DPS FRAMEWORK SCHEDULE 4: LETTER OF APPOINTMENT AND CONTRACT TERMS

Part 1: Letter of Appointment

Dear Sirs

Letter of Appointment

This letter of Appointment dated Monday, 28th September 2020 is issued in accordance with the provisions of the DPS Agreement (RM6018) between CCS and the Supplier.

Capitalised terms and expressions used in this letter have the same meanings as in the Contract Terms unless the context otherwise requires.

Order Number:	CR20079
From:	**Department of Business Energy and Industrial Strategy**, 1 Victoria St, Westminster, London, SW1H 0ET("Customer")
To:	**AMION Consulting Limited**, Winslow House, Rumford Court, 16 Rumford Place, Liverpool, United Kingdom, L3 9DG ("Supplier")

Effective Date:	Monday, 28th September, 2020
Expiry Date:	Friday, 18th, December 2020

Services required:	Set out in Section 2, Part B (Specification) of the DPS Agreement and refined by: The Customer's Project Specification attached at Appendix A and the Supplier's Proposal attached at Appendix B.

Key Individuals:	[redacted]

Contract Charges (including any applicable discount(s), but excluding VAT):	As per AW5.2 Price Schedule response highlighted within the RM6018 Contract Terms, section; Annex 1 – Contract Charges. The total value of this contract shall not exceed £49,800.00 Excluding VAT.

Insurance Requirements	Additional public liability insurance to cover all risks in the performance of the Contract, with a minimum limit of £5 million for each individual claim. Additional employers' liability insurance with a minimum limit of £5 million indemnity. Additional professional indemnity insurance adequate to cover all risks in the performance of the Contract with a minimum limit of indemnity of £2 million for each individual claim. Product liability insurance cover all risks in the provision of Deliverables under the Contract, with a minimum limit of £5 million for each individual claim.
Liability Requirements	**Suppliers limitation of Liability** (Clause 18.2 of the Contract Terms);

FORMATION OF CONTRACT

BY SIGNING AND RETURNING THIS LETTER OF APPOINTMENT (which may be done by electronic means) the Supplier agrees to enter a Contract with the Customer to provide the Services in accordance with the terms of this letter and the Contract Terms.

The Parties hereby acknowledge and agree that they have read this letter and the Contract Terms.

The Parties hereby acknowledge and agree that this Contract shall be formed when the Customer acknowledges (which may be done by electronic means) the receipt of the signed copy of this letter from the Supplier within two (2) Working Days from such receipt

For and on behalf of the Supplier:

Name and Title: [redacted]
AMION Consulting

Signature: [redacted]

Date: 25 September 2020

For and on behalf of the Customer:

Name and Title: [redacted]
Deputy Director, Business Growth, BEIS

Signature: [redacted]

Date: 29 September 2020

ANNEX A

Customer Project Specification

1. Background

Spatial disparities across UK regions are large, in absolute terms and by international standards. The case for addressing regional disparities concerns economic inefficiency and underutilisation, but also economic opportunity and social equity. The Industrial Strategy Council (ISC) has identified that regional productivity differences are at their highest in a century. The Government's 2017 Industrial Strategy White Paper noted that: "unless we improve productivity …, we cannot raise living standards and quality of life for all our citizens" and sets the goal of improving the foundations of productivity 'in all parts of the country'." Regional disparities are apparent when looking at a range of indicators. For example:

- there is a 19-year difference in healthy life expectancy for men and women between the most prosperous and most deprived areas ;
- lowest income groups have experienced the fastest growth in housing costs relative to income ;
- there are twice as many students attending outstanding schools in London compared with northern regions ;
- a child in London with parents in the bottom third of the occupation distribution has a 30% chance of moving to the top third, compared with just a 17% chance for a child in Yorkshire & the Humber .

The evidence also shows that disparities are widening in many areas, due to a cycle whereby high performing regions attract young and skilled workers, creating agglomeration effects and opportunities which act to further attract skills and businesses away from underperforming regions, leaving these regions in a low-skill and low income equilibrium. Even the 11 large UK cities (excluding London) do not achieve their potential in terms of economic performance. Their average productivity was 86% of the UK average in 2016 and they display large productivity gaps when compared to second-tier cities in other OECD countries.

The Government has made a clear commitment to reducing spatial inequalities by unleashing the potential of left behind regions through investment in infrastructure, education and technology. The Prime Minister has reiterated the Government's commitment to the levelling up agenda in his speeches, providing a clear mandate for local growth policy and the development of evidence and frameworks that will facilitate this work. The levelling up agenda seeks to close these gaps and create a more equitable national geography. The benefits of doing so are large, with a potential increase of 7.1% in average UK productivity (equating to over £100 billion in additional GDP) if the productivity of second-tier UK cities could be improved to meet the UK average. PWC also estimated a £83bn national GDP dividend if the productivity gaps between local enterprise partnerships and the national average were halved.

This work will aim to improve understanding of the drivers of regional productivity differences. Although some work in this area already exists, much of literature is dated and the problem has not been adequately explored given the scale of the issue. The availability of good spatial data has been a significant barrier prohibiting in-depth research into this issue. In order to improve data quality and support place based economic strategies BEIS commissioned the creation of a new dataset and report bringing together a wide array of publicly available and comparable indicators covering all Local Enterprise Partnership and

Local Authority regions. This work will seek to build upon the empirical evidence on drivers of spatial productivity difference by making use of the latest theory and the recently available wealth of data.

2. Aims and Objectives of the Project

The aim of this research will be to assess the extent to which factors identified in the productivity literature, and more particularly their mix, explain differences in regional productivity. The research will add to the empirical evidence and produce outputs which are directly relatable to the UK's administrative regions by making use of the recently aggregated dataset of 70+ indicators covering a wide array of metrics. Contractors should make use of existing frameworks such as those of the Industrial Strategy Council, OECD, PWC and other sources the contractors feel appropriate

The objective of the work is to improve the understanding of the policymakers and regional growth analysts of the causes of spatial disparities so that these may be better addressed through existing and potentially new local policy levers being developed as part of the levelling-up agenda. The outputs will help determine how Local Enterprise Partnerships (LEPs) and Mayoral Combined Authorities (MCAs) develop and implement their economic strategies and guide them in assessing which dimensions of productivity are most relevant and need to be prioritised.

Research objectives:

- Improved understanding of the drivers of spatial productivity difference and their relative importance

- Development of a framework to relate the observed productivity differences at a spatial level to information on the levels of local assets, capital (physical and human), connectivity and business dynamism etc

- Improved ability to conduct regional comparisons and explain disparities in a clear way, for example, be able to decompose the observed productivity gap between a LEP and the England average into the constituent productivity drivers from the framework to be developed as part of the study

- An enhanced evidence base to support the development of regional economic strategies and specific policy interventions. The findings will help illustrate the mix of attributes and the relative strengths and weaknesses of a local economy in driving productivity compared to suitable comparable areas

3. Suggested Methodology

Contractors should seek to align to the following methodology however may propose any econometric techniques that would be appropriate for answering the research questions:

- Using theoretical frameworks proposed in the academic literature can we explain the extent to which spatial productivity differences we observe in English Local Enterprise Partnerships (LEP) regions are related to the local assets of these regions

  Researchers will need to complete a brief review of the academic literature on the topic what drives regional productivity gaps, referencing works such as; UK Regional Productivity

Differences: An Evidence Review – Industrial Strategy Council (2020) , Spatial Dimension of Productivity - OECD (2020) , Spatial Determinants of Productivity: Analysis for the Regions of Great Britain - CfEP , What Drives Regional Productivity Gaps Across the UK – PWC (2019) .

Upon completing the literature review researchers will propose a methodology for decomposing productivity differences in the 38 LEPs using the dataset of 70+ indicators which will be made available by BEIS. This will involve undertaking econometric analysis to determine the relative importance of the indicators, to test how they align with the drivers identified in theoretical frameworks, and to illustrate how individual LEP productivity gaps can be explained by these drivers. Previous research on this topic has had success using methods such as structural equation modelling and principal component analysis.

4. Deliverables

BEIS require the following deliverables as part of this research project:

- A research report within the BEIS Research Report template containing:
    - A brief literature review summarising the theory and evidence relating to our current understanding of spatial productivity differences
    - Based on the literature review, a presentation of a framework of productivity drivers used to inform the empirical approach for analysing the determinants of spatial productivity differentials
    - A description of the methodology used
    - A written explanation of research findings, including a discussion of the factors determining spatial productivity disparities (making use of analytical outputs, including charts and tables to support the findings).
    - A discussion of any uncertainty and limitations of the analysis and their causes.
- A presentation of the final findings delivered to the steering group and BEIS policy customers.
- A spreadsheet presenting the project's data analysis and summary outputs
- Any code used to conduct the analysis.

ANNEX B

Supplier Proposal

Literature Review

There exists a moderately large volume of literature focussed on spatial productivity, some recent examples of which are referenced in the tender invitation. Our literature review will provide an overview not only of the underlying theoretical frameworks within which such analyses are conducted but also the (i) technical approaches adopted to deliver insights (where relevant) and (ii) explore the extent to which any of the latter might/not provide fruitful vehicles to deliver aspects of the study and thereby enter into consideration in later analysis.

Analysis

There is an inherent tension between the (top-down/bottom-up) methodologies used to assess spatial performance. Micro-level, bottom up approaches contain substantial detail of plant level activities but tend to delegate spatial drivers to single binary/dummy variables. Top-down approaches forsake plant-level detail for the benefit of analysing higher-level performance metrics and drivers at the same spatial scale.

Our proposal sits within the second of these perspectives in that it seeks to (i) contrast local area productivity performance against a range of local economy 'assets' (ii) define the relative importance of such assets in explaining performance and (iii) examine the role of asset 'mix' in understanding spatial productivity patterns.

Key to these issues three interlinked elements: namely the:

- scale of spatial analysis;
- nature of the performance variable; and
- the set of potential drivers.

Spatial scale

The project is to be focussed at decomposition across LEP/MCA areas, the geography of which thereby forms the primary scale of interest. This does not necessarily require that analysis be undertaken at this scale but it does require that outputs can be (re)structured at this scale. As such, both the performance and driver indicator set should be available at the same geography and contemporaneous.

Performance variable

There has been a significant improvement in the volume of information available at LEP level in the recent past. ONS provides LEP level productivity data in the form of GVA per hour worked over the period 2004-2018. We anticipate that this will form the initial performance metric for the study although the relatively small number of observations at LEP (England) level leads us to reflect upon the potential use of NUTs III performance data as a backup or additional validation data source in the event that analysis at LEP level is constrained due to size.

Driver dataset

We expect that the BEIS LEP/LAD datasets will form the basis of the driver profiles to be modelled as part of the study. Selection of potential drivers will reflect both the frameworks identified in the literature review and a series of screening tests for robustness and compliance with the requirements of the methodology proposed. Consistent with the above discussion, we will need to reflect upon the potential use of broader data profiles as a backup or for additional validation in the event that analysis at LEP level is constrained due to size.

Our previous work in this area has operated by defining a series of asset groups – generic groupings reflecting elements such as enterprise characteristics, labour market; location/access, industry structure, skills, housing and property - represented through a series of people and place indicators that characterise small area economies. It is our intention to operate in a similar manner for this exercise with groupings defined on the basis of the literature review, datasets and liaison with BEIS/project steering group.

Method

The basis of our anticipated approach lies in the development of a framework that not only accommodates the nature of, and interaction between, spatial performance drivers but their relative importance in explaining performance patterns, enabling assessment of area 'asset mix' in enhancing/constraining development prospects and identifying the scale of any deficit relative to better performing comparators. In essence, the task is to define a methodology that can

1. reflect interaction between what are likely to be highly collinear drivers;
2. assign a appropriate set of weights to the mix of drivers, reflecting their role in explaining performance; and
3. decompose the relative contribution of individual drivers to permit individual area profiles to be constructed and contrasted.

We will address:

1. through use of dimensionality reduction techniques to generate a suite of latent variables that represent the selected driver dataset;
2. via modified regression-based procedures to determine a set of weights for these variables that account for the profile of spatial productivity; and
3. by reverse engineering the regression-weighted outputs to form an index of driver scores representing the status of individual drivers in each area, allowing contrast of driver profiles between areas and providing a basis for identifying the extent of driver deficit/surplus relative to comparators.

There are four prima-facia technical challenges in our proposed approach, all of which have some bearing on outcomes:

- collinearity/confounding;
- spatial dependence;
- endogeneity; and
- functional form

Collinearity/confounding

We anticipate that the driver dataset will exhibit substantial collinearity. This is an inevitable feature of spatial datasets to be acknowledged but which can addressed through dimensionality reduction. Transforming a dataset (of given dimensionality) into a new reduced dimension dataset that is orthogonal (non correlated) and retains as much of the initial data geometry as is feasible, provides a potential basis on which to address collinearity/confounding.

In practice, both linear and non-linear approaches are available within broader convex and non-convex frameworks. Principal Component Analysis (PCA) is the most common technique within the more prevalent convex framework, requiring eigen-decomposition of the data matrix. Reduction is achieved by embedding datasets into a linear subspace of lower dimensionality

with the projection maintaining as much data variance as possible. The leading eigenvectors outline a series of uncorrelated linear combinations of the variables and typically contain most of the variance in the dataset.

Traditional PCA has been extended to the representation of nonlinear manifolds. Isomap (isometric mapping) techniques address circumstances where high-dimensional data points on or near a curved manifold are misinterpreted as near-points. Diffusion maps provide an alternative to Isomaps and define a Markov random walk on a graph of the data. While PCA decorrelates components, some dependencies may remain if source datasets are non-Gaussian. Independent Component Analysis (ICA) and Dimensionality Reduction via Regression (DRR) are approaches that seek to address the issue.

As such, there exist a variety of potential dimension reduction paths and the starting point for this part of our analysis will be an assessment of a number of different reduction methods as a means of representing variation in the selected driver dataset. Parameters for evaluation will include standard tools such as RMSE but will also extend to specific measures of embedding quality.

Despite the advance of nonlinear methods, PCA remains the most widely used dimensionality reduction technique in many disciplines and typically performs well in embedding tests. It is relatively straightforward to apply and interpret, involves solution of a convex problem which permits invertibility and facilitates performance assessment. We have used PCA or principal components regression (PCR) in a number of exercises similar in nature to the current context.

We are conscious, however, that there exist grounds for caution. The practice of rotating components is common though can be troublesome in terms of underlying implications. Another, sometimes overlooked, attribute of PCA is potential sign indeterminacy, a by-product of computations used to ensure numerical stability. Finally, PCA is sensitive to outliers. A key characteristic of any robust estimator is the breakdown point - the proportion of outliers beyond which the estimator loses robustness. Both OLS and PCA have a zero breakdown point in that a single outlier may be sufficient to undermine outcomes. Consequently, there has been substantial investigation of methods to define more 'robust' PCA bases. If a PCA approach is pursued, these elements will need due consideration.

Spatial Dependence

It is common for observations to be correlated in terms of time, subgroup clusters or spatial distribution and it is highly likely that the driver dataset will display spatial dependence. This will need to be addressed to ensure that regression coefficients are not biased.

One (traditional) means of encompassing spatial dependencies is to specify autoregressive models but another modus operandi is that of eigenvector spatial filtering (ESF). The latter uses a set of synthetic proxy variates, based on some 'articulation' (typically a spatial weights matrix) that ties observations together, as control variables in a model specification. These controls identify and isolate stochastic dependencies among the observations allowing modelling to proceed 'as if' these observations are independent.

The ESF approach uses a mathematical decomposition of a transformed spatial weight matrix and generates s series of eigenvectors and eigenvalues. Eigenvectors are orthogonal/uncorrelated and each portrays a different map pattern exhibiting a specified level of spatial correlation when it is mapped in conjunction with the corresponding spatial weight matrix

In practice, ESF accounts for spatial correlation with a linear combination of the eigenvectors. As the combination accounts for spatial correlation, the ESF regression specification does not suffer from such correlation in its residuals. In other words, addition of the eigenvectors in the

regression equation does not change the expected conditional mean of Y because the mean of each eigenvector is zero.

Classical ESF considers eigenvector parameters as fixed whereas modern variants allow consideration of random effects ESF. RE-ESF models extract eigenvectors whose eigenvalues exceeds a defined threshold with parameters estimated by restricted maximum likelihood (REML).

In addition to accounting for spatial dependence, there is some evidence that ESF approaches may also be an effective method to alleviate spatially-related omitted variable bias. Another appealing feature is that it utilises a relevant subset of eigenvectors extracted from a spatial weights matrix, whereas a spatial autoregressive model utilises the full set of these eigenvectors, both those that correlate and those that do not correlate and hence introduce noise. We will examine models that include both fixed and random effect ESF structures.

Endogeneity

It is anticipated that a number of the underlying asset structures/indicators used in this exercise may be endogenous in nature. The extent to which intermediate/latent variables constructed from asset structures are themselves endogenous, on the other hand, is a matter of debate. In practice, there exists no *a priori* basis on which to 'impute' the presence of endogenous regressor relationships in the context of the approach envisaged and we thereby intend to adopt a simple stance of testing for, and contrasting, outcomes with and without adjustment for endogeneity.

While instrumental variable (IV) approaches remain the most common method of accommodating models with one (or more) endogenous variables, the definition of appropriate instruments remains a challenge. In the absence of traditional instrument structures, we will explore alternatives and examine potential to use 'synthetic' instrumental variables (SIVs).

One potential SIV, related to the discussion in the previous section, is to use artificial map patterns derived from the spatial configuration of a spatial system as SIVs. Another area of research has focussed on purely statistical approaches that do not require observed instruments. Options for these 'instrument free' methods include the increasing ability to model the joint distribution of an endogenous regressor and the error term (the structural error) and make inferences about model parameters by maximizing the likelihood from the joint distribution. Copula methods can be used to build the marginal distribution function of an endogenous regressor.

Copulas are functions that join or "couple" multivariate distributions to their one-dimensional marginal distribution functions It is therefore feasible to employ a copula model to construct a multivariate distribution which effectively captures the correlation between the regressor and the structural error. If this correlation is appropriately handled, endogeneity is removed and it is possible to obtain consistent estimates for model parameters. We will examine the extent to which allowing for endogeneity through use of SIVs impacts on the regression-based weights used within the study.

We envisage that formal modelling of endogeneity will be undertaken via a two stage residual inclusion (2SRI) (control function) procedure. Rather than replacing endogenous variables by first-stage predictors as in 2SLS. 2SRI includes first-stage residuals as additional regressors but faces the disadvantage that standard errors from the second stage are typically incorrect as they ignore measurement error that carries over from using the predictions of one model in another. We will address this issue by correcting standard errors using quasi-maximum likelihood estimation (QMLE).

Functional form

While the linear regression model remains a fundamental building block of multivariate analysis, it is less than clear that it may be the model of choice in the current context. Our preferred performance variable - GVA per hour – may not be normally distributed and the presence of outliers may raise concerns about the likely robustness of OLS. A common approach in such circumstance is to assume that the dependent variable is lognormally distributed which generally helps with skewed distributions, but evidence of significant skew and kurtosis may remain. In this case, we will need to examine prospects for making other distributional assumptions and modelling and to consider estimation through semi-parametric approaches such as Generalized Additive Models for Location, Scale and Shape (GAMLSS).

In GAMLSS models, traditional assumptions about exponential family distributions for a response variable are relaxed and replaced by a general distribution family, including highly skewed and/or kurtotic continuous and discrete distributions. Estimation is based on backfitting-type Gauss-Newton algorithms with AIC-based selection of relevant predictors. In practice, GAMLSS procedures allow direct modelling of distributional moments. As such, we may use a GAMLSS structure to model performance even if a standard regression is suitable as it permits direct modelling of the standard deviation as well as the mean.

Outputs

We are of the view that the proposed approach provides a 'best-fit' framework for the project objectives. It seeks to account for multiple drivers, distinguish the relative importance of drivers in explaining spatial productivity performance and provides a structure to facilitate comparator analysis.

Dissemination

We would develop with BEIS a dissemination programme, which we anticipate would comprise four components as follows:

(i) Final Technical Report – this would present the results of the research and include technical appendices setting out the methodology and the econometric results;

(ii) Separate summary report – this would be produced in a published form and would be written in an accessible style, summarising the key policy and practice lessons from the research. It would include charts, maps, tables and graphs, along with an infographic;

(iii) Workshops – technical sessions with analysts and others to discuss the research methodology/approach; and

(iv) Seminars – presenting the results of the research to interested groups including LEPs.

We attach an example of an earlier analysis that used a similar approach to that outlined above, together with examples of accessible documents produced for Sports England that were prepared to enable the widespread dissemination of the results of economic modelling analyses.

PROJ1.2 STAFF TO DELIVER (max 6 sides)

Please demonstrate your knowledge of the skills and expertise that are essential to the successful delivery of this project. Please provide your methodology as to how you will maintain your ability to deliver these through the lifetime of the project. Bidders are asked to demonstrate: As a minimum your response should include: • Any support that would be

needed and from whom, in order to undertake and complete this project. An attachment is allowed for this question This question is limited to 6 sides of A4

AMION Consulting is a leading economics advisory business. We provide independent strategic advice to help achieve economic growth. We are absolutely focused on delivering success for our clients and work with them to understand their objectives and share our knowledge.

AMION's principals and senior consultants are established practitioners, each of whom has proven national expertise in the field of economics and economic development. We blend together this recognised expertise to offer clients an innovative, practical and focused service. We have worked extensively with Government and its agencies (including Homes England and Development Corporations), local authorities, developers, and Local Enterprise Partnerships (LEPs), as well as a range of private sector clients.

AMION has the knowledge and experience to successfully deliver the research services for BEIS. In particular, we would highlight the following:

- Successful track record in managing major research assignments – the AMION team, led by [redacted], has successfully completed various major research assignments for central government, including in relation to the National Strategy for Neighbourhood Renewal and the Local Enterprise Growth Initiative. The firm is currently completing research for MHCLG based on hedonic modelling in relation to additionality. [redacted] has also previously provided expert advice to MHCLG on Cities, Regions and Neighbourhoods and was a member of the Expert Economic Panel for a major national infrastructure project.
- Expert knowledge of regional development – AMION has extensive experience and knowledge of all of the component of regional development having advised Regional Development Agencies and LEPs on their Strategic Economic Plans and Local Industrial Strategies. The firm has extensive knowledge of sector specific issues, infrastructure development, development economics, skills development, housing, commercial property, environmental and social issues.
- Analytical modelling expertise – [redacted] is an AMION associate and has specific expertise in statistical and econometric analysis relating to microdata, multivariate methods and spatial econometrics. With extensive application of limited dependent variable techniques, modelling of count data, multi-level modelling, non-experimental evaluation methodologies and other analytical tools, he has substantive quantitative experience and specific experience of Counterfactual Impact Evaluation methods. This skillset will be critical to 'getting under the skin' of regional performance data and producing meaningful results. He and [redacted] have worked together on economic modelling research assignments for over twenty-five years.
- Successful track record drafting accessible policy and practice focussed reports – the AMION team, led by [redacted], has successfully prepared various summary reports that draw out the policy and practice implications of research. For example, the firm is currently preparing a policy and practice paper for MHCLG in relation to additionality to inform discussions with HM Treasury in relation the Spending review.

All aspects of the project will be delivered by AMION staff and senior associates. We do not envisage any additional external support for analysis or delivery. The study team for this assignment would comprise:

- [redacted] is the Chief Executive of AMION and leads the firm's economic services. He specialises in economic research and analysis, business case development and

appraisal, impact assessments, economic and regeneration strategies, evaluations, and market analyses. [redacted] has led studies to develop Strategic Economic Plans and Local Industrial Strategies. He has advised on the development of numerous business case submissions (underpinned by economic impact assessments) throughout England, for example HS2. Major development related projects have included the development of business cases for the Paradise development and Smithfield schemes in Birmingham, as well as the Paddington and Pall Mall schemes in Liverpool. [redacted] has advised Homes England (and its predecessors) on business cases and appraisals for over twenty-five years and has assessed hundreds of schemes. He has prepared national guidance and is currently leading a study for the MHCLG to update the Additionality Guide.

[redacted] experience assisting with strategic and economic development projects includes:

- current additionality research work for MHCLG
- advice to (now) Homes England on placemaking and drivers of local change;
- guidance, evaluations and research for the HCA – Additionality Guide (including all updates), Cost per Job Guidance and Cost Benefit Analysis Guidance; and Regeneration and Place Making research;
- evaluation of the National Strategy for Neighbourhood Renewal (now MHCLG)
- evaluation of the Local Enterprise Growth Initiative (now MHCLG, BEIS and HM Treasury)
- evaluation of the English Cities Fund (ECF) Programme (HCA)
- local economic assessments for areas such as Worcestershire, Warwickshire, Staffordshire, the A11 Corridor, Liverpool City Region and Tewkesberry
- evidence reviews for the development of the LIS for Worcestershire LEP and Liverpool City Region LEP;
- research to explore the economic synergies within and between Warwickshire, Worcestershire and Staffordshire;
- forecasting and sector studies, including work on the civil nuclear sector
- business case for the HS2 UK Central station;
- business cases for HS2 Ltd including: the relocation of The Island Project; the strategic acquisition of the Bromford Lane site; and the Network Park site;
- business case for the Snow Hill Growth Strategy;
- economic case for the development of Liverpool2 – a new in river terminal at Liverpool Docks – and for the development of Port Salford;
- business Case for the MIRA EZ Investment Plan;
- business Case for the International Festival for Business (IFB) 2014, 2016 and 2018;
- business Case for Liverpool's City Deal Programme for Liverpool City Council; and
- Housing and commercial development schemes – including support to developers in submitting planning cases. Examples include a recent housing scheme in Poole and North Wales. As well as working for the public and private sector clients on commercial developments with a current example being the support to Peel in relation to developments at Wirral and Liverpool Waters.

- [redacted] is a Senior Associate of AMION Consulting. Originally a university academic, he joined a university-based consultancy becoming managing consultant before starting Pion Economics in 1998. [redacted] has specific expertise in statistical and econometric analysis relating to microdata, multivariate methods and spatial econometrics. With extensive application of limited dependent variable techniques, modelling of count data, multi-level modelling, non-experimental evaluation methodologies and other analytical tools, he has substantive quantitative experience and specific experience of Counterfactual Impact Evaluation methods. [redacted] is an Approved ONS Researcher for purposes of accessing ONS microdata and using the facilities of the ONS Virtual Micro Laboratory (VML) to access/use the UK Business Structure Database (BSD).

  [redacted] previous relevant experience includes:

  - current additionality research work for MHCLG;
  - evaluation of City Challenge Programme in England, with responsibility for data analysis of the programme across England;
  - advice to (now) Homes England on placemaking and drivers of local change
  - leading on econometric analysis for the National Evaluation of the Local Enterprise Growth Initiative (Business Innovation and Skills and Department for Communities and Local Government), as a member of study team with AMION Consulting and CUPS;
  - leading on econometric analysis for the National Evaluation of the National Strategy for Neighbourhood Renewal (Department for Communities and Local Government), as a member of study team with AMION Consulting and CUPS;
  - Low business growth rates in Liverpool (Liverpool Vision) – responsibility included statistical analysis of business data into reasons for low growth rates;
  - leading on economic modelling for the Ministry of Defence – impact of macro-economic factor on recruitment and retention in the armed forces;
  - impact evaluation for the LCR CA Households into Work programme;
  - thematic evaluation of the Cornwall and Isles of Scilly Convergence Programme;
  - potential economic impact of Shale Gas in the Ocean Gateway;
  - evaluation of the Liverpool JET Service (Liverpool City Council);
  - various work for the Government Office North West including: Objective 3 Programme Status Evaluation, evaluation of CFO Proposals, North West Objective 3 Initial Programme Evaluation, Ex-Ante Evaluation of the North West URBAN II Programme;
  - economic evaluation of the Greater Manchester HEIs;
  - provision of advice and consultancy support for the Isle of Man government in the economic evaluation of training programmes;
  - evaluation of the Grants for Research and Development programme;
  - Jodrell Bank Impact Study; and
  - Mersey Gateway Impact Study.

- [redacted] is an Economics Graduate from the University of Durham and is part of AMION's economics team. As a member of the team, [redacted] primary focus is policy and economic analysis and conducting impact assessments. She has recently provided inputs into transport related business cases such as the Snow Hill Station Strategic Outline Business Case.

  [redacted] has assisted with the following strategic and research projects:

  - Research assistance for the additionality research for MHCLG;
  - Snow Hill station Business Case in Birmingham, which included estimating amenity benefits of the proposed transport infrastructure developments using business rates data from the Valuation Office Agency;
  - research assistance and data analysis for the LCR CA Households into Work programme;
  - preparation of the Birmingham Smithfield Business Case, seeking funding for a mixed-use development within Birmingham City Centre;
  - NAMRC Midlands Business Case, seeking funding for a research and development facility in Derby. Lucy prepared various BEIS models to help estimate the impact of the proposed scheme on employment and business growth, as well as an example of a bottom-up appraisal of an R&D policy; and
  - preparation of a report on the economic impact of affordable housing in Wales for Community Housing Cymru.

AMION Consulting have previous experience of the proposed methodology and have used the outputs to guide a variety of project-based local strategy developments. The analysis proposed here is substantially more extensive than earlier versions.

PROJ1.3: UNDERSTANDING THE PROJECT ENVIRONMENT

Demonstrate your understanding of the project environment, detailing any knowledge relevant to the project and policy/programme area, including any data sources or research relevant to the project. Bidder guidance Bidders are asked to demonstrate: As a minimum your response should include: • Interpretation of the project and what is required • How the bidder will ensure the successful deliver of this project within the working environment An attachment is allowed for this question This question is limited to 2 sides of A4.

Spatial productivity differentials are deeply entrenched within the UK. Such is the pattern of performance in England that only a third of NUTS3 areas perform better than the overall England average and only a handful of these lie outside the London, South East and East regions.

Examination of LISA (local indicators of spatial autocorrelation) profiles suggest that significant 'high-high' performance correlations are present in London and its hinterland whereas significant 'low-low' performance correlations are evident in the West Midlands, East Yorkshire and North East of England. Persistent and extensive differentials such as these raise important questions as to what it is that accounts for such variation across the country.

There is no shortage of analyses that provide insight into aspects of spatial performance but the identification of productivity drivers, and their relative importance, has proved somewhat elusive. One of the reasons for limited progress, in our view, is the presence of an inherent tension in methodologies intended to assess spatial performance.

Much recent work has focussed on plant-level analyses, typically modelling patterns of total factor (TFP) or labour productivity via estimation of production functions using datasets such as the Annual Respondents Database (ARD) or Annual Business Survey (ABS).

Such studies reflect a level of detail previously unimagined by regional analysts but there is one fundamental deficiency – apart from the fact that plants are spatially referenced by location, there is generally little commensurate assessment of the wider performance advantage or disadvantage associated with operating at that location.

As such, there may well exist substantive spatial heterogeneity (i.e. very similar firms may perform differently in different locations) that remain unobservable and unaccounted for in such models other than indirectly, through the use of city/region dummies in model specifications. All spatial drivers are thereby amalgamated into a single coefficient which is somewhat limiting given that research suggests that up to 50% of the productivity difference between London and elsewhere may be due to unidentified spatial factors.

The alternative to the bottom-up micro-level approach is to operate within the context of a spatial 'landscape' in which productivity performance and potential drivers are brought together for scrutiny and analysis on a consistent spatial basis. Here, productivity is defined in terms of broader (higher-level) metrics rather than at individual plant level, a compromise inherent in adopting a spatial perspective. Directly assessing the relationship between productivity and potential drivers at the same spatial scale, on the other hand, does not subsume all spatial drivers within a single binary variable.

Our view is that the proposed project is intended to make headway in the context of these competing approaches. It has the ambition of providing insight into the range of spatial features that combine to explain variations in spatial performance and constructing a framework within which to (i) assess the relative standing of areas in terms of such drivers (ii) evaluate the nature/extent of driver deficit/surplus relative to potential comparators and (iii) provide support for LEP/MCA development planning.

Our proposal is based on a top-down rather than bottom-up methodology. The basis of the approach lies in the development of a framework that not only accommodates the nature of, and interaction between, spatial performance drivers but their relative importance in explaining performance patterns, enabling assessment of area 'asset mix' in enhancing/constraining development prospects and identifying the scale of any deficit relative to better performing comparators. In essence, the task is to define a methodology that can

1. reflect interaction between what are likely to be highly collinear drivers;
2. assign a appropriate set of weights to the mix of drivers, reflecting their role in explaining performance; and
3. decompose the relative contribution of individual drivers to permit individual area profiles to be constructed and contrasted.

This approach is based on previous, exploratory use of such a framework to provide insight into a range of local area strategy reviews/analyses all of which are unpublished. Dimensionality reduction was previously used to generate a suite of latent variables that represent the selected driver dataset with regression analysis used to assign weights for these variables and reverse engineering the regression-weighted outputs to form an index of driver scores.

The major advances in our current proposal primarily relate to considering a wider range of dimensionality options and amending regression models to reflect spatial dependence, endogeneity and potential non-linearity. While our proposal is significantly more advanced than earlier exploratory work, we will have that experience to guide project delivery.

The analysis will be undertaken using desk-based materials and primarily through the R programming language and software environment.

PROJ1.4 PROJECT PLAN AND TIMESCALES

Please outline your proposed project plan and timescales, ensuring the key deadlines outlined in the specification are met. Bidder guidance Bidders are asked to demonstrate/provide: As a minimum your response should cover; • A detailed timetable for carrying out the work based on the proposed approach and method • Highlight key milestones and deadlines, including suggested meetings and progress reports. An attachment is allowed for this question This question is limited to 2 sides of A4.

[redacted] will be the Engagement Leader with overall responsibility for management of the assignment. [redacted] will be Project Manager, providing day-to-day oversight of the research. Internal Chairman reviews will be undertaken by [redacted] at every project milestone. [redacted] will also be kept informed of project progress on a regular basis and will provide objective advice and support to the team as necessary. No charge will be made for these Quality Assurance reviews.

In terms of communication between AMION and the BEIS Steering Group, we propose bi-weekly telephone updates and progress notes provided by email during the course of the research assignment. The telephone conversations will also be used to discuss any issues which may have arisen over the intervening period and whether any particular actions need to be undertaken by either party. Short action notes will be prepared by AMION after each call or meeting. This will help to ensure that the research deadlines are met.

We will also hold an inception meeting with BEIS at the start in order to clarify the tasks, outputs and work programme of the assignment. Prior to the Inception Meeting, AMION will prepare an initial list of information requirements to ensure that the project can proceed without delay.

Our weekly planning will ensure that our named team members are aware of their targets in relation to the research project each week and will therefore allocate the appropriate time to each task. We have, in preparing this tender, determined that our team members have sufficient capacity in their work schedules over the next few weeks/months to be able to dedicate the necessary time to the assignment. AMION's working practices include the submission of weekly timesheets which are used to manage time inputs for all projects and ensure that projects and fees remain on schedule.

During periods of increased workload, we will be able to provide additional resources. AMION has a team of six economists and a further two associates, all of whom have extensive experience of both preparing public sector research studies for a range of clients. We are therefore fully confident in our ability to flexibly manage the flow of work coming from the commission, including during periods of increased activity. Our intention would be to work very closely with BEIS in completing the research. We would therefore like to be provided with contact details for a person with responsibility for the assignment who we will be able to contact with information requests.

The key milestones for the assignment are as follows:

(i) Inception meeting – w/c 31/8

(ii) Literature Review – w/c 7/9 – w/c 14/9

(iii) Data Compilation – w/c 7/9 – w/c 28/9

(iv) Data Analysis – w/c 5/10 – w/c 19/10

(v) Draft Report – w/c 26/10

(vi) Final Report – w/c 23/11

(vii) End of programme dissemination (Meetings/Presentations) – these have been programmes for the w/c 23/11 – w/w 30/11, but in reality, we would expect this to extend beyond the end of the contract period.

Figure 1 sets out the proposed research programme.

PROJ1.4: Project Plan and Timescales

Proposed research programme - 14062020

Milestone date															
Months	Aug-20	Sep-20				Oct-20				Nov-20					
Week Commencing	31st	7th	14th	21st	28th	5th	12th	19th	26th	2nd	9th	16th	23rd	30th	
Milestone															
Anticipated contract start date															
Inception Meeting															
Literature Review															
Data Compilation															
Data Analysis															
Draft Report															
Final Report															
End of programme dissemination (Meetings/Presentations)															
Anticipated contract end date															

Part 2: Contract Terms