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Improve Reliability of Estimating the Demand-side Size of the U.K. Geospatial Industry

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Background & Motivation

This dissertation seeks to improve the reliability of estimating the demand-side value of the U.K. Geospatial industry across various sectors. For the purpose of the report, the following sectors were considered, a) Agriculture, Forestry and Fishing, b) Mining and quarrying, c) Electricity, Gas, Steam and Air-conditioning Supply, d) Water Supply, Sewage and Waste Management, e) Construction, f) Transportation and Storage, g) Public Sector.

The study also tried to examine the potential positive impact on the demand value for these industries once the application of GIS is done. Based on the supply side numbers, a multiplier methodology is applied to obtain multiplier values for these sectors. Furthermore, new companies are trying to exploit a wide range of new use cases. With the revenues of the new companies being relatively small, there are huge opportunities in sectors such as financial services, defence, and construction for them to thrive in well-defined niches.

Data & Methods

Data was obtained from the sponsor organisation, ConsultingWhere for this study. To prevent any distortion in the study, the cumulative supply-side revenue of > 1 million GBP was considered. Also, missing information was dealt with by referring to beta.companieshouse.gov.uk website.

As the key objective was to find the demand multipliers of each industry segment mentioned above, i.e. for each pound of revenue clocked how many pounds of demand value is added. A 5 stage methodology was adopted to generate demand multipliers summarised as follows: a) Data Quality (fitness for use) b) Dealing with Missing Data c) Creating Schema for Supply and Demand-Side d) Augmenting Database e) Multiplier Methodology using Least Square and Least Norm Solutions.

Key Findings

The results using Least Norm Solution shows that the Demand Multiplier, M lies in the range of [-2.6, 125.5] with multiplier values in 8 sectors were below 1 and in 10 sectors were greater than 20.

With the Least Square method, better results were obtained as it allows us to provide bounds while minimising the objective function. As expected, none of the demand multipliers were negative and the range of the values was [0.1, 125.5] with 7 values below 1 and 10 values above 20. In the next approach, a modified weight matrix after normalising with supply-side revenues was used. This allowed us to put desired bounds directly on the unknown variables and that fetched even better results. Now, the multiplier values lie in the range of [2, 10], and no correlation to allocation was observed across industries, and as expected demand value-added was proportional to supply-side revenues.

Previously adopted methodology for checking the demand size by analysing the supply numbers was undertaken in several countries yielding a multiplier in the range of 5-20 times. Now, being able to assign the demand multiplier values to different industries will certainly bring a better estimation of the demand value created after implementing GIS in various sectors.

Value Added

This dissertation has demonstrated that the implementation of GIS is effective in:

1. Creating a positive impact on the demand side of a business, and
2. Assess whether it is beneficial to introduce GIS in the respective sectors

The work is of potential interest to ConsultingWhere and would also like to take a piece of the research work to turn it into a blog. Moreover, with the addition of a new industry, it would be convenient to look at the sectors and picking up multiplier values for better estimation of the demand-side value it can possibly create.