COYPU

Cognitive Economy Intelligence
Plattform für die Resilienz
wirtschaftlicher Ökosysteme

Towards a Regional Public Dashboard for Crisis and Resilience Management

Fatih Kilic
Institut für Angewandte Informatik (InfAI)

eswc24

Motivation

Regional Approach

- Economic analyses and forecasts including economic shocks are available at the national level, but specific analyses for the regional and local levels are often missing.
- It is important because regions are affected differently by shocks due to their specific industrial structures.

Challenges in Crisis and Resilience Management

- In the short term, supply chains can hardly be changed.
- In the medium and long term, supply chains can be modified (e.g., through diversification, reshoring, etc.). However, a complete decoupling from international value chains does not occur, primarily due to the economic welfare gains from international trade.

Goal

- Regional public dashboard for Saxony as blueprint, for crisis and resilience management, transferability to other regions.

- Quantify the effects of shocks along international value chains at regional and local levels in quasi-real-time.
  - especially changes in production, unemployment, value creation, tax revenues

- Support decision-makers from politics, economy, and administration in responding promptly to crises, containing the effects, and strengthening regional resilience.
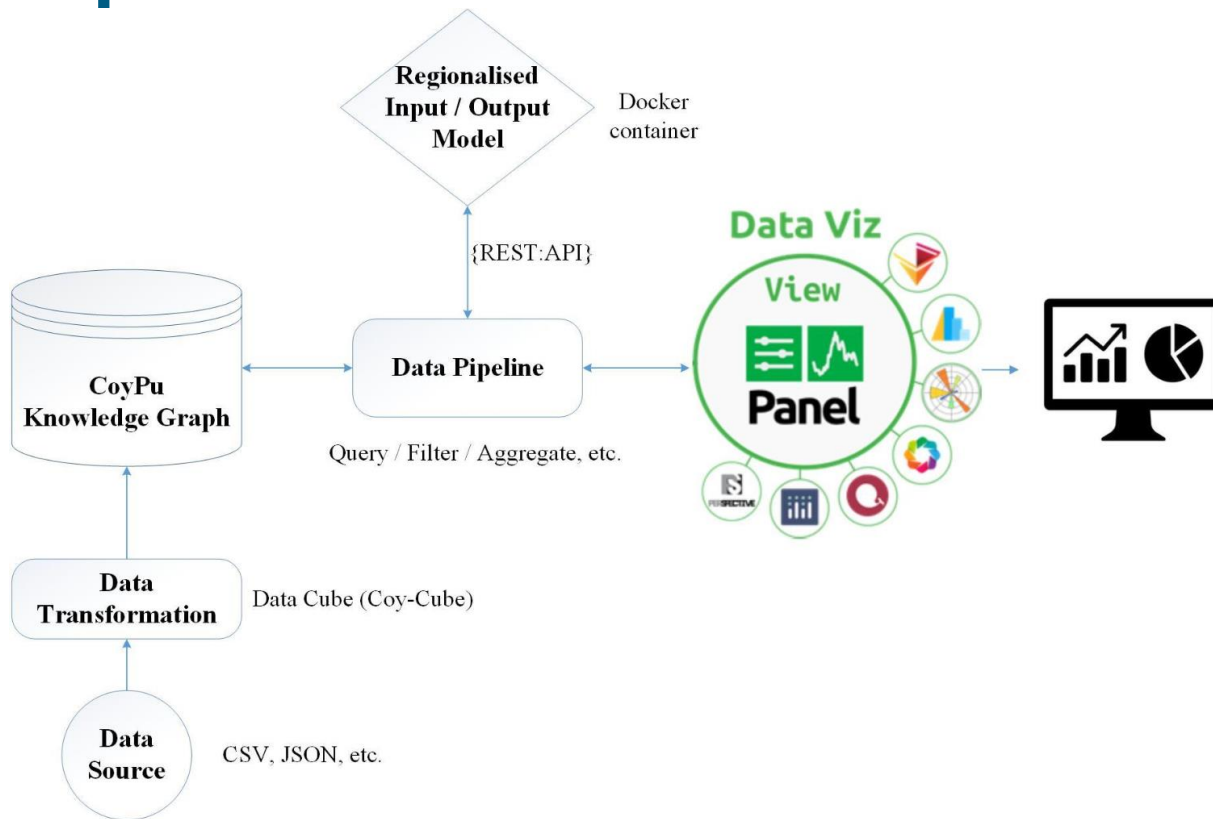
Data and Method

- **Data from Federal Statistical Office of Germany (Foreign Trade, National Accounts, Crisis «Events» such as Disaster event , etc.)**
- **Data are semantically linked and integrated into CoyPu knowledge graph.**

- **Modelling of Supply Chain Shocks for Saxony:**
  - **Regionalized input-output model (interlinkages between industries)**
  - **Effects of (crisis) events on imports of intermediate goods to Saxony**
  - **Overall economic effects for Saxony (direct, indirect, induced)**

Concept

Regionalised
Input / Output
Model

Docker
container

{REST:API}

Data Viz

View

Panel

CoyPu
Knowledge Graph

Data Pipeline

Query / Filter / Aggregate, etc.

Data
Transformation

Data Cube (Coy-Cube)

Data
Source

CSV, JSON, etc.

Coy-Cube

- Customized data cube for the public dashboard
- Coy-Cube is used to represent the data from Destatis (Statistisches Bundesamt)
- Created the prefix "cq:" for the Coy-Cube and multiple properties
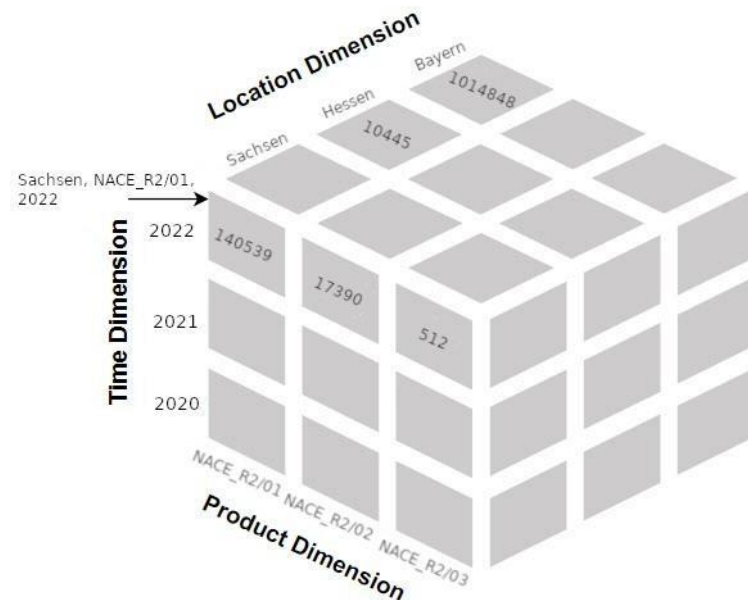

```
# -- Datastructure definition --
cq:dsd a qb:DataStructureDefinition ;
  rdfs:label "Data Structure Definition for 51000-0034" ;
  qb:component [ qb:dimension coy:hasYear , qb:order 1 ] ;
  qb:component [ qb:dimension cq:state, qb:order 2 ] ;
  qb:component [ qb:dimension cq:productGroup, qb:order 3 ] ;
  qb:component [ qb:measure cq:value, qb:order 4 ] .

# -- DimensionProperty definition --
cq:state a qb:DimensionProperty ;
  rdfs:label "state" ;
  rdfs:comment "state of Germnay" .
```

```
<https://data.coypu.org/genesis/51000-0034/observations/import/2022/14/GP19-01>
    a qb:Observation ;
    cq:state <https://data.coypu.org/state/Sachsen> ;
    cq:productGroup <https://data.coypu.org/classification/nace_r2/01> ;
    cq:value "140539" ;
    coy:hasYear 2022 .
```

Data Visualization & Dashboard Development
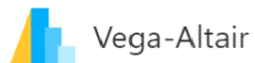
Panel

- Develop in your favorite environment, editor or jupyter-notebook
- Combine the Python visualization tools and plotting libraries such as Plotly, bokeh, etc.
- Develop quickly data tools, dashboards and complex apps
- Create interactive, high performing, streaming data applications that can run entirely in the browser
- Create performant, secure and production-ready web applications
- Panel is also part of HoloViz project

HoloViz-maintained libraries:

https://dashboard.coypu.org/

Towards a Regional Public Dashboard for Crisis and Resilience Management

Fatih Kılıç[2], Till Grabo[2], Julia Lücke[1], Norman Radtke[2], Christian Danne[4], Sabine Gründer-Fahrer[2] and Michael Martin[2,3]

[1]Deutsches Institut für Wirtschaftsforschung e.V., Berlin, Germany
[2]Institute for Applied Informatics (InfAI), Leipzig, Germany
[3]University of Technology Chemnitz, Germany
[4]DIW Econ GmbH, Berlin, Germany

Abstract

The paper presents ongoing work on a public dashboard that displays the trade relationships of a regional economy in Germany (Saxony) and uses semantic data integration techniques to connect it with localized information on global crisis events in supplying countries. Furthermore, it quantifies the impact of external supply shocks on (subregions of) the Saxon economy in quasi-real time and provides estimates of changes in macroeconomic determinants based on a regional input-output model. The dashboard will be a public resource to support decision makers from politics, business and administration in mitigating the effects of crises and improving regional resilience.

Keywords

Resilience Management, Crisis Management, Coypu Knowledge Graph, Regional Input Output Model

Further information
https://coypu.org/

Fatih Kilic (InfAI): kilic@infai.org

COYPU
Cognitive Economy Intelligence
Plattform für die Resilienz
wirtschaftlicher Ökosysteme