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The Value of Geospatial Information to Local Public Service Delivery in England and Wales

Final Report

Executive Summary

Prepared for the Local Government Association (LGA) and Improvement and Development Agency (IDeA)

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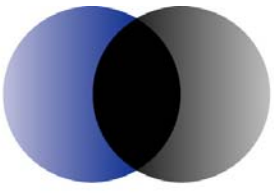

ACIL Tasman

Economics Policy Strategy

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For information on this report

Please contact:

Andrew Coote
Telephone +44 (0)1923 291000
Mobile +44 (0) 7860 884119
Email andrew.coote@consultingwhere.com

Alan Smart
Telephone +61 2 6103 8201
Mobile +61 404 822 312
Email a.smart@aciltasman.com.au

Gesche Schmid
Telephone +44 (0)2076643131
Email Gesche.schmid@local.gov.uk

Executive summary

Overview

This report examines the economic impact of the use of geospatial information in local public service delivery in England and Wales. Based on case studies in key application areas and applying a conservative valuation methodology, this study estimates that **GDP was approximately £320m higher** in 2008-9 in England and Wales than would have been the case without adoption of geospatial information by local public services providers[1].

Under a business as usual scenario, this would be expected to rise to **an estimated £560m in 2014-5**, but with more rapid introduction of government policies to free up data access and copyright and with improved awareness of the value of geospatial information at senior management level, **this could be improved to an estimated £600m by 2014-5**, with significant gains across various areas, but particularly in Primary Care Trusts (PCTs)[2].

There are additional benefits to citizens from more effective interaction with local public service providers, including reduced travel costs. Furthermore, **construction, transport and business services sectors are positively impacted**, and greenhouse gas emission intensity are lower than they would otherwise be to achieve the improved level of output.

Purpose

Geospatial Information (GI) already underpins many services and policy decisions in local public service delivery. The overall aim of this study is to provide a better understanding of the value GI offers in economic terms, to local public service delivery within England and Wales and recommend ways in which this might be further enhanced.

The findings will inform local public service providers where changes to current geospatial policy and practice can enable better and more effective use of GI in local public service design and delivery, and support cost savings in a period of public expenditure constraint.

Approach

The study approach has been designed to address the lack of existing "hard" evidence of economic benefits associated with the use of GI. The initial study stage included primary and secondary research; interviews; a workshop with key opinion formers and discussions with many other interested parties. The assembled evidence was then packaged for analysis

[1] For the purposes of the study the scope of local public service delivery covers local authorities, emergency services and Primary Care Trusts (PCTs).

[2] PCTs in this context are taken to include the delivery as well as commissioning of primary care services within the National Health Service.

using ACIL Tasman's computable general equilibrium (CGE) model[3], a well established and proven economic model used previously to evaluate the economic impact of geospatial information at a national level in Australia and New Zealand. CGE modelling takes account of feedback loops and as a result tends to produce much more conservative impact estimates than other economic valuation methodologies. Furthermore, as it takes into account productivity impacts only, it provides a lower bound estimate for the ultimate economic impact of geospatial information.

Policy Drivers

With the formation of a new government, there are likely to be substantive policy changes over the next few years. A key focus in these changes will be the transformation of services with cost savings, whilst achieving improved quality of service, as the primary objective.

In the context of the study, GI "intercepts" with a number of broad policy directions:

- Operational efficiency: the need to reduce costs while delivering high quality services;
- Shared Services: working across organisational boundaries and to operate through partnership;
- The Big Society: local government as an enabler of a more self-service approach that facilitates citizens to act for themselves; and
- Information economy: the move to 'data democracy' and greater transparency.

Sector-specific statutory regulation also relies heavily on GI. Key examples, referenced in the study, include planning; traffic management; flood risk and environmental protection.

Furthermore, there are strong indications that the importance of GI is being increasingly recognised in public policy and legislation:

- European Union level: the INSPIRE Directive (European Commission, 2007) provides a technical framework to facilitate the access and sharing of data to assist policy-making;
- National level: the UK Location Strategy (Department of Communities and Local Government, 2008) was published with the aim to maximise the value of location based data to the public, government and business sectors; and
- The response to a consultation on the policy options for GI from the Ordnance Survey, government announced free of charge access to a variety of Ordnance Survey datasets; the proposal for a public sector-wide mapping agreement and the technical delivery of INSPIRE network services through the Ordnance Survey.

[3] General equilibrium models provide a representation of the whole economy, set in a national and international trading context, using a 'bottom-up approach' – starting with individual markets, producers and consumers and building up the system via demands and production from each component. When an economic shock or disturbance such as an increase in a sector's rate of growth is applied to the model, each of the markets adjusts to a new equilibrium according to the set of behavioural parameters which are underpinned by economic theory.

Geo-economics

The methodology adopted for the study is underpinned by solid economic theory and practice. We use the term geo-economics to describe our approach as it goes beyond conventional cost-benefit by modelling the national economy's ability to deliver more with the same resources by using geospatial information.

GI is a subset of the wider information technology industry. The role and value of information in determining broad macroeconomic outcomes has been increasingly recognised as advanced industrialised economies are shifting to what has become known as 'knowledge economies'. As such we are following a well-trodden path and the overall approach adopted, known as productivity accounting, is an established methodology for such work.

Market Failure and Government intervention

The report considers the consequences of 'market failure' in the market for information and the case for government intervention. The most important observations are that:

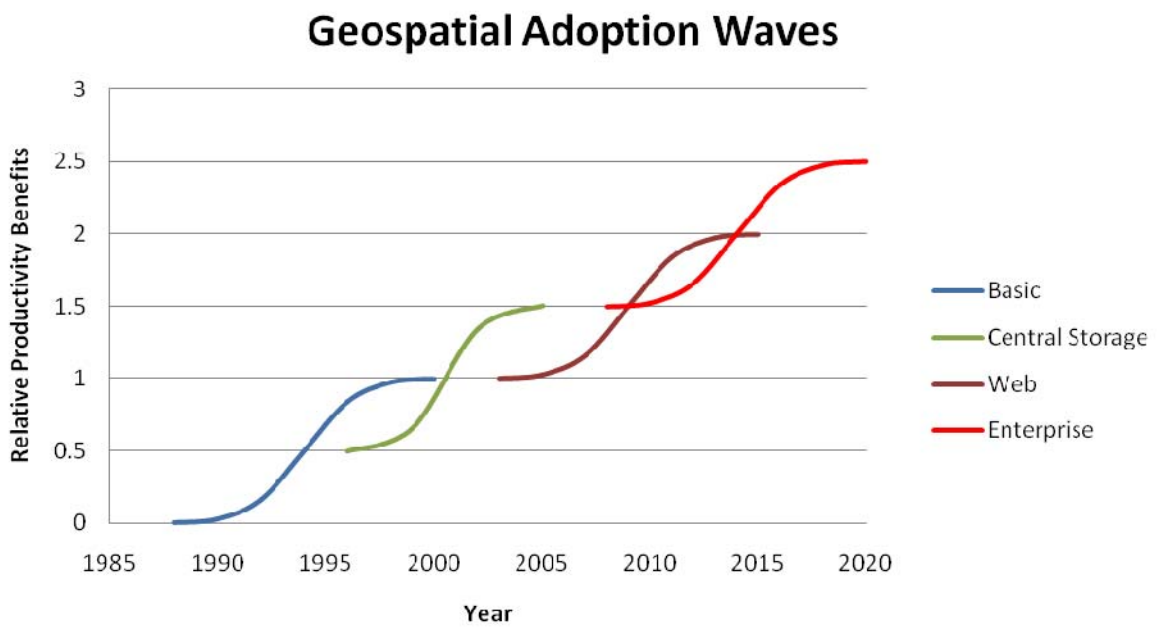
- GI is not a public good until it is placed in the public domain;
- Market failure does not automatically imply that government *should* intervene; costs and benefits from intervening must still be assessed. A public interest problem might have a private rather than public sector solution given the vibrancy of the GI industry, so Government has to carefully balance private sector interests with the wider public interest when deciding whether to intervene;
- Similarly, a natural monopoly situation does not mean that government *must* intervene; there are many private companies that have the ability to provide some of the key geospatial information services that would traditionally have been seen as the remit of government; and
- Finally, dynamics can be important and if government enters or supports a sector that is moving rapidly it should also consider its 'exit' strategy – along with the preceding comment this means that the appropriate role of government is fluid and shifts over time.

Adoption and Diffusion

We believe that GI adoption fits the Rogers model for technology adoption and diffusion, based on a "bell curve" succession of innovators (2.5 per cent), early adopters (13.5 per cent), early majority (34 per cent), late majority (34 per cent) and laggards (16 per cent). We identify four waves of innovation commencing around 1990. These are demonstrated in the diagram below.

- The first wave began with the introduction of basic GIS on desktops moving beyond the innovator stage from 1990 onward;

- A second overlapping wave saw central storage and gradual linking of databases providing selected local government staff with wider access to internal data;
- A third wave arrived starting in 2000 with the introduction of web mapping. Most staff gained access to electronically stored maps accessible over an intranet and/or the internet. This wave is still working its way through local government organisations in England and Wales; and
- A fourth wave, involving the integration of these technologies into mainstream enterprise systems and the interoperability of data across organisations are just getting underway. The value of geospatial information will only be fully realised once this wave has been completed.



Case Studies

To provide the inputs to the economic modelling, we examined seven broad service areas in detail:

- Customer Interface – work done by local public service providers to improve the experience of interaction with them by citizens and businesses.
- Transport and Highways – covering route planning, streetworks and highways inventory management functions within single and two tier authorities.
- Planning and Consultations – planning is often the area where GI technology was first used in local authorities, the case studies particularly focus on the consultation process.
- Revenue and Benefits – raising revenue through Council Tax for domestic and non-domestic rates, fee-charging property search services and the payment of benefits to citizens.

- Health and Social Care – as a prime example of a service area with a very high public profile where the potential for efficiencies resulting from shared services between local public service providers, including PCTs is a priority.
- Safer Communities – focusing on the use of geospatial information in local authorities and police, particularly referencing Crime Reduction Partnerships.
- National Land and Property Gazetteer (NLPG) – is a land and property information service and fits the criteria by its virtue of its applicability across a wide range of services. The benefits of the NLPG are manifest in many of the services above so we focus here on data sharing.

In order not to under represent the scope of current and potential benefits, other applications identified during the research are also presented although these are not included in the economic evaluation.

Barriers and opportunities

The results of a survey of the local public services community identified the top three barriers to further implementation of GI as (i) lack of awareness of benefits and resistance to change amongst users; (ii) implementation costs (hardware and software); and (iii) inappropriate data pricing and/or restrictions on access.

We also offer a range of possible explanations for the "sub-optimal" rate of progress in implementation based on the experience of the study team in other sectors and geographies:

- Capacity building issues – lack of necessary human resources with the right skills and knowledge;
- Policy conflicts;
- Lack of incentives for managers to make changes;
- Concerns about mistakes or inaccuracies in the data or maps due to resultant impact on reputation or fears of potential litigation if data are released;
- Data "hoarding" – where officials seek to maximise remit or influence by retaining control of information; and
- Institutional inertia

Fortunately, there are powerful paradigm shifts in the market that offer opportunities for step change, including technological advances such as location based services, such as Google Earth or Bing, designed for the consumer market but applicable to local public service delivery. Open source, shared procurement and site licensing are also positive trends in the market, driving down solution costs and encouraging competition.

Economic Modelling Results

Our analysis suggests that significant productivity improvements are already being gained through the use of GI and that the pace of benefits realisation will increase further as more local service providers move towards enterprise-wide implementation.

The case studies reveal strong business cases in many application areas, including:

- Channel shift – through deployment of transactional web mapping systems.
- Improved transport efficiency – by wide application of route optimisation and better streetworks management.
- Better decision making – using geospatially-enabled local information systems.
- Reduced data duplication – using master datasets such as the NLPG.
- Empowering frontline workers – by speeding up analysis and enhancing mobile working.
- Helping identify social deprivation – through data integration and analysis.

Our research found that the average annualised cost to benefit cost ratio was approximately 1:2.5 considered over an average 5 year project life cycle i.e. for every £1 invested a return of £2.50 would be realised. The raw analysis suggests a figure closer to 1:3.75 but we have reduced our assessment on the basis that our sample has a bias towards more innovative and better managed projects. A detailed analysis of the value of NLPG data sharing shows net benefits over a 5 year period in the range £15 million - £24million.

We estimated that the applications analysed have led to an accumulated 0.233 per cent increase in productivity in 2008-9 for local public service providers.

We also estimated that the improved services led to a 0.06 per cent improvement in the productivity of the construction sector and smaller impacts on land transport and business services sectors. In addition, there was a general increase in labour productivity equivalent to an increase of approximately 1,500 full time equivalent staff across the economies of England and Wales. This is as a result of the accumulated effects of improved citizen and business contact with local service providers.

The case studies also provided insights into the further increases in productivity that could arise by 2014-5. Drawing on the adoption curves, it was estimated that by this period, further innovation could lead to a 33 per cent increase in these productivity estimates for the business as usual case. We assess that an additional 25 per cent increase in take up could be realised under the optimal policy case.

Wider economic Impact

For the year 2009 it is estimated that the adoption of GI in local public service delivery meant that:

- Gross Domestic Product (GDP) for England and Wales was £323 million higher than it would otherwise have been (around 0.02 percent of GDP).
- Government revenue from taxation was £44 million higher than it would otherwise have been.
- The delivery of goods and services by local public service providers was £232 million higher than it would otherwise have been.

Business as usual scenario (2015)

Under such a scenario, GI will continue to be more widely and comprehensively implemented at the rates predicted by the adoption curves outlined above.

By 2015, it estimated that GDP for England and Wales will be £561 million higher than it would otherwise be without the adoption of geospatial information applications. Further:

- The delivery of goods and services by local public service providers will be £372 million higher than it would otherwise be.
- Taxation revenue will be £89 million higher than it would otherwise be.

Optimal scenario (2015)

Under the optimal (ideal) adoption scenario, it is estimated that GDP will be £599 million higher by 2015 than it would otherwise be without the adoption of geospatial applications. Further:

- The delivery of goods and services by local public sector providers will be £399 million higher than it would otherwise be.
- Taxation revenue will be around £95 million higher than it would otherwise be.

Better policies and action to deliver the ideal scenario, therefore would result in around £38 million in additional GDP for England and Wales in 2015 and there would be additional taxation revenue (all else equal) of around £6 million.

Impact on emissions of greenhouse gases

The modelling also showed that the introduction of GI in local public sector service delivery resulted in the emissions intensity of the economies of England and Wales being around 0.013 per cent less in 2009 than it would have otherwise been. This is mainly attributable to fewer vehicle journeys.

Under a no change in policy, the modelling projected that emissions intensity of these economies will be 0.020 per cent lower in 2015 than it would have otherwise be. This

percentage increases to 0.021 per cent with ideal policies. Due to the high-level characterisation of the impacts of the geospatial systems, these are considered to be very conservative estimates of the reduction in emissions intensity associated with the adoption of GI in local public service delivery.

Other benefits

Non-productivity related benefits include:

- environmental benefits arising as a result of better planning and management of infrastructure development.
- more sustainable environmental management through better and more accessible and interoperable data
- improved health and wellbeing of citizens dependent on local public services
- small improvements in time available for citizens for leisure and family activities.

Geospatial information also facilitates involvement in local decision making and, consequently, more opportunity for participatory democracy.

Recommendations

The report makes a number of strategic recommendations for improving the rate of adoption of geospatial information and the consequent benefits:

1. **Gaining Political Commitment:** Local public service providers should work with industry bodies, such as the Association for Geographic Information (AGI), to create a concerted plan of action aimed at promoting better top management and political understanding of the case for the better use of GI.
2. **Public Data Accessibility:** All geospatial information collected or created at any level of government should be made as readily accessible as possible for unrestricted public use unless there are overriding reasons of privacy or security not to do so. In making this recommendation, we do not imply that access to all government data should be at no charge.
3. **Copyright and Licensing:** Restrictions on the use and redistribution of government geospatial information through licensing and copyright should adopt a "light touch" approach focusing on protecting data integrity and large-scale copyright infringement.
4. **Geospatial Awareness:** Local public service providers leverage the drive for greater operational efficiency to organise a series of themed events presenting the savings and/or other benefits identified in each of the case study services.

5. **Business Case Training:** Local public service providers consider establishing a training programme for those responsible for developing business cases for geospatial projects, to equip them with the necessary tools and techniques. Training should not only cover developing and presenting the business case but also techniques for proving that the predicted benefits are realised after implementation.