# Integrating Geospatial Linked Open Data and Knowledge Networks into Business Intelligence

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**Geospatial Linked Open Data (LOD), and more generally, the idea of making semantically annotated location data available on the Web, has taken information technologies by storm. However, this idea's novelty and complexity do not ensure the successful integration of LOD across applications and domains, particularly with the Location Business Intelligence (BI). Although the integration of Geospatial LOD in Location BI solutions would be beneficial for both, they still remain largely separated.**

## MOTIVATION

When Linked Data can be analyzed and visualized in Business Intelligence tools, the best of both worlds can be combined. With Linked Data, it is possible to combine a large variety of data and query it at the source. Business Intelligence tools serve as an optimal GUI for the visualization of these data. The data would no longer need to be copied and extracted to data warehouses and could be analyzed and visualized directly from the source. For end-users who want to use the data in Business Intelligence tools, the Linked Data technology will become much more accessible [1]. Geospatial data integration in Business Intelligence is a fundamental step for the creation of maps and other visualization products, which in turn, can be a source for potential decisions and user- and industry-specific solutions.

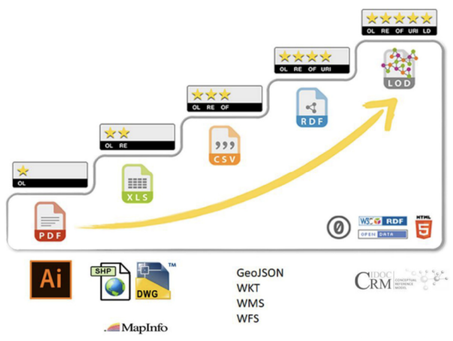


*Fig. 1 The Five Star Open Data model (CC–0) [2], [3] applied to spatial data types [4]*

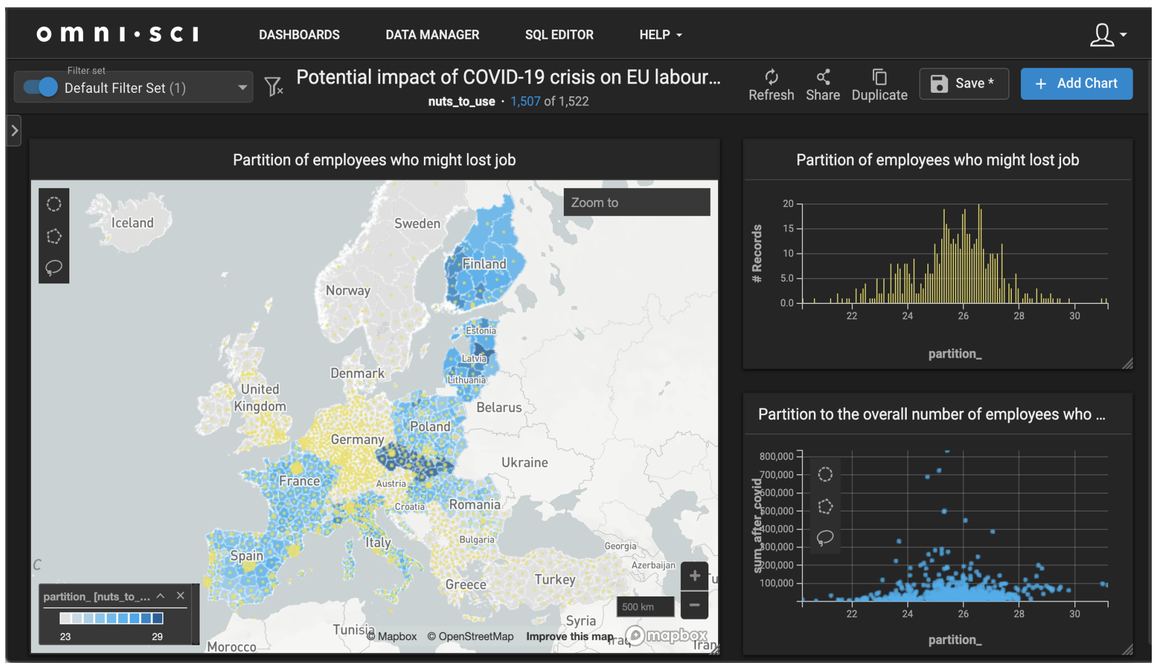


*Fig. 2 Potential impact of COVID-2019 crisis on EU labor markets | OmniSci*

## METHODOLOGY

To investigate factors that prevent successful deep integration of Geospatial LOD in Location BI, there were done such steps as:

- Review of the related works and findings
- Development of two thematic scenarios
- Exploration of the relevant LOD providers
- Exploration of leaders of the global Location BI market
- Integration of Geospatial LOD to visualization frameworks of BI tools

## THEMATIC SCENARIOS

Scenario 1. *Potential impact of COVID-2019 crisis on EU labor markets*

Scenario 2. *Closeness of bike-sharing services to the areas of Alpine ibex colonies concentration within Switzerland*

## LOD PROVIDERS

eurostat

EUROPEAN DATA PORTAL

## LOCATION BI SOFTWARE

tableau

esri

CARTO

omni·sci

## RESULTS

At first glance, the availability of data for being queried within interlinked RDFs in LOD providers completely satisfies the requirements of The Five Star Open Data model. But in fact, it remains as an isolated technology for the outside use, in particular in Location BI. BI tools mostly focus on geospatial data transfer and integration technologies that are common and easily accessible among end-users. They are: Extract, Transform, Load (ETL), API and Web Services, and SQL queries on databases.

## CONCLUSION

Geospatial data is still not ideally preserved from the LOD environment to the BI solutions, and the gap remains uncovered. It is highly reasonable to support Location Business Intelligence with a cartographic methodology of the Geospatial LOD integration. Successful deep integration of both would allow Business Intelligence tools to directly transform the potential of Geospatial Linked Open Data into valuable decisions and solutions across various domains.

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## YEAR

2020

## KEYWORDS

Geospatial, Linked Open Data, Business Intelligence, Location Intelligence, interoperability and reusability

## REFERENCES

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*This master thesis was created within the Cartography M.Sc. programme – proudly co-funded by the Erasmus+ Programme of the European Union.*

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