Cost Benefit Analysis of Address and Street Data for Local Authorities and Emergency Services in England and Wales

Final Report

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Executive Summary

- Government Investment in the LLPG/LSG over the period 2010-5 has yielded a net benefit of approximately £86m in savings from reduced data duplication and integration, improved tax revenues, channel shift and route optimisation in waste management

- Future net benefits from the same applications are likely to be in the region of £200m over the next 5 years based on the current rates of adoption, this represents a Return on Investment (cost-benefit ratio) after discounting of 4:1.

- The return could be significantly higher if barriers to adoption, particularly access to funds, staff retention and improved national collaboration are addressed. This we estimate could be worth additional benefits of £20m over the next 5 years.

- National collaboration initiatives with potential to emulate the DCLG waste partnership include shared gazetteer maintenance services, enhanced analysis for education, social services, public health and emergency services.

Purpose

The purpose of the research study is to provide a cost/benefit evaluation of the impact of address and street data that GeoPlace collates, across England and Wales.

Source: GeoPlace Project Brief

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Scope

- The study will examine the financial costs and benefits of address and street data for local authorities, who create the data and use it.

- The findings report would need to provide headline statements that can be used further e.g. for every £1 invested, £XX is returned in value.

Source: GeoPlace Project Brief

- A variation added to the scope is: assessing the benefits to local authorities in their work with emergency services

Study Methodology

- Literature review
- Compilation of a database of existing case studies
- Questionnaire
- Training course
- Interviews
- Construction of the CBA Model
- Validation Workshop
- Economist Review
- Final Report

Literature Review

Economics

- Value of Information principles

- Public Information Value (European Union POPSIS study)

Previous Studies

- CEBR Report

- LGA Economic Value Study

International Comparative Studies

- PSMA (Australia)

- Denmark

Key Findings

External Factors: PESTLE Analysis

- Political
  - Lack of awareness of the potential of Address and Street gazetteer data in decision making
  - Devolution and local decision making: a possible way to put on the Government agenda
  - Role on the integration of health and social care poorly understood
- Economic
  - Further cuts in public spending
  - IT-driven Transformation – seen as a important lever to reduce co
  - Reduced funding for partnership working with emergency services in many localities
- Social
  - Vulnerable people, social isolation, digital inclusion – all helped by Addresses
  - Early retirement initiatives in LG : increase need for knowledge management
- Technology
  - Massive changes facilitating integration: APIs, open standards, cloud, data as a platform, big data (predictive analysis), web 2.0 -> web 3.0
- Legislative
  - Information governance restrictions on addresses (regarded as personal data in NHS)
- Environment
  - Emergency management particularly flooding, requiring better address data

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Internal Factors

Key Impacts on LLPG/LSG since last review in 2010:

- Creation of GeoPlace
- Public Sector Mapping Agreement
  - AddressBase from OS available without charge if national coverage required
- Severe reductions in local authority budgets
  - Consequent cuts to staff numbers engaged in gazetteer maintenance
  - Loss of expertise, many retirements result in loss of domain knowledge
- Increasing levels of integration of the Address ID (UPRN) into core LA systems
- More use of Address in analysis e.g. benefit fraud
- Reduced interaction of emergency services with LAs
  - Reduced resource for crime prevention partnerships with Police
  - Mixed picture with Fire and Rescue Services
- Volume of change to address data still significant
  - New housing, street renaming and improvements in data quality
- More shared services including address and street gazetteer maintenance

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Key Current Government Policy Initiatives

There are a variety of current initiatives where address data can "intercept" the political agenda and thereby access funds and support:

- Government Data Service
  - For Centres of Excellence in information sharing
  - Implementing Transparency code, open data
  - Encouragement of standardisation (Addresses already have a national standard)
- Local Government shared services
  - Opportunities for greater efficiency in address maintenance
- House building incentives

  - addresses part of information infrastructure for strategic planning
- Local Land Charges – centralised Land Registry database to include UPRN?
- Devolution deals e.g. Manchester
- Health and social care integration
  - Mental health initiatives, Troubled families, digital exclusion
- Increased ability to charge for services

Use Cases for LLPG/LSG by Business Function

- Planning and Development - neighbour notification, local plan revision, planning consultations, local land charges
- Highways and Transport - streetworks planning / permits, optimising inspection routes. gritting, service interruption notices
- Revenue and Benefits - Identifying fraud, missing council tax or non-domestic rates collection
- Corporate Services - Strategic planning, executive dashboard, gathering evidence for decision making, members support
- Social Services - troubled families, home visits, neighbourhood analysis
- Street Scene - reporting problems, graffiti, work order management, management reporting
- Property Services - asset management, property sale / purchases, neighbour notification, shared office space
- Environmental Services - illegal tipping, commercial premises licensing
- Customer Services - identifying location, analysis of calls, CRM improvement, service interruption notices, opinion surveys
- Waste Management - refuse collection, recycling, minimising land fill, garden and trade waste
- Public Safety - including contingency planning, evacuation plans
- Education – student registration, school place allocation, school transport, catchment areas
- Electoral Management - electoral roll management, polling district demarcation, polling station
- Public health - joint strategic needs assessment, drug and alcohol services, NHS liaison

Emergency Services

- Evidence of a significant downgrading of interaction between local authorities and emergency services was found during the study

- Crime reduction partnerships, widely adopted and well resourced in 2010 have been subject to budget cuts and changes in priorities in many localities.
  - Sharing of address information through information integration has consequently been considerably reduced and is largely restricted to serious case reviews.

- In respect to fire and rescue services considerable progress was made in some areas during preparation for the now defunct Fire Control project, and the use of AddressBase within despatch systems does occur.

- Some examples of best practice, such as the London Fire Brigade, were found but tend to be based on enthusiasm of particular officers rather than being a corporate priority
  - There is clear potential for improved interaction in respect to initiatives such as fire safety checks for vulnerable people
  - In view of the large "on the ground" work of FRS organisations, the potential as a source of quality improvement of addresses is significant
  - Co-despatch trials between ambulance and fire services, requiring greater data integration within despatch services, if rolled-out nationally, also has potential to improve data quality

Questionnaire Results

Questionnaire outcomes: Ranking of Current Users

Total Responses: 133
Ranking: 1 – most important users

Low Importance,
Big Opportunities

Legend: Rank 1, Rank 2, Rank 3

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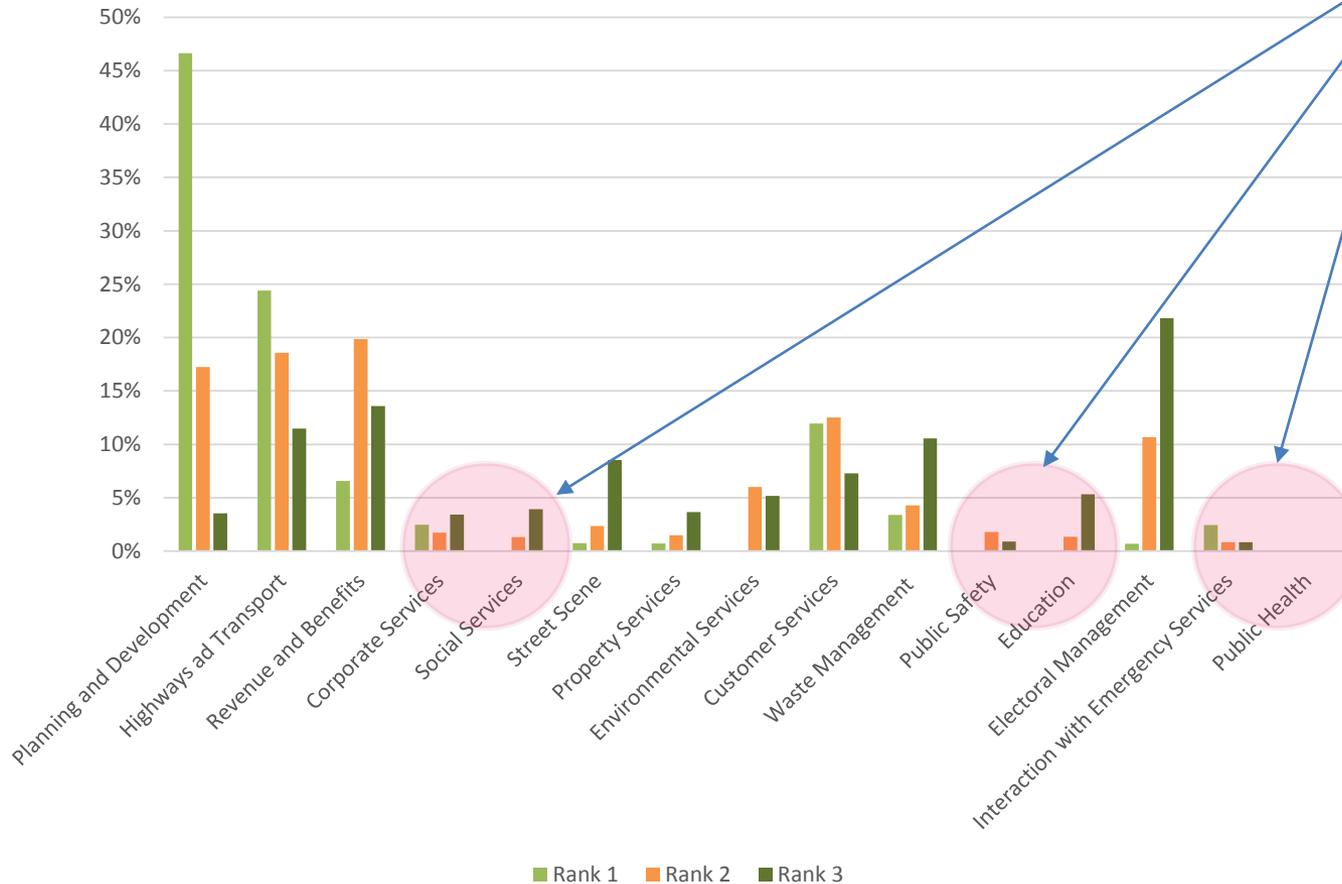
Time saving Assessment

Q5 For the most important use of the LLPG/LSG, what would you assess to be the approximate percentage time saving from previous approach?

Answered: 75   Skipped: 103

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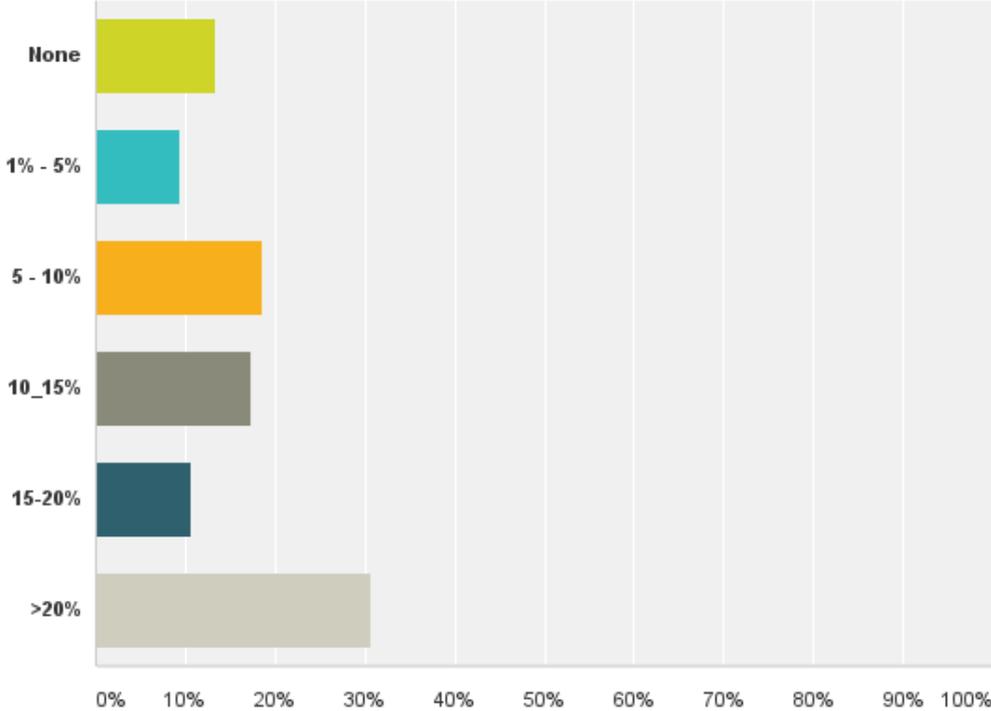
Cost-Benefit Analysis

Quantification Approach

- Use standard approach
  - Cost-benefit Analysis
- Establish benefits already realised (ex-post)
  - Categorised to ensure an even spread across a range of use cases (applications)
- Estimate current adoption levels and future rates
  - to a realistic horizon of 2020
- Focus on largest and most irrefutable benefits accepting that they only represent a proportion of potential benefits:
  - This means looking for where the use cases support existing policies or processes
- Make conservative assumptions in all cases
  - Use sensitivity analysis to estimate lower and upper bound RoI
- Adjust for optimism bias
  - Those providing case studies will focus on positive experiences

Quantified Use Cases

The most widely adopted quantifiable use cases are:

1.   Benefits from data sharing and integration using the UPRN

    –   Reduced data entry, automatic e-forms population

2.   Revenue and Benefit Analysis

    –   Additional Council Tax revenue

3.   Waste Management

    –   Route optimisation

4.   Channel Shift

    –   Web services reducing face to face and telephone contact

These are the building block of the cost benefit analysis

Data sharing and Integration Savings

- The basis of calculation is the Improvement schedules for April 2014 and April 2015 supplied by GeoPlace.

- These indicate the volume of changes made to the LLPG over the preceding 12 months.

- The number of Full Time Equivalent (FTE) staff who made these changes is based on a sample survey of local authorities and a regional survey from 2013 of London Boroughs

- The average time taken to make each change is calculated by dividing the number of changes by the staff time available

- The number of systems integrated with the master UPRN database based on live link counts in the improvement schedules is then used to estimate the savings.

- A more detailed description of the methodology is contained in a separate document supplied with the financial model

Regression Analysis example: Council Tax

The quantification of the remaining use cases used regression analysis:

Case Study	Net Savings	Total Council Expenditure
All Welsh Counties	£360,000	£7,139,857,300
Barnsley MD	£100,000	£ 412,667,000
Huntingdonshire 2TD	£14,000	£ 29,278,000
Leeds MD	£92,826	£ 1,283,256,000
Total (case Studies)	£566,826	£8,865,058,300
Scaled for National Impact	£4,140,849	£64,762,145,296
Forecast (Excel)	£2,924,651	
Regression	**£3,029,162**	
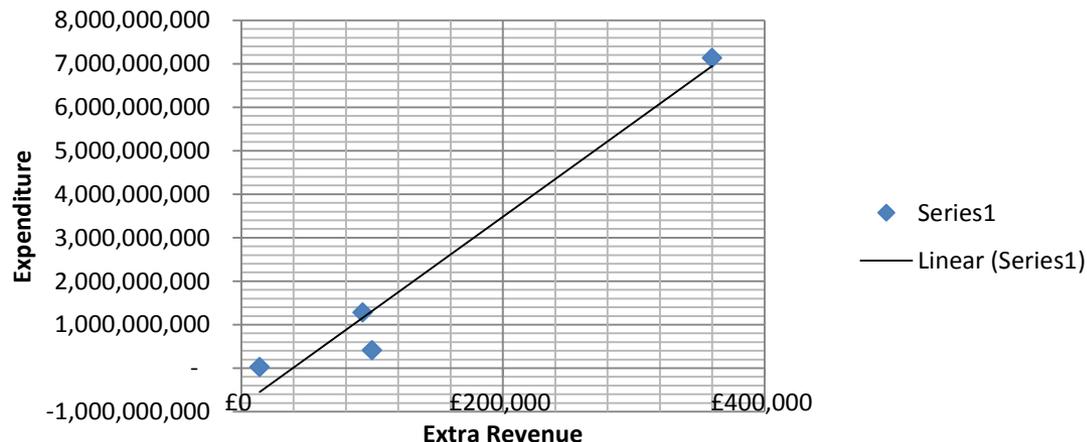
Emerging User Cases: not quantified

During the study many other use cases were evaluated.

- The use of addresses in electoral management applications is well established but quantifiable savings are relatively small.

- Other more substantive applications are in the early stages of adoption, so there are few case studies
  - Modelled these into RoI calculations would involve scaling to national impact from small base which is not statistically sound.

- Most promising are:
  - Shared services: single resource for maintenance between authorities
  - Social Services: identification of troubled families, vulnerable people
  - National Fraud Initiative (NFI): integration with central Government data has potential to build on work quantified for revenue and benefit use case
  - Education: more efficient pupil admissions and subsidised transport
  - Emergency services – improving the quality of LLPG/LSG

Social Services example: Troubled Families

- Integration of Council core systems (Benefits, Education and UPRN) as basis for analysis in one Northern Unitary Authority.
    - Supporting evidence for grant applications on known cases
    - Identify new potential cases for follow-up by social services
    - Resulting grants leveraged by analysis are shown below:

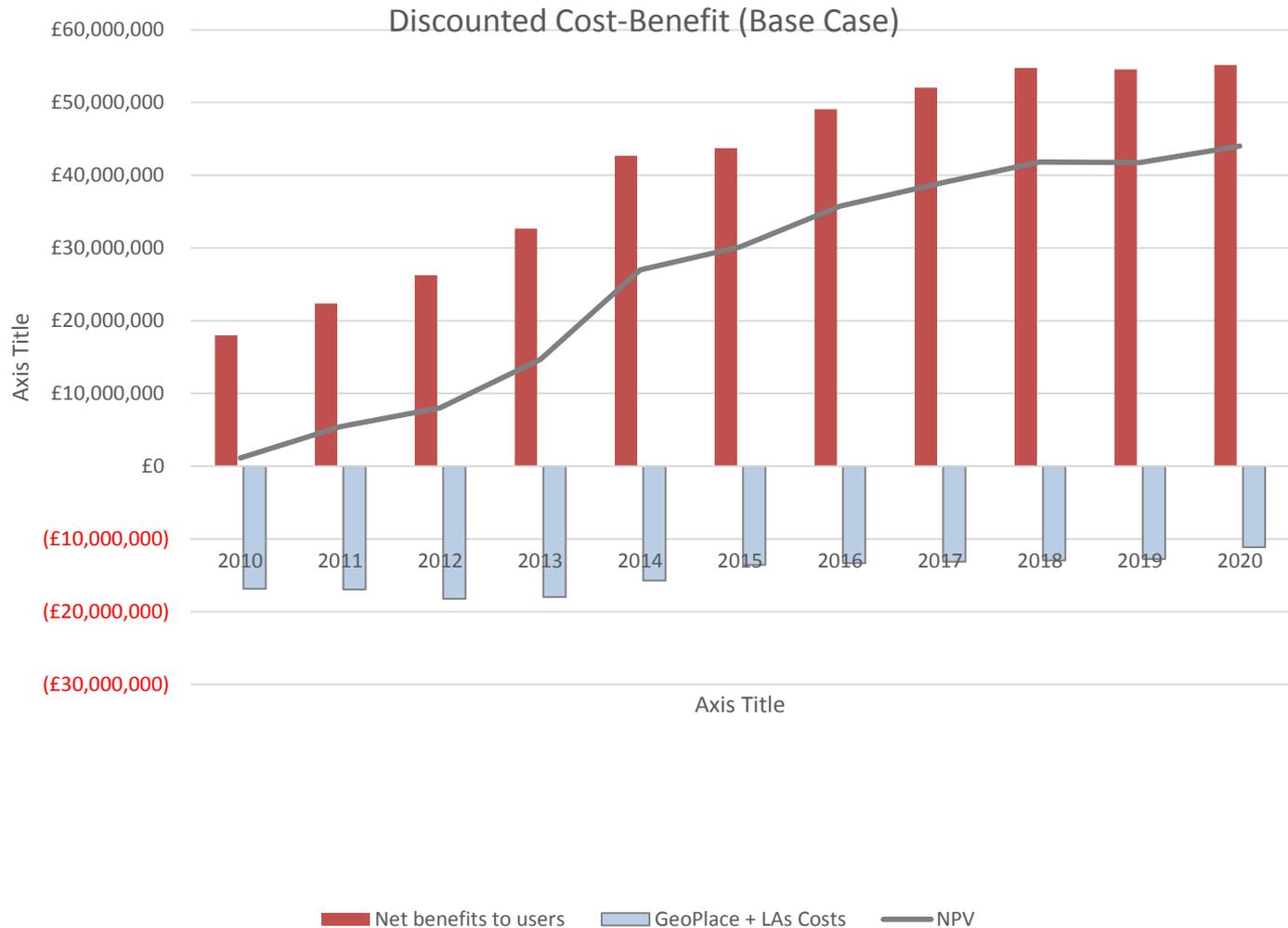| Year	Attachment Fees £	Results Payment £
2012/13	592,000	2,800
2013/14	691,000	98,700
2014/15	102,400	586,100

Education Example: London Grid for Learning

- LGfL has implemented a number of data integration initiatives.
  - that related to school admissions uses to UPRN
- The move to having waiting lists online.
  - behind the scenes this is only possible due to UPRN being in the child record and online account tool.
- The savings in staff time from the reduced workload, particularly on appeals, in Harrow Council alone is estimated at £55k per annum.
- Scaling this to London (on the basis of population) would result in savings of the order of £1.9m[1] p.a.
- Taking a conservative view of the attribution to the LLPG as 10% compared to the next best alternative (PAF), this equates to a potential benefits of £ 190k p.a. for London

NFI: UPRN relevant fraud risks targets

Data Match	Possible Fraud or Error	Cumulative Outcomes
Pensions payments checked to records of deceased people	Pension fraudulently cashed on behalf of a dead person	£450m (15,000 cases)
Housing benefit payments checked to payroll records and other income sources	Benefit claimed falsely because the claimant has not declared income	£226m
Blue badges records checked to records of deceased people	Blue badge used by ineligible person	£36m (68,000 badges)
Housing tenancy records checked to other housing tenancy records	Tenants are resident at two different addresses suggesting possible cases of subletting or dual tenancies.	£42m
Council tax records to electoral register	Council taxpayer wrongly gets single person discount because the person is living with other countable adults which means the council taxpayer does not qualify for a discount	£161m (97,000 SPD claims)
Payroll records to other payroll records	Employee paid incorrectly, for example, by working for one organisation while on long-term sick leave at another	£22m

Source: audit commission

Final Results

- Over period 2010-5
  - Estimated Net Realised Benefits   circa £86m
  - Return on Investment   2:1

- Over period 2016-20
  - Discounted Net Cashflow Predicted   circa £202m
  - Return on Investment   4:1

- Largest contributing use cases (in 2015)
  1. Data sharing and integration   £23m p.a.
  2. Route Optimisation   £17m p.a.
  3. Channel Shift   £2.5m p.a.

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Results: Graphical Representation

Discounted Cost-Benefit (Base Case)

Legend: Net benefits to users | GeoPlace + LAs Costs | NPV

Sensitivity Analysis

- Sensitivity Analysis is used to test the robustness of the financial model
- In this study, the major quantifiable variable is the estimated savings from data sharing. The following values were used:
  - Lower bound 2.5 min per change
  - Upper bound 4.5min per change
- The results are tabulated below:

Period	Lower Bound	Mean	Upper Bound
Realised 2010-15			
∑NPV	£52m	£86m	£121m
RoI	1.5	1.9	2.2
Predicted 2015-20			
∑NPV	£164m	£202m	£240m
RoI	3.6	4.2	4.8

Independent results validation: LGA Study 2010

- LGA Study 2010:
Predicted Data Sharing Gross Benefits (2014-5):   £17.7m

Year	1	2	3	4	5	6
Discount factor	0.9615	0.9246	0.8890	0.8548	0.8219	0.7903
Year	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Benefits		£3,533,230	£7,066,460	£10,599,691	£14,132,921	£17,666,151
Capital costs	£923,529	£923,529	£923,529	£923,529	£923,529	
Recurrent costs		£1,181,271	£2,362,542	£3,543,814	£4,725,085	£5,906,356
Total costs	£923,529	£2,104,801	£3,286,072	£4,467,343	£5,648,614	£5,906,356
Net benefits	-£923,529	£1,428,430	£3,780,389	£6,132,348	£8,484,307	£11,759,795
Discounted net benefits	-£888,009	£1,320,664	£3,360,752	£5,241,956	£6,973,482	£9,293,937
NPV as at 2008-09	£25,302,781					

- Current Study Data Sharing Gross Benefits (Mean) 2014-15: £27.4m

Accurate Change Data and Functions Data	
2014	2015
£28,806,621	£25,975,867

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Limitations of the financial analysis

- Limited set of use cases included in quantification
  - Chosen to be easily understood and defensible
  - May under-estimate the true level of benefits
- Extrapolation from limited sample of case studies
  - May not be representative but values used in calculations reduced by 25% to counter positive bias of case studies
- Panel of experts used to validate assumptions do not have perfect knowledge of practice in all local authorities
- Adoption rates and levels of expenditure are based on consultants judgement from case study and market evidence
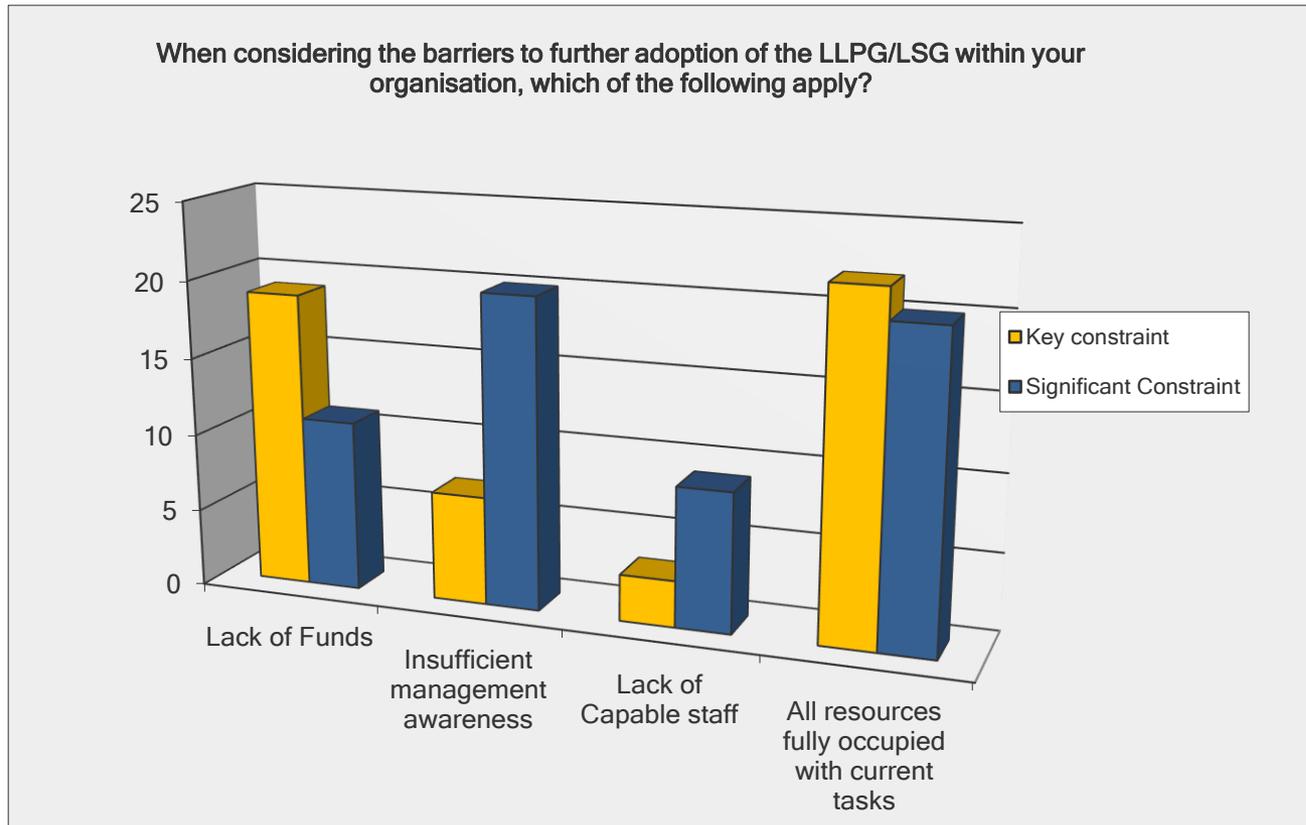- Predictions about the future are inherently uncertain

Economist Review

- Review was undertaken by Alan Smart of ACIL Allen, principal of a large economic consultancy based in Sydney, Australia

- Mr Smart has led many of the largest economic studies Internationally in the geospatial field over the last decade

- His review comments can be summarised as:

  - Approach using cost-benefit analysis is appropriate for the nature and scale of the investment

  - Negative discounts for years 2010-15 should be introduced into the discounted cash flow calculation, to bring the cashflow to a consistent present value

  - Setting a project life cycle through to only 2020 was commensurate with an area of fast developing technological change

  - Not trying to account for "sunk costs" from the period before establishment of GeoPlace was a pragmatic and defensible position

  - Case study scaling was justified although more examples would have further strengthen the analysis

- He was also able to supply supportive evidence for Australian G-NAF project included in the literature review

Benefits Realisation

- It is critical that a plan is put in place commencing now that allow the predicted benefits to be realised and evidence of their realisation measured and recorded to allow future auditing

- The following performance Indicators (KPIs) are suggested:
  - Adoption Rates for the quantified use cases to increase by 10% per annum
  - One new use case reaching 10% adoption per annum

- The "improvement schedule" represents the most easily adapted vehicle for measuring such quantifiable improvement.

- The questions asked in the improvement questionnaire will need only minor enhancement to collect the following information:
  - Number of FTEs employed on Address maintenance and Street Naming and Numbering
  - Gazetteer changes numbers separate out into automated and manual types
  - Cost of UPRN-based integration projects completed (time and investments)

Barriers to Adoption

Barriers to Adoption

When considering the barriers to further adoption of the LLPG/LSG within your organisation, which of the following apply?

- Lack of funds and fully occupied staff are the main constraints
- Lack of management awareness is a contributing factor
- Many narrative comments relate to software limitations

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Overcoming barriers to adoption

- Many Local Authorities need access to more staff resources
  - Almost all available effort spent maintaining and improving quality of data
  - At individual councils there is a need for better C-level briefing materials
- Greater collaboration with bodies like Socitm and Nesta* to share research, resources and paths to influence at a national level
- Identify initiatives with short-term impact to demonstrate results (quick wins)
  - Further development and promotion of case studies in social services, education, emergency management are recommended
- Identify and spread awareness within the local authority community of best practice exemplars of LLPG integration enhancing access to sources of Government grants and funds e.g. Troubled Families
- Look to access EU research funds for public sector efficiency
- Collaboration with LGA to replicate the DCLG digital local success on waste management as a national model for other use cases

Recommendations

- Sustained multi-facet marketing campaign based on the results of this study. Key messages:
  - Substantial benefits realised for past investment
  - Need for current staffing levels and product quality to be maintained in order to realise greater benefits going forward
  - Multiple opportunities for enhanced benefits tied to national efficiency initiatives, such as Troubled Families
- Enhanced collaboration with bodies working at a national level such as Audit Commission (NFI), Socitm CIO Council, DCLG and Nesta
- Promote best practice examples across a wider range of business functions
- Work with Ordnance Survey to promote use of AddressBase for local authority functions where out of area coverage required.
- Seek to replicate DCLG schemes such as DCLG Local Digital Project - Local waste service standards for other use cases
- Establish KPIs that allow realised benefits to be regularly (annually quantified)
  - Extend to improvement schedules to allow collection of data to support measuring these KPIs

Annexes – supplied separately

- Reference to sources of further information
  - Interview notes
  - Questionnaire analysis
- Case Studies
  - Database of existing studies
  - Slides sets for selected existing case studies
  - new case studies
- Financial Model
  - Cost-benefit Analysis Summary
  - Integration benefit calculations
  - Trend (regression) analysis for other use cases

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