a time when more human resources were required to capitalize on ReRO's niche in the marketplace, fewer human resources were available to arrange collaborative bids, administer the ongoing research projects and market ReRO services.

A second factor of major importance was the changing institutional environment both in terms of the collaborating partners undertaking the research and the regional agencies who commissioned projects. One of the most fundamental issues that the Observatory had to confront from the outset has been that of competition between the individual research units within the network for the same relatively limited set of research projects. On most occasions, ReRO would only bid for projects that were distinctively 'regional' and required inputs from each of the sub-regions, rather than more projects that were more localized in their geographies. There have been instances when ReRO has undertaken projects for local clients such as Leeds Development Agency (ReRO, 1994) or Leeds City Council (ReRO, 1997a), but the major benefits associated with ReRO's team approach were realized with region-wide research studies. However, over the decade, several of the ARUs grew substantially in size and found themselves in the position of being able to make independent bids for work that might have been considered, at one time, as the territory of the Observatory.

As well as the changes taking place on the supply side, very significant changes occurred in the institutional environment on the demand side, particularly since the change of Government to a Labour administration. Some important changes took place before this with the integration of the Regional Offices of the Departments of Trade and Industry, Environment, Employment and Transport into a single integrated Government Office for Yorkshire and the Humber (GOYH), with a single Regional Director and with responsibility for the allocation of substantial funds under the Single Regeneration Budget (SRB). Reform of local government also occurred in 1996 with the replacement

of Humberside by a number of new unitary authorities, the creation of York as a new unitary authority and the consequent redefinition of the boundaries of its surrounding rural districts in North Yorkshire. In 1996, a new Regional Assembly for Yorkshire and Humberside (RAYH) of elected members from all the local authorities across the region was created to lobby for its members on major regional issues and to prepare Regional Planning Guidance, the regional strategy for physical planning. Most recently, further change has come with the creation of a Regional Development Agency, Yorkshire Forward, to encourage industrial and commercial competitiveness and to prepare an economic development plan for the region, in line with central government emphasis on regionalism and the enhancement of regional autonomy and planning. In these dynamic circumstances, one might have expected that ReRO's role in providing an information and research service to have flourished. ReRO did indeed undertake research on school performance for the new Government Office (ReRO, 1998) and a review of existing strategies and plans for the new Regional Assembly (ReRO, 1997b). However, despite producing two 'state of the region' reports in the early 1990s (Leigh, *et al*. 1990, Stillwell and Leigh, 1995), ReRO was not commissioned by Yorkshire Forward to undertake its initial review of the region's problems. This contract went to another group of researchers at Leeds Metropolitan University (1998). Thereafter, the preparation of Yorkshire Forward's economic strategy itself was undertaken by a large national consultancy company, regardless of the wealth of experience and local knowledge existing within the region.

In summary, confronted with the Labour Government's 'new regionalism' involving new institutions and a renewed emphasis on physical and economic planning at the regional scale in Yorkshire and Humberside, the role of ReRO in attempting to draw attention to the 'strategic imperative' (Green and Leigh, 1990) has become less critical. The 'regional vacuum' has begun to be filled. Thus, the major institutional changes that have occurred in the region, together with the emergence of YHUA in fostering inter-university collaboration, have played their part in ReRO's transition.

So what lessons have been learnt over the last ten years? A number of issues can be identified that have arisen from ReRO's experience in each of its five functional areas. In terms of the provision of *research and consultancy services*, the ReRO experience has been one where the undoubted benefits of working as a team with a wide range of skills and regional expertise have been tempered by the larger administrative burden associated with partnership. The submission of project bids and reports to strict deadlines requires both intensive effort and effective management from project coordinators. These demands raise important questions about the role of academics as managers when, traditionally, they have many other teaching and research commitments. There is a strong case for ensuring that the core staff of an observatory are full-time employees and that the Director at least has been exposed to some of the management methods and training that are observed in consultancy companies in the private sector.

Another important issue is liability, be it individual or institutional. It is inevitable that, when a number of groups (ARUs) are involved in a large research project undertaken under a tight timetable, there is always the risk that something might go wrong with potentially damaging repercussions. Who assumes responsibility in these circumstances? The implication of this is that there has to be a clear agreement between the outset on who is responsible for what, and this has to be in the form of a 'Heads of Agreement' or maybe even a formal legal contract, both of which involve yet further administration. Not only must there be a clear allocation of responsibilities that is transparent from the outset, but it is also necessary to agree how the funding is to be divided between the partners and what the observatory is actually providing for the percentage overhead that it levies on any project. These are all sensitive issues that require careful handling by the Director, who must also show political awareness when deciding which of the ARUs should be involved in smaller research projects requiring only a small number of participants from two or three ARUs.

It is crucial that those individuals in the region who are responsible for strategic decision-making in any particular sector have access to the most recent and most accurate *intelligence* about economic, social and environmental change. An observatory should

ensure that it is in a position to collect and provide this information. This implies initial investment in the hardware and software components of a GIS and purchase of relevant digital or attribute data sets. It requires the availability of skilled staff to construct and develop the GIS. The costs involved in establishing a Regional Intelligence Centre can therefore be substantial, depending on the level of sophistication required. Furthermore, once the system has been built, activities such as maintenance and data update may also be quite costly, if only in manpower terms. Therefore, it becomes very important that the system is built in accordance with the demands of the observatory and its clients. Although care must be taken to avoid being led by the technology rather than the immediate requirements, the opportunity should not be lost to exploit the Internet and Web-based technologies that have now become part of our everyday lives. At the very least, this means using the Web as a channel for disseminating information about the observatory, and about the region, to existing and potential clients.

In the UK, one of the most important requirements for planners in the public sector and in the business world, is for information about the future. What are the implications of current demographic or social trends for the demand for goods and services? What are likely to be the changes taking place in the geographical patterns of demand? Where are the areas of decline or stability in the next 10 years, or more importantly, where are the future growth areas? The answers to these questions can be guessed on the basis of intuition, but it would be very advantageous to have data on forecasts or projections available from the Regional Intelligence Centre. In the UK, official national population projections are generated every few years and sub-national projections for local authority areas have been made based in recent years on mid-year populations in 1996 (ONS, 1999) and 1998 (ONS, 2000). However, one of the problems associated with these projections is that they are not produced for small areas such as wards, or for postal sectors that are often the geographical areas most used by businesses. Furthermore, at the small area scale, there are no official projections either of households, housing or residential land (Stillwell and Debenham, forthcoming). Some local authorities attempt to prepare local projections for their wards; some geodemographic consultancy companies attempt to estimate projections for postal sectors that can be purchased by the business

world but, in general terms, there is a significant lack of information in this context. Consequently, one of the most valuable tools that might be developed by on observatory and linked to its conventional GIS capabilities, is a model-based planning support system that provides projections of a range of variables for small areas (Rees, 1994). However, the funding implications of these types of decision support systems may be very considerable and the skills required to develop the modelling software are in short supply.

Two points can be drawn from ReROs relatively limited experience as far as *education and training* is concerned. The first point is that an observatory like ReRO is very well placed, given its network across universities and its links with regional agencies, to be able to assemble teams of experts to give courses, particularly at a higher level, to existing and potential regional managers. These courses may range across a wide spectrum of subject matter from strategy formulation and vision building at one end, to the use of GIS and spatial model-based decision support tools at the other. Secondly, an observatory might also consider the role of coordinating postgraduate level programmes that enable full-time or part-time students to study and work at more than one institution in a region, either simultaneously or consecutively, thus learning from leading experts in different fields who work in different institutions.

Publications have always been considered a priority by ReRO since they represent one of the major outputs and should stand up both to academic and non-academic scrutiny. *The Regional Review* has been regarded as a 'shop window' for ReRO and the Editorial Board has attempted to produce a journal that reports interesting applied research but also provides useful commentary or insights into major regional issues. *The Regional Review* has tried to bridge the gap between the academic and the real world. This is not always been easy because academics have traditionally found it difficult to convey their research results in the form of an executive summary or a press statement of limited length, whereas few businessmen appear to have insufficient time to pen well considered articles, let alone check up on the accuracy of data or the source of references. This demands a considerable amount of editing in order to produce a well-balanced volume that contains accurate information as well as readable text.

The function of producing a regular publication is assisted immensely when there is effective *networking*. On the one hand it is important to know the types of applied and regionally relevant research that is ongoing in the universities, whilst on the other hand, it is important to have contacts with the movers and shakers in the region at large, or at least with those who have a clear understanding of what is going on in the field of regional development. One familiar problem is that organizations and people in positions of responsibility change. The institutional environment is very dynamic and consequently it is necessary to ensure that new contacts are made and new networks are put in place. The experience of ReRO suggests that it is important to establish contact and gain the support of senior decision-makers since these are the very people for whom the observatory's publications and its research and intelligence services are intended. Finally, some emphasis should be put on the development and maintenance of a good Web site since the Internet is clearly an increasingly important channel for disseminating information and there are new opportunities for collaborative working.

The Way Ahead

ReRO has been a unique experiment in providing a 'one stop shop' to handle research and intelligence queries in the region of Yorkshire and Humberside. It undertook some important collaborative research projects during the 1990s and performed a valuable role in its varied activities. The characteristics of ReRO have been outlined in this paper and some of the issues that it has confronted have been identified. There are two hallmark features of ReRO that deserve re-emphasis: firstly, its independent perspective and unbiased approach; and secondly, the pursuit of high quality in everything it does.

The loss of research momentum in the last three years, as explained above, suggests that the role of ReRO needs to be reconsidered, with emphasis moving away from applied research projects, and towards activities that enhance the role that universities and their research communities play in the region and in the nation. This implies a much closer working relationship with the Yorkshire and Humberside Universities' Association (YHUA), and the reconstitution of the Board of Directors, the Editorial Board and the

Editorial Advisory Board to reflect this. It also involves the re-launching of *The Regional Review* to contain a much broader range of applied research activity and 'regional issues' than has been the case over the last decade.

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