Return on Investment Analysis

Assessing the value of Address and Street Data to Local Authorities in England and Wales

Final Report

May 2022

geoplace®

ConsultingWhere

Maximising the value of location information

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Preface

The Board of GeoPlace welcomes this report.

We see a growing number of examples in local authorities of the Unique Property Reference Number (UPRN) and Unique Street Reference Number (USRN) streamlining and simplifying processes, from school admissions to planning applications.

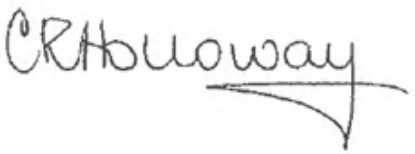
However, convincing decision-makers that investment in address and street data will produce a good return on investment requires a solid business case.

This report, produced by the GeoPlace team, with help from local authority address and street custodians, demonstrates that over the past 5 years, increased use of the UPRN and USRN has increased revenue and reduced costs in local authorities in England and Wales, to an estimated £250 million.

That figure is set to increase to a six to one return over the next 5 years, as a result of further integration of the UPRN and USRN into council systems.

The Return on Investment (RoI) study provides a strong business case to support investment in address and street data – not only in local authorities but also in central government and commercial organisations.

I encourage you to use it to convince senior decision-makers of the importance of the UPRN and the USRN in reducing costs, stimulating better decision making, driving innovation, and improving outcomes for citizens and local economies.



Claire Holloway

Chair of the Board, GeoPlace

Executive Summary

Investment in national address and street data[1] for England and Wales is yielding impressive returns. Between 2017-21 these investments generated £253m in savings with a Return on Investment (RoI) of 4:1 derived from reduced data duplication and increased system integration, improved tax revenues, customer service enhancement through web delivery of services and route optimisation in waste management.

Wider adoption across the country, particularly in adult social care, education, planning and environmental health is predicted to generate £384m savings over the period 2022-2026. This would represent an enhanced RoI of approximately 6:1.

So, over the 10-year period from 2017-26, the total net benefits after applying the Treasury Discount Rate are expected to be £636m representing an overall RoI of 5:1.

The return to individual local authorities has the potential to be higher, if the barriers to implementation identified in the report can be overcome and its recommendations are widely adopted.

[1] The address dataset is widely referred to at a local level as the Local Land and Property Gazetteer (LLPG) and streets as the Local Street Gazetteer (LSG).

Study Approach

Purpose and Scope

Since the last study in 2016, the applications of address and street data has expanded significantly.

This is evident both in terms of the number of local authorities using the National Address and Street Gazetteer databases[2] and the range of applications to which they are applied.

The scope is limited to England and Wales as separate legislation and mechanisms for acquisition of data and its maintenance exist in Scotland and Northern Ireland, so are not directly comparable in terms of Return on Investment.

The study considers the impact on local authorities only, it does not extend to emergency services, central government or commercial applications.

The analysis is split into two components.

i) Benefits already realised by local authorities in the 5-year period 2017-21, what economists refer to as an "ex-post" calculation i.e., after the event.

ii) as well as "ex-ante" predictions of future benefits during the 5-year period 2022-7.

The costs incurred by both GeoPlace and local authorities are derived from public information and surveys commissioned for the study.

[2] The national address data is often referred by its identifier the Unique Property Reference Number (UPRN).

Assessment Process: Cost Benefit Analysis

Choice of Method

Cost Benefit Analysis (CBA) is the most commonly used technique for deriving an estimate of Return on Investment (RoI). The concept can be thought of simply as for each £1 of investment, how much will be returned by the end of the project.

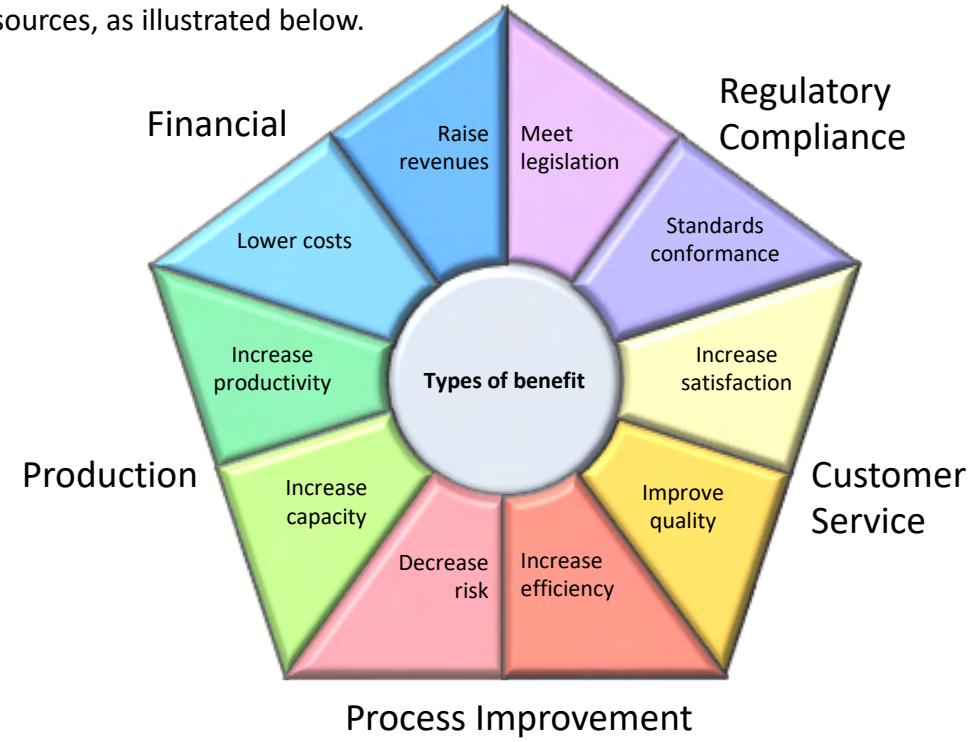
UK Treasury Green Book advice is that CBA is the most robust approach for projects where results are real and tangible, as is the case here.

CBA attempts to collate the direct costs and the most significant quantifiable benefits, adjusted for the time value of money i.e., returns achieved at some future date are discounted to take into account the opportunity cost of having made an alternative investment.

The CBA is expressed in financial terms. However, further qualitative benefits discovered during the study are also reported. These qualitative benefits, although not expressed in financial terms, may be politically, socially or environmentally significant.

Types of Benefit

We have developed a structured segmentation of benefit types that recognises a number of generic sources, as illustrated below.



Process

Existing case studies

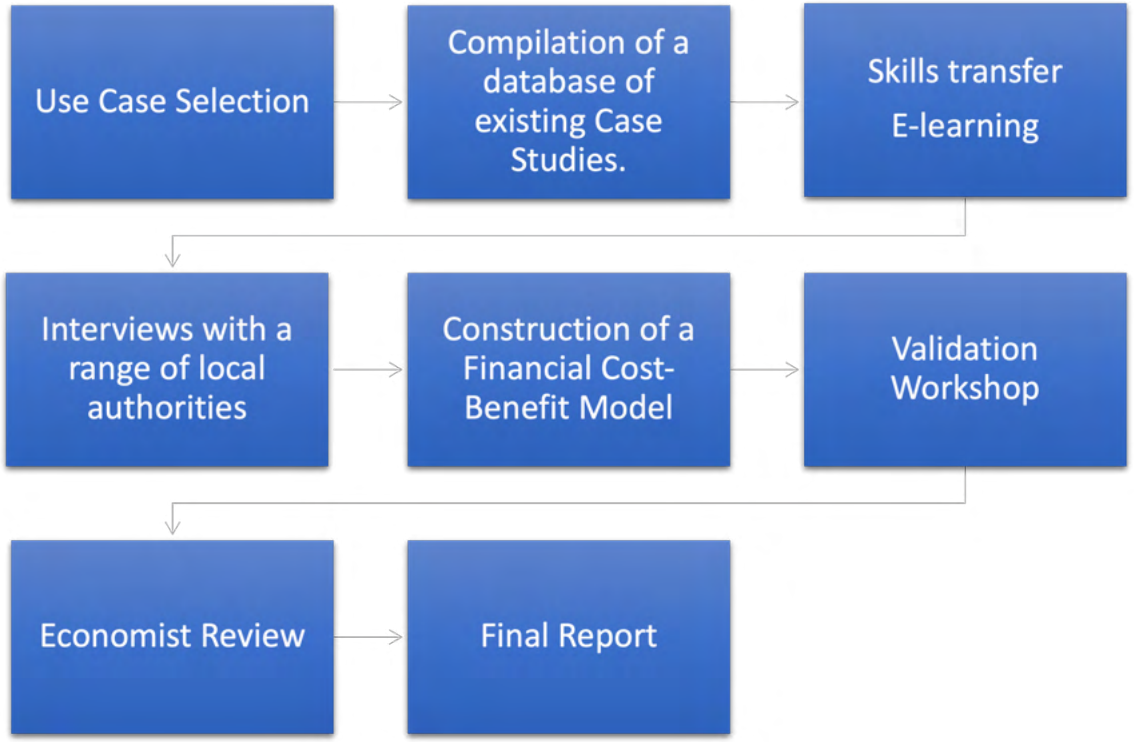
GeoPlace has a breadth of existing case studies that highlight the work of custodians and local authorities, and give insights into the qualitative and quantitative value of street and address data. GeoPlace has worked with ConsultingWhere to produce a case study database and the estimates of financial benefits included in many of the case studies have been an important resource for the cost benefit analysis.

In addition, we used our own database of case studies drawn from our work with local authorities and from other sources to supplement this information.

Training Courses

Five online training courses for contributors to new case studies were held in October 2021 and February 2022.

The courses were based on the ConsultingWhere training. The first course was designed to assist practitioners in **Assessing the Business Case for Investment in Geospatial Projects**. In response to demand from attendees, this was supplemented by an additional course on **Influencing Decision Makers**.



Interviews

The research interviews were conducted over a period of five months. Due to the constraints of the COVID-19 pandemic, all the interviews were conducted remotely. The interviews took a structured approach that first invited interviewees to consider benefits in qualitative terms. The interviewee was then asked to further consider the quantifiable benefits and feedback that information to the research team once they had time to collate relevant data and, in some cases, corroborate with colleagues.

In total we conducted over twenty interviews. Each organisation was selected to ensure, as far as possible, a range of authority types and varying degrees of reliance on the UPRN/USRN.

Validation Workshop

Following completion of the preliminary research and analysis for the study we held a validation workshop where leading opinion formers, including representatives from the Local Government Association (LGA) and Socitm, were presented with our results and invited to give feedback. The contribution of those who attended was insightful and provided further rigour to the research process.

Economist Review

ConsultingWhere worked with one of the foremost experts in the field of geo-infonomics, Alan Smart of ACIL Allen to validate the methodology and results. Geo-infonomics is the science of applying economic principles and techniques such as cost benefit analysis to geospatial applications. Alan Smart is the principal author of the seminal studies on the economic benefits of geospatial in Australia, New Zealand and Canada. He was also the reviewer for the previous RoI study.

Final Report

This final report is being delivered along with a short video designed to raise awareness among senior executives.

Construction of the CBA Model

From the information gathered through the preceding steps we have created a financial model. The model is essentially a set of spreadsheets that build up a picture of the return on investment in England and Wales.

Principles

It was not feasible to conduct a survey of all local authorities to derive returns, as most do not collect the data to financially evaluate the return on investment. To overcome this, we have calculated a range of values for the RoI by including sensitivity analysis, which has varied parameters for best and worst case scenarios.

In order to bring the values to a common baseline (described as Net Present Value), discount rates are applied to past and future benefits (and costs). It is conventional to ignore the effects of inflation since they generally apply equally to costs and benefits so cancel each other out.

Establishing the proportion of the benefits directly attributable to GeoPlace information, as opposed to the application itself has been assessed for each use case quantified. We also consider the counterfactual – what would have been used if the gazetteers were not available. The financial model is designed to be modifiable so that it might be maintained and updated as more information becomes available in the future. This has been supplied to GeoPlace, along with a tutorial (with accompanying Microsoft PowerPoint Presentation) on how it can be best used going forward.

Process

The study undertaken has gone through the following steps:

Each case study has been corroborated against normal industry behaviour in order to validate that it reflects the extent it is likely to be implemented by other local authorities across England and Wales. The optimism bias prevalent in all case study-based calculations has been taken into account by “writing down” the value of benefits by 20%.

The benefits identified by the local authorities from their case studies were scaled up to achieve a national impact based either on population, total council revenue/expenditure or other possible metrics depending on applicability.

The current level of adoption was then used to predict the total impact of full adoption. The adoption period is the time it is estimated it is likely to take for the technology to become “business as usual” across all local authorities in England and Wales. This has been assessed from the GeoPlace Improvement Schedules, an annual questionnaire completed by all local authorities that details (amongst many other factors) integration of the LLPG with other information systems.

The adoption rates have then been applied to the flows of net benefits over time that allowed us to calculate both the level of current cost-benefit and predicted position over the next 5 years (to 2026). We only predict to this horizon as the pace of change of technology makes looking further not credible.

The costs for building and maintaining the address and street data is offset against the benefits and allocated to the appropriate applications.

The assumption has been made that investments made before 2017, in terms of both costs and benefits can be regarded as amortised.

Economic Principles

The Value of Information

Assessing the value of information is a complex task.

The starting point is to clarify what is meant by value in the context of economic appraisal.

In economic terms fundamental geospatial data is an intermediate good. It does not of itself generate value until applied to processes or is used as an enabler in the production of goods or services. So, to understand its value, we need to explore how suppliers and users draw from the data.

For a government agency, it could be as narrow as the direct financial benefit (for example realised future savings) less the cost of the investment in acquiring the data.

For a policy decision maker, it could be as wide as the expected benefits that would accrue to society as whole from the use of the data, less its costs.

This underscored one of the important lessons in undertaking such studies, that we must not confuse the value of information with the value of benefits from policies and/or systems that use it in decision making. So, we are looking to attribute the appropriate proportion of the benefits to the information component of the application. This is often described as the "apportionment or attribution problem" by economists.

Where this was revealed in use cases, we used expert opinion to derive a conservative assessment of a suitable percentage attribution to the address information component.

The other important concept relevant to return on investment is to understand the concept of the "counterfactual". This involves evaluating alternative evidence to support decisions:

- other data sources (increasing in a world of data abundance)
- different evidence bases (often from social science)

It follows that an information source is only worth the "delta" in value between it and the next best alternative.

Value is determined by four key factors[3]:

1. The degree of uncertainty faced by decision makers.
2. What is at stake as an outcome of a decision.
3. The cost of using the information to make decisions.
4. The cost/price of the next-best information substitute.

We must also factor-in the ability and willingness of individuals to act on the information they receive.

[3] Molly K. Macauley, 2005, The Value of Information: A Background Paper on Measuring the Contribution of Space-Derived Earth Science Data to National Resource Management: https://media.rff.org/documents/RFF-DP-05-26.pdf

Comparative Studies

The Economic Impact of Geospatial Services (2017)

A report commissioned by Google[4] clearly demonstrates that the application of geospatial information has significant benefits outside of the traditional geospatial domain. It estimates worldwide and regional benefits for consumers (commuting and fuel efficiency, personal safety and purchasing efficiency), private industry (new products and services, productivity benefits, sales growth particularly for small businesses and tourism spend) and wider societal benefits (job creation, traffic congestion, urban planning, civic engagement, public health, safety and emergency response, disaster preparation and responsiveness, environment and wildlife preservation, knowledge creation and human capital development).

Unlocking the Value of Geospatial Data (2018)

The study[5] looks at how key parts of Ordnance Survey's (OSGB) highly detailed OS MasterMap are being made completely open under the Open Government Licence (OGL), with the remaining data being made freely available up to a threshold of transactions. This work will release £130 million per annum of economic value.

Making OS MasterMap available in this way is based on addressing the barriers identified through user research with, in particular, start-ups and small businesses. This research with both current and potential users of OS MasterMap identified four major barriers to its use:

- Price (complexity and cost);
- Licensing (complexity and restrictiveness);
- Ease of use (discoverability, interoperability and mechanism of delivery); and
- Derived data (complexity and restrictiveness).

By addressing these barriers to use, these changes will enable businesses of all sizes to access not only OS's high-quality data, but to also access geospatial data more widely to unlock economic value. In particular:

- Significantly more geospatial data will be fully open for businesses and developers to use, free and without restriction;
- Start-ups will be able to deliver new products and services with the data using the free threshold;
- Some businesses will not need to pay at all for their use of OS data because of the use of the free threshold;
- New innovations will be possible in the housing market — for example, this data will make it easier for property developers to identify potential development sites that aren't currently registered;
- New users will be able to understand the pricing structure for the data more easily following the OS changes removing uncertainty around cost of use; and
- An improved errors and omissions tool and reporting process, and publication of data in additional formats will further improve the quality of the data and its ease of use.

Return on Investment Global Meta-analysis (2015)

The study titled 'A Meta-Analysis on the Return on Investment of Geospatial Data and Systems: A Multi-Country Perspective'[6] looks at return on investment based on mainly cost-benefit studies and attempts to explain some variations across 82 cost-benefit assessments undertaken between 1994 and 2013. Multivariate regression methods are used to assess the size, significance and direction of individual effects. The results suggest that regional factors have the largest impact on the profitability of GI. Returns in Australia and New Zealand, for example, are four times larger than in Europe. In addition, small-scale regional investments have a 2.5 times lower return than large-scale international investments. **Overall, the expected benefits of GI investments are approximately 3.2 times larger than the costs.**

The observed increase in return for larger-scale investments is significant in the context of this paper since it indicates that the national approach to SDI is likely to yield a better return than the "project-based" investments that have previously characterized geospatial investment.

[4] The Economic Impact of Geospatial Services, AlphaBeta, September 2017: https://www.valueoftheweb.com/reports/the-economic-impact-of-geospatial-services/

[5] Unlocking the Value of Geospatial Data, 2018: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/733864/Initial_Analysis_of_the_Potential_Geospatial_Economic_Opportunity.pdf

[6] Trapp, N et al in Transactions in GIS, 2015, 19(2): 169–187

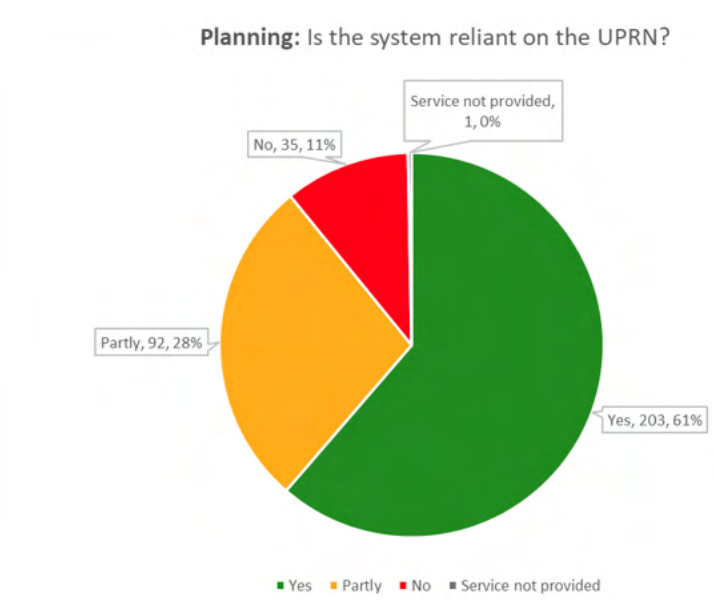
Improvement Schedule

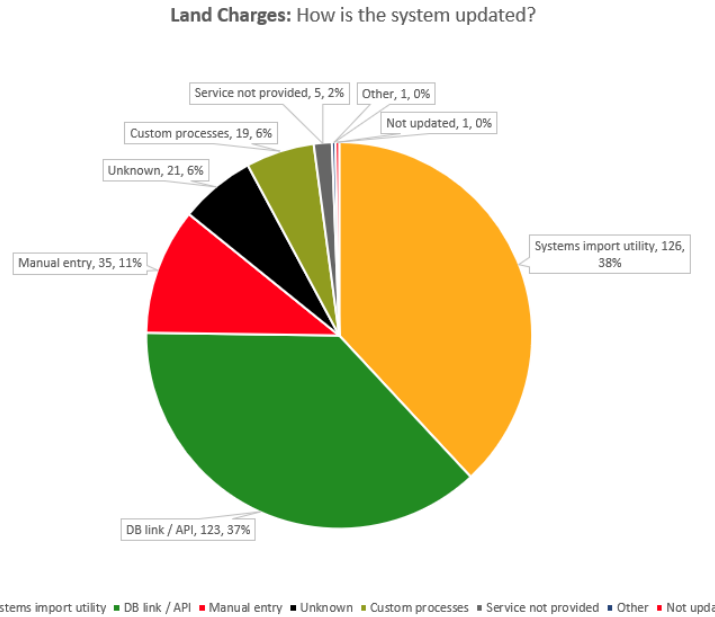
GeoPlace has established the Authority Improvement Schedule which provides a framework for each authority to plan improvements to their address and/or street data over the financial year. The scheme supports authorities by identifying areas of need and aims to improve the overall quality of address/street data year on year.

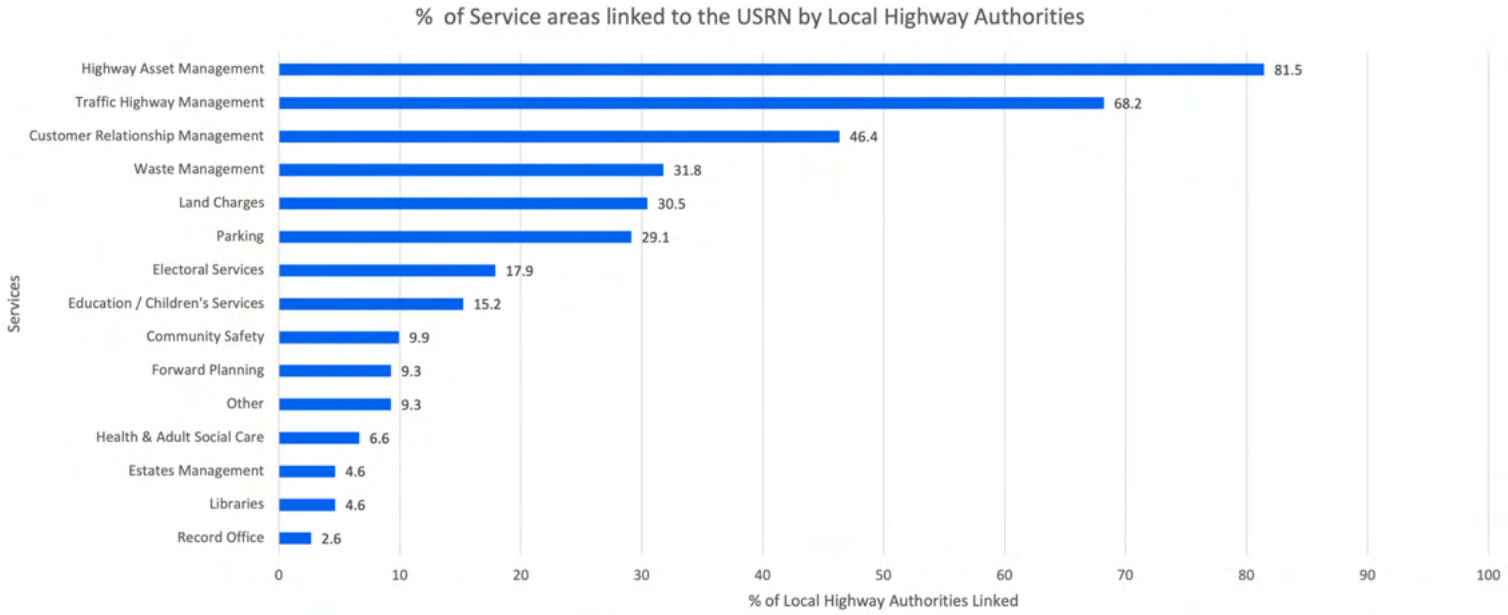
To track improvements, the scheme has a standardised structure of Gold, Silver, Bronze and Achieved National Standard levels that each meet a set of criteria.

The results from the 2021 Improvement Schedule had a 100% completion rate, covering all 331 English councils and 22 Welsh councils, and formed the starting point of research for this study. Analysis of the raw data enabled the selection of a range of suitable authority types to approach for interview.

Analysis of previous results over several years was used to interpolate annual adoption rates.







Socio-Economic Impacts

Local Authority Use Cases

Wide applicability

There are a large number of different functions within local authorities that rely on address and street data as important parts of their reference data, where it is essential that data is comprehensive, consistent and current. The study examined each of the twelve areas as summarised in the table below to identify the range of use cases, their relative importance, overall financial value and potential for quantification.

	Corporate Services	Strategic Master Plans Performance Dashboards Economic Growth		Architecture and Design	Visual Impact Analysis Utility Network Design BIM
	Development Planning	Local Plan Changes Neighbour Notification Building Control		Customer Relationship Management	Channel Shift to Web Resolving Location Using GIS Spatial Analysis of Call Distribution
	Environmental Services	Trading Standards Grounds Maintenance		Transport and Highways	Highways Asset Management Traffic Orders Parking Transport Modelling
	Revenues and Benefits	Property Valuation Non-domestic Rates Collection Benefits Fraud Avoidance		Electoral Management	Boundary Reviews Validating Electoral Roll Allocation to Voting Stations
	Land and Property	Housing Land Value Capture Estates Management		Education	Strategic Planning School Placement Bus Pass Allocation
	Social Services	Locating Vulnerable People Troubled Families Programme Deprived Neighbourhood Action Plan		Waste Management	Refuse Collection Commercial Property Landfill Site Selection

Quantification

In view of the limited time and data available, a small selection of use cases were chosen to be quantified. The next few slides explain the approach to each quantified use case in more detail.

Data Integration

The ability to integrate datasets using the Unique Property Reference Number (UPRN) and Unique Street Reference Number (USRN) is the capability that adds most value across a range of local authority functions.

The basis of quantification of the benefits realised is derived from combining several recent surveys undertaken by GeoPlace and other public statistics:

1. Volumes of integrations – the Improvement Schedule provided information regarding system integrations for all 331 address authorities and 174 street authorities in England and Wales. Those regarded as having achieved full integration met all the conditions for the following query on the local authority tables:

Use of Local Land and Property Gazetteer (LLPG) or OS AddressBase[7]

AND Automated interface

AND Daily or real time updating

The systems integrations evaluated for address data were planning, building control, CON29 searches, education and environmental health. For streets traffic highways management, traffic orders and parking integrations were evaluated.

2. Time savings – were evaluated from the average number of changes made per annum over a four-year period from 2016-19 for all authorities. The figures are captured by the GeoPlace hub system daily. An average time for manually incorporating each record change of 3.5 minutes was used as a multiplier, based on expert opinion from custodians questioned during interviews.

3. Effort estimates – a survey of over 50 authorities was conducted in early 2022 to determine the hours spent per week updating the LLPG and LSG. A fulltime equivalent (FTE) availability of 1672 hours per annum was assumed.

4. Salary survey – a survey of 100 authorities was undertaken to identify spine point range for LLPG and LSG custodians. To cover overheads an uplift of 30% was added to average salary calculation.

5. Trend Analysis – historical levels of implementation were calculated based on previous improvement surveys, whilst predictions were based on modelling of standard adoption curves.

[7] For the street system integration query use of the Local Street Gazetteer (LSG) was substituted.

National Non-Domestic Rates

The use of UPRNs to link different authority systems brings with it the ability to increase and improve revenue collection around National Non-Domestic Rates (NNDR) and reduce rates of fraud. It is important for every local authority to aim to have the highest link rate possible between their address data held in the LLPG and NNDR systems and the use of the UPRN to establish this link is crucial.

Bath and North East Somerset Council recently examined whether there was a potential for increasing Business Rates revenue through integrating their collection systems with the UPRN. The UPRN was already being used by the council within business rates and for planning, building control, and licencing data. However, there was no communication between different software systems. Underpinned by the UPRN, these were combined, allowing the departments to work collaboratively. A revenue to the council of £320,000 in uncollected NNDR was identified in the first 6 months. The team found around 50 businesses were having their waste collected on a domestic waste collection. The waste team then could follow up to bring in more revenue to the council. Two new enterprise zones were identified, in which the council could retain 100% of the business rates. Previously it would have taken a long time to identify new businesses in these areas.

A couple of years ago, Barnsley Metropolitan Borough Council won the Financial Award at the Exemplar awards partly as a result of identifying around £80,000 savings/additional revenue from taxation. Since then, the authority has continued to accrue savings and additional revenues in excess of £50,000 per year and is undertaking a matching exercise with a commercial business directory supplier to identify potential non-payers of NNDR which has identified a number of leads to follow up.

In Blackburn, the Custodian began to match properties across the council systems using the UPRN as the unique identifier. This has resulted in the Revenues and Benefits department being able to identify additional properties and businesses that it could bill for NNDR. Currently the two departments collaborate closely with the Custodian and now get weekly reports of all properties within the Revenues and Benefits system that do not have UPRNs in order to add them and cross-match. As with other authorities, a fruitful source of information came from linking data from the Cleansing department to other systems which identified business properties having waste collected on domestic rounds or business properties not being registered for NNDR.

Highways Asset Management

Street lighting

Local authorities manage a wide range of assets linked to the highways, all of which need to be maintained and repaired when necessary. This includes some 5.7 million street lights and almost one million lit sign units. Asset management has been widely accepted by central and local government as a means to deliver a more efficient and effective approach to the management of highway infrastructure assets through longer term planning, ensuring that standards are defined and achievable for available budgets. Asset management systems provide information on the location and performance of highway infrastructure assets and ultimately support decision making and reporting. Knowledge of the asset and its condition and performance is vital for making the right investment decisions, as well as for demonstrating to senior decision makers and stakeholders the overall investment requirements. Integrating these highways asset databases, in particular around the spatial location of a specific asset allows for more robust planning of asset management and introduces the potential to model different scenarios.

In 2013, Conwy carried out a restructure which resulted in the amalgamation of three departments into a new Environment Roads & Facilities Department. A need to rationalise the number of existing IT systems, led to the establishment of a robust asset management system, creating savings and efficiencies across the department. Departmental data linked directly to the LSG and USRN has enabled the introduction of real time customer interface Portals. Being accessible 24 hours a day (via PC, mobile or tablet), allows citizens to report service requests at their convenience.

In 2017, 47.2% of all Street Lighting requests were reported online. The number of days to repair street light failures (KPI) has shown a significant improvement from 4.75 days in 2014-15 to 2.56 days in 2017/18, demonstrating an enhancement in service delivery.

The reduction in system and administrative costs alone has resulted in an annual saving of £126,260.

Bedford Borough Council integrate the position of each street light with its USRN into its 'smart' street lighting central management system (CMS) installed in the borough. Each light is now linked to a street which permits customer reporting issues to be logged against the USRN but allocated to the correct asset type. The CMS reporting enables the LED lanterns to be dimmed giving better control of the light source by street which also helps the council to monitor energy consumption. Having the asset linked via the USRN improves fault reporting and repair times. In 2021, 92.5% of all the street light assets in the borough were working as planned.

Salford Council have 28,000 lighting columns and receive about 1,800 reports of faults a year. All street light assets are linked into the asset management system, referenced by the USRN. Prior to this, when a fault was recorded, usually via a phone call, it took several days to get the report to the correct team and any updates, after a site visit, could also take a number of days to get back. Now, the street lighting team maintenance operative receives the fault immediately, referenced by the USRN, and any updates are sent straight away from site via mobile technology.

Adult Social Care

Identifying patients for local authority intervention

During the COVID-19 pandemic the Shielded Patient List (SPL) was a record of vulnerable patients thought to be at high risk of complications from COVID-19. NHS, social care organisations and local authorities used the list to identify vulnerable patients in their local area. Once identified, these patients were sent a letter with advice on how to protect themselves and how to access NHS services when required.

The NHS SPL was issued to local authorities each week and included all those patients currently on the list who live within the local authority's boundary. The list was dynamic and changed each week to reflect the changing status of patients' risk from COVID-19 infection with individuals added to or deducted from the high-risk category each week depending on their changing health circumstances.

Initially the data was provided without a UPRN for each patient, this forced local authorities to undertake a time-consuming, and expensive, manual matching process to correctly identify patients and their address.

Following a national campaign, the UPRN was added to this data and was included in the technical output specification for local authority extracts. The addition of the UPRN eliminated any need to undertake manual matching, and thus created huge efficiency savings compared to the resources required to process the SPL without the UPRN.

In March 2020 with the onset of COVID-19, Leeds City Council needed to identify and manage residents on the SPL. Pre-COVID Leeds had a local vulnerability list of 18,000 which grew to 40,000 at the start of the pandemic with data from multiple sources, often duplicated. This required a huge effort to identify and locate individuals with over 20,000 records having to be manually matched with addresses and cleaned to begin with. The addition of the UPRN to the national SPL dataset proved a game-changer, eliminating overnight the need to undertake massive data matching and validation exercises.

Adult Social Care

The Adult Social Care (ASC) sector is a huge employer of staff, employing some 1.6 million people in England alone. Adult social care covers a wide range of activities to help people who are older or living with disability or physical or mental illness live independently and stay well and safe. Local authorities are responsible for assessing people's needs and, if individuals are eligible, funding their care. There are close to 2 million new requests for Adult Social Care support with local care services each year. These requests come from a variety of sources to the local authority who then need to assess both the care needs of the individual and their funding eligibility. Having the ability to correctly match an address with the individual requiring assessment is therefore a crucial step in the process. Poor quality data either from the requesting organisation or within the local authority systems results in effort and cost being expended in matching an individual to an address.

Flintshire developed a link between the local adult social care system and council addressing by adding the UPRN to the ASC system. Every day around 130 records are added to the system, the address matching between the incoming data and the other local authority systems is now totally automated. This is producing an efficiency gain for the authority and better adult safeguarding outcomes as the assessment process can be started immediately on receipt of request.

Customer Relationship Management

Customer Relationship Management (CRM) is the combination of practices, strategies and technologies that companies use to manage and analyse customer interactions and data. CRM systems are used in local government to support customer services staff members in their interactions with the public.

It is also intended to help in the communication of information about the customers and services internally throughout the organisation. Councils can employ such systems to build a better picture of why customers contact them and for ways in which they can improve their services. In essence, the technology gives councils the information necessary to review how they conduct business and to move from a departmental structured organisation to a customer-centred one.

However, traditional CRM tends to be very costly and complex. Perhaps not surprisingly local government has struggled to identify a robust business case and to establish any substantial return on investment.

Many of the public interactions require basic address information and particularly those related to highways and transport use cases require street data. Moving these interactions online reduces the cost of providing services. Providing customers with facilities to identify the locations for the queries or problems they wish to report further enhances services. This can act as a significant component of a business case.

The majority of local authorities now use web-services as their preferred point of contact for public enquiries. GIS tools are supplemented by public portals such as FixMyStreet[8] to support the move from telephone and face to face contacts. One of the case studies for this study is Leeds City where 50 out of 52 services return a location and 95% of enquiries are handled through web self-service.

The savings from direct use of enhanced national address and street data are calculated by comparison of the average cost of telephone contact of £3.57, with a web contact £0.19, enabled by such data. These figures are inflation adjusted from a Socitm national analysis.

75% of the gains from this source have already been realised in period 2017-21 but an estimated 25% of councils have still to adopt optimal use of address and street data.

This quantification based on seven case studies from a range of types of authorities has been estimated to have yielded national efficiency savings of £18 million in 2021.

[8] https://www.fixmystreet.com

Waste Management

Waste management is a costly and high public profile activity for local authorities. It encompasses the collection of waste, both from residential and commercial sources and its transfer to recycling or landfill sites.

The benefits of this use case were calculated from a series of detailed case studies from local authorities in across England and Wales. These studies revealed that the costs of general refuse collection could be significantly reduced by route optimisation. Comprehensive and up to date street data, combined with current addresses of both residential and commercial property are key to the use case.

The datasets are used to fuel Geographical Information Systems (GIS) using geospatial analysis algorithms to create routes that minimise distances travelled, types of vehicles deployed, crew size and hours worked. Parameters can be weighted according to local conditions to provide options which can then be discussed with council officials, residents, and collection teams.

In authorities where the function is outsourced this approach led to reduced bids by providing more accurate data during the tendering process, more informed discussions with companies during the contract negotiation process and easier performance monitoring. Where the refuse collection has remained in-house then the requirement to service new housing or the purchase of new vehicles has given the impetus for change.

One case study is Wolverhampton Council that started charging customers to collect their garden waste[9]. It was imperative for this income to generate a positive return. It would not be acceptable if it resulted in costs being incurred elsewhere – in Customer Services, for example – due to an increase in calls.

The solution is a self-serve portal that enables the booking of garden waste collection, easily and quickly, with integration that also improves the efficiency of back-office services and field-based colleagues.

Over a 6-month period nearly 27,000 customers registered for the service generating an income of approximately £918,000 towards the service for the first year.

Staff hours saved within Customer Services equated to £14,000.

In the last assessment of return on investment the value of data in this use case was a major component of the benefits identified.

Much of the benefits have now been realised with currently about 80% of councils having changed their working practices in this area. There is however, another 20% of “late majority” adoptions where potential benefits are expected in the period 2022-6.

The ex-post assessment for years 2017-21 also recognises a proportion of the gains already made.

[9] https://www.geoplace.co.uk/case-studies/generating-revenue-improving-services-for-citizens-using-the-uprn

Selected Qualitative Use Cases

There were many other use cases identified during the study that we were unable to quantify. Here we present a few key examples.

Matching with third party datasets

Local authorities receive data from many different sources in the course of their normal operations. Some of this data will contain addresses that need to be verified and matched to other authority databases before it can be used. Receiving third party data without a UPRN forces local authorities to undertake a time-consuming, and expensive, manual matching process to correct the property and address. Inaccurate address matching can impact on revenue collected via council tax and increases the potential for fraud.

For Hillingdon Council the bulk of addresses that need to be verified are the monthly databases received from the Valuation Office Agency (VOA) and Royal Mail. The VOA assesses properties to ensure that they are in the correct Council Tax band and sets the rateable value of property used to calculate the business rates for that property. It is therefore crucial that the exchange of address data with the local authority is accurate. Unfortunately, much of the data received from the VOA or Royal Mail does not include the UPRN which necessitates time-consuming manual processes, often including a site visit, to verify the correct address. The LLPG team initially verify with Council Tax whether rates are being paid on these addresses then check if there are any other references online but need to undertake site visits if the previous tasks did not yield results.

As the second largest borough in London, site visits can often take several hours to check just a few addresses. A recent verification exercise on just six sites required visits but even with a site visit more information may be needed. In this case the council had to revert back to Royal Mail to clarify and the responses highlighted the difficulties faced, including one address that did not actually exist but was in fact a seed address for Royal Mail data integrity and two addresses that belonged to houseboats that in the original data had been given both boat name and street (where the canal mooring was) leading the team to assume they were actual properties. The council estimate that it can take well over an hour in actual time spent per address (site visits, emails, phone calls, web research and checks) to verify each query and this does not reflect the time spent waiting on responses and then analysing and actioning them. Over a year the council expects to receive anywhere between 360 to 2,400 queries that require this level of checking which is the equivalent to a full-time employee working solely on this issue.

Ash Die Back

Ash Die Back (ADB) is a disease that affects a very large proportion of Ash trees and over recent years has spread across the UK at a rapid pace threatening the future of this tree species. In most cases, the disease sadly results in the death of the tree. As the disease progresses through the tree, its trunk and stems become brittle, unstable and if left, becomes dangerous. Local Authorities across the UK are faced with the problem of managing this disease that causes risk to both biodiversity and human life. Conwy County Borough Council use GPS survey data collected by Mott McDonald through an innovative video survey that enables the detection of ash trees along the highway network, picking up the location of the tree and capturing data including tree height, degree of dieback, spatial location and associated photographs. This has been spatially analysed and linked to the LSG, resulting in the identification and quantification of the scale of ADB along Conwy Council's Highway Network. In Conwy 4,799 Ash trees have been identified with ADB along the higher hierarchy highway network alone.

Cost analysis has confirmed the associated expected felling costs in excess of £1.6 million. This data and spatial analysis, linked to the LSG, has enabled the development of a risk-based approach through the categorisation of trees by ADB condition, height and hierarchy identifying risks to public safety. Conwy County Borough Council wanted to locate and survey all Ash trees adjacent to the higher hierarchy road network. Therefore, Highway Network data, underpinned by the USRN, was used to identify the lengths of highway

that needed to be surveyed based on their associated road hierarchy. A total of 492 km of highway network was identified as survey lengths and Mott MacDonald used this data to program their surveys. This resulted in the authority being able to prioritise the management of ash trees by condition and hierarchy, giving the authority intelligence on:

- Which trees may be dangerous and where they are located on the highway network
- Ability to prioritise based on risk – knowing which sections of the highway network contain the biggest density of trees
- By linking the data back to the USRN, identification of the roads with the highest density/volume of ash trees

To survey the high amenity highway network without this technology would have been impossible – what was done in 3 months would have potentially taken a year with additional staffing resources required, costing in excess of £30,000. However, this would not have identified all the trees at risk of ADB. The technology the video survey data provided enabled data to be captured from a moving vehicle which included the location of the tree and associated data. To undertake the same level of survey using a traditional methodology of site visits by a tree inspector would have required additional traffic management to alleviate the health and safety risk. Conwy estimated that this additional cost would have been between £61,000 and £185,000 to survey the 305 miles of high amenity network.

Early Assignment of Addresses

The early georeferencing of new build property has the potential to make the process of street naming and numbering more effective. Developers plans can be fitted to existing map features using standard Geographical information Systems (GIS) software. The coordinates for individual properties can be attached to the UPRNs at a much earlier point in the process.

What is described as “early life cycle” improvements in quality have significant benefits as this accurate positioning currently is often not possible until Ordnance Survey has undertaken survey work and updated mapping data available to authorities, which can be up to six months or more after completion.

Education

Address and street data are key criteria in decisions about school placements and awarding of bus passes.

However, the most recent improvement schedule shows less than 10% of authorities have completed integration of address and street data into their systems. For the remainder of authorities it is often necessary to re-enter information into the education administration system in order to make such decisions, with attendant risk of delay and creating errors. In one local authority this work takes about 50% of a member of staff on a full-time basis.

Some authorities have commissioned work from their system provider to develop bespoke interfaces at high cost in order to achieve integration.

Results

Key Findings

Many authorities have embraced the use of national address and street data to create innovative services that improve efficiency within the authority, aid revenue collection and offer better customer service.

However, custodians, who maintain these datasets are under immense pressure. Changes in structure and reductions in staffing are often adversely affecting the speed at which they can make updates.

Often custodians find their service placed in areas of the authority which do not provide appropriate management oversight.

Custodians inherently understand the value of the data they produce and maintain and can see the benefits of using it in a broader context across the authority. However, beyond a qualitative knowledge of the value of the data, there is often a lack of understanding on how to quantify this value.

Senior management, in many cases, do not understand either the value of the service or the benefits it can bring to the authority resulting in too little investment.

Procurement of new software systems frequently fails to specify the need to support address and street data.

Barriers to adoption

There are a number of barriers across local authorities that are hampering the effective use of the national data resources.

- In many cases address data is treated as personal data with a reluctance to share this across the wider authority.
- UPRNs are in many cases seen as an afterthought and are added towards the end of a process, such as planning. The addition of this data earlier in the process would assist in realising its potential and value to the authority.
- There is still a lack of understanding at higher levels in many authorities as to the value of this data. As a result, teams find themselves reduced in size and constantly having to justify the work they undertake.
- The lack of understanding of the value of the data results in both a lack of investment and a lack of resources to integrate systems and use the data effectively.
- Software suppliers are reluctant to add facilities to enable more effective integration of the national address and street data.

Cost Analysis

GeoPlace

GeoPlace provides the coordination, quality assessment and improvement services for national address and street data.

It is jointly owned and funded by the Ordnance Survey and Local Government Association (LGA).

Not all of the organisation's costs are directly related to the activities of local authorities. It undertakes commercial and other activities in connection with its sales of Ordnance Survey AddressBase products and consultancy work.

In conjunction with the financial management team at GeoPlace the following has been assessed as applicable capital and recurrent costs over the period of the study. These include wages and salaries, social security, pension, temporary contracts, leases, rentals and other overheads.

Local Authority

Capital costs related to the implementation of the integrations of address and street data into software systems. Here, improvements in the availability of Application Programming Interface (API) facilities within many systems has led to a reduction in costs since the last study.

An estimated total of £16.5m over the period 2017 to 2026 has been used to account for this expenditure.

The recurrent costs have been evaluated on the basis of surveys undertaken of local authorities' custodians. Two separate studies were undertaken of staff in those authorities, undertaking maintenance of address data (147 returns) and street data (34 returns).

These results were then combined with surveys of the same cohort of the levels of commitment to the work in terms of numbers of hours per week. This was multiplied by the Full Time Equivalent (FTE) hours availability estimated at 1672 per annum.

A flat rate overhead 30% was then applied to calculated salaries.

Benefits Summary

The table presented here summarises in financial terms the quantified use cases described earlier.

The net benefits have been discounted using the Treasury guidance rate of 3.5% per annum and represent the estimated mean case estimate over the period of 10 years from 2017-26.

The value to Highways Asset Management, Waste Management, Customer Relationship Management (CRM) and Data Integration represent the largest components in financial terms.

The value accrued for Waste Management and CRM is predominantly historical (2017-21).

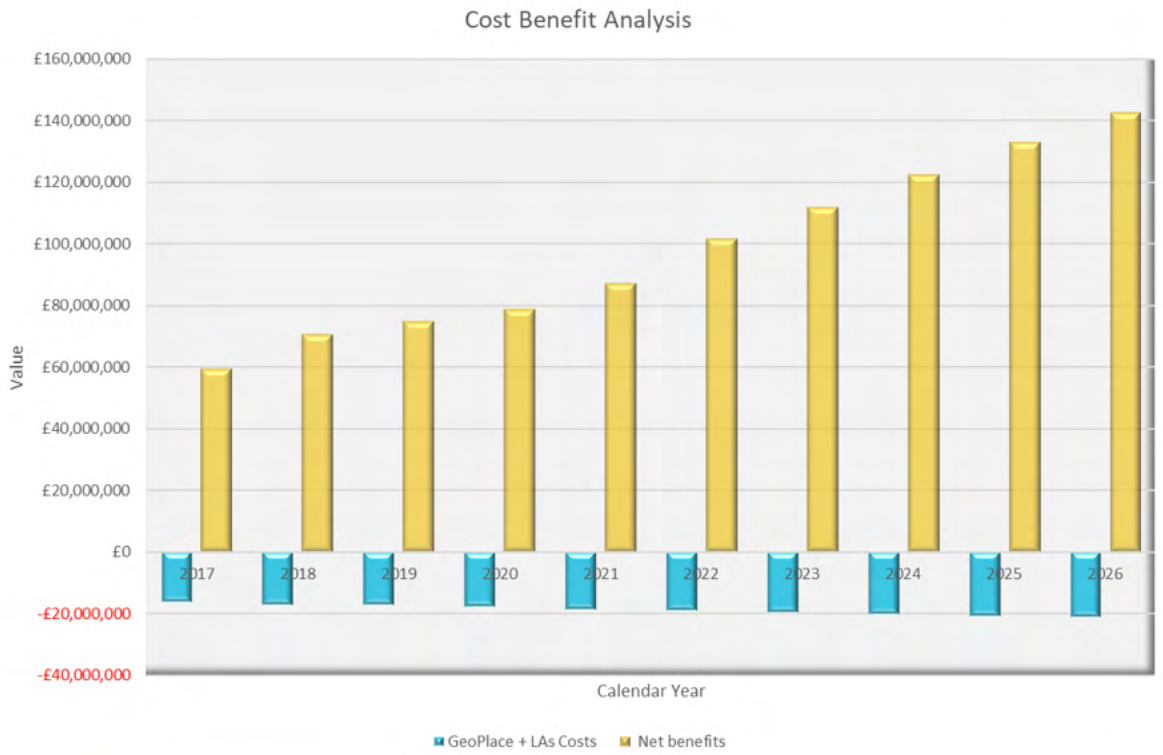
Those of growing importance are Highways Asset Management and Adult Social Care.

Data Integration has ongoing growth potential as more functions see the benefits of having a single source of the truth for address and street data.

Quantified Use Case	Discounted Benefits (Millions)
Data Integration	**£171.0**
National Non-Domestic Rates	**£74.9**
Highways Asset Management	**£190.7**
Adult Social Care (including COVID Shielding)	**£9.8**
Customer Relationship Management	**£167.9**
Waste Management	**£180.0**
TOTAL	**£794.3**

Return on Investment

2017-21
Realised Benefits: **£253m**
Return on Investment: **4:1**
2022-26
Realised Benefits: **£384m**
Return on Investment: **6:1**
Total Period (2017-26)
Cumulative Net Present Value: **£636m**
Return on Investment: **5:1**



Commentary

Prediction is very difficult, especially if it's about the future!

Niels Bohr
Danish physicist,
contemporary of Einstein

The chart above illustrates that the returns have been steadily increasing over the period under consideration.

The increases predicted over the next period (2022-26) are expected to outperform those achieved during the earlier period (2017-21). This can be ascribed to an increasing range of use cases being adopted and at an increasing rate.

The estimated levels of return are commensurate with those observed in other value studies of geospatial information. The levels of return on investment over the last 5 years, reflect those predicted in the previous (2016) study[10], which adds credence to the methodology followed and rigour of analysis.

The predicted increase over the next period, has been validated with a panel of experts.

Limitations of the financial analysis

- A limited set of use cases was included in the quantification – these were chosen because of the attributes of being easily understood and validated.
- Only a limited number of benefit types, such as time savings, were evaluated.
- The innate positive bias of extrapolating from case studies has been accounted for by writing down the value of the benefits, however, this is based upon expert opinion.
- Adoption rates are based on the consultants' judgement from case study, improvement survey and other market evidence.

Benefits realisation

It is critical that a plan is put in place, commencing now, that allows the predicted benefits to be measured easily and reliably to facilitate future auditing.

The Improvement Schedule represents the most easily adapted vehicle for measuring Key Performance Indicators (KPIs).

[10] https://www.geoplace.co.uk/case-studies/geoplace-identifies-4-1-roi

Recommendations

Sustained Marketing of the Value Proposition

We recommend a sustained, multi-faceted, marketing campaign based on the results of this study. This should include:

- Video presentations suitable for sharing with senior decision makers explaining the value of national address and street data.
- Publication of the case studies that have been produced as a result of the study.
- Support guides to aid procurement of systems that facilitate the integration of these data into a wider range of corporate systems.

Enhanced Staff Resources

Enhancement of current staffing levels in many authorities to realise the greater potential benefits in the next 5 years. Many authorities have suffered staff loses during the years of austerity and have not replaced these personnel.

GeoPlace Strategy

Enhance collaboration with bodies working at a national level such as the National Audit Office, Valuation Office, Land Registry and DLUHC in government and Socitm and Solace as pinnacle representative bodies.

Complete plans to incorporate the accurate coordination of Unique Property Reference Numbers (UPRNs) in the National Address Gazetteer (NAG) at an earlier stage in the planning process.

Advance the concept of improved integration of authoritative key registers within government to provide more consistent and up to date information for users across all sectors.

Work more closely with the private organisations particularly in land and property, transport and finance sectors to ensure national address and street data meets their digital transformation objectives.

Monitoring Success

Establish key performance indicators (KPIs) that allow realised benefits to be continuously quantified. To support this the Improvement Schedules process should be extended to ask additional questions concerning realised benefits.