



# COYPU

Cognitive Economy Intelligence  
Plattform für die Resilienz  
wirtschaftlicher Ökosysteme

**Risiken von Lieferkettenabhängigkeiten regionaler  
Wirtschaftsräume erkennen -  
Dashboard für die Resilienz der sächsischen Wirtschaft**

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Gefördert durch:



Bundesministerium  
für Wirtschaft  
und Klimaschutz

aufgrund eines Beschlusses  
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# Ziel

- Regionales öffentliches Dashboard für Krisen- und Resilienzmanagement
- Effekte von Schocks entlang internationaler Wertschöpfungsketten auf regionaler und lokaler Ebene in Quasi-Echtzeit quantifizieren
  - insb. Veränderungen in Produktion, Arbeitslosigkeit, Wertschöpfung, Steuereinnahmen
- Entscheidungstragende aus Politik, Wirtschaft und Verwaltung darin unterstützen, zeitnah auf Krisen zu reagieren, die Effekte einzudämmen und die regionale Resilienz zu stärken

# Motivation

## Regionaler Ansatz

- ökonomische Analysen und Vorhersagen unter Einbezug ökonomischer Schocks sind für die nationale Ebene verfügbar, spezifische Analysen für die regionale und lokale Ebene fehlen häufig
- diese sind wichtig, da Regionen aufgrund ihrer spezifischen Industriestruktur sehr unterschiedlich von Schocks betroffen sind

## Krisen- und Resilienzmanagement als bleibende Herausforderung

- in der kurzen Frist können Lieferketten kaum verändert werden
- mittel- und langfristig können Lieferketten verändert werden (z.B. durch Diversifizierung, Reshoring etc.)
- eine vollständige Entkopplung von intern. Wertschöpfungsketten findet aber nicht statt (u.a. wegen ökonomischen Wohlfahrtsgewinnen durch internationalen Handel)

# Daten und Methode

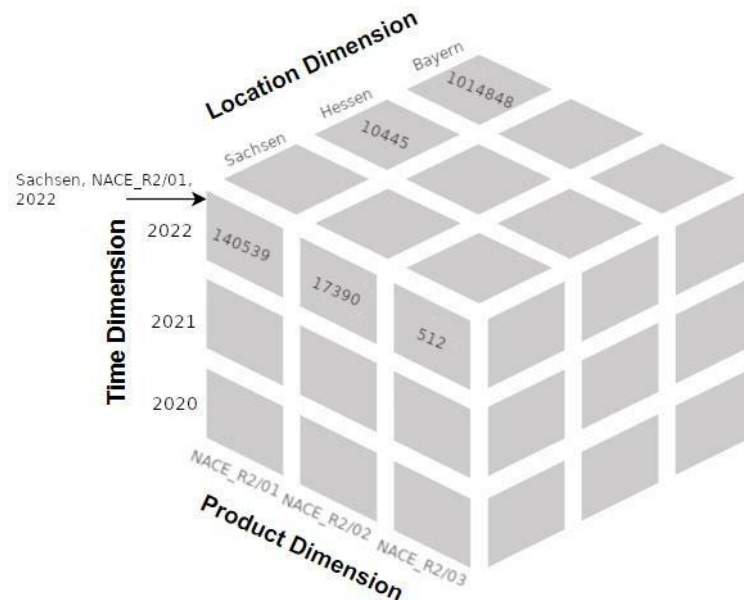
- Daten der öffentlichen Statistik (Außenhandel, Volkswirtschaftliche Gesamtrechnung etc.), (Krisen-) Events
- Daten sind semantisch verknüpft und in Wissensgraphen integriert



- Lieferketten-Schocks:
  - regionalisiertes Input-Output-Modell (Verflechtung zwischen Industrien)
  - Effekte von (Krisen-) Events auf Importe von Vorleistungen nach Sachsen
  - gesamtwirtschaftliche Effekte für Sachsen (direkte, indirekte, induzierte)
- Dashboard für Sachsen als Blueprint, Übertragbarkeit auf andere Regionen

# 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

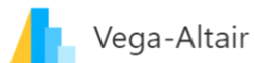


```
# -- Datastructure definition --
cq:dsd a qb:DataStructureDefinition ;
  rdfs:label "Data Structure Definition for 51000-0034" ;
  qb:component [ qb:dimension coy:hasYear , qb:order 1 ] ;
  qb:component [ qb:dimension cq:state, qb:order 2 ] ;
  qb:component [ qb:dimension cq:productGroup, qb:order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

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

```
<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



# 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:



hvPlot



HoloViews



GeoViews



Datashader



Lumen



Param



Colorcet

# SAXONIAN PUBLIC RESILIENCE DASHBOARD DEMONSTRATOR

[Imoressum CoyPu, BMWK](#)

InfAI Institut für Angewandte Intelligenz COYPU

## Interactive Filters for Data Exploration:

### Foreign Trades:

Trade Direction  
export  
import

Trade Group  
Crop and animal production, hunting and related activities  
Electricity, gas, steam and air conditioning supply  
Extraction of crude petroleum and natural gas  
Fishing and aquaculture  
Forestry and logging

Years: 2019 - 2021

Amount (in tons): 0.0 - 2.2m

Value (in Tsd. Euro): 0.0 - 2.9m

### Disasters and Events:

Disaster type  
Epidemic

List of Events

Show Events on Map!

Reset Filters! Generate Report!

## Introduction to CoyPu


In an increasingly networked corporate world, the company-specific variables that are relevant from the perspective of crisis management have very complex relationships and dynamic interactions with a wide range of external factors (e.g., location, customers, competition, suppliers, personnel market, legal and social framework). These external interactions in turn give rise to far-reaching internal (domino) effects and interdependencies across all areas of the company (operational, financial, strategic) (Fig. 1, right). Neither in-house expertise nor personal or local consultant knowledge is therefore sufficient to generate valid, economically usable insights or to derive concrete crisis-related entrepreneurial measures.

The CoyPu project addresses the complex economic challenges in crisis situations with an intelligent platform for the integration, structuring, networking, analysis and evaluation of heterogeneous data from economic value networks as well as the industry environment and social context. Based on cognitive modelling of data within a promoted system of networked knowledge graphs and flexibly configurable AI analysis tools, the CoyPu platform enables high-quality and up-to-the-minute insights into economic facts, trends, impact relationships and forecasts. The crisis-relevant questions that can be answered in this way can concern individual value networks or concrete value chains, focus on different regions, industries or company sizes, or be located at the overall economic level.

Thanks to its adaptability, the CoyPu platform can provide both low-threshold self-service offerings for broad use by SMEs and make complex analysis tools available for economic ecosystems for professional use by analysts and facilitators. Institutions of public administration, politics and associations, and research. Extensively networked and semantically integrated data from a variety of sources form the basis of a new information transparency for companies and markets, especially in the SME sector. By providing user-friendly offerings and enabling typical support roles for companies, SMEs can benefit from available AI functionalities even without access to technology specialists.

A federated approach on the level of data and methods as well as the inclusion of diverse legal issues across all development phases of the project is the basis of legally secure and data-sovereign applications in CoyPu.

Due to the intended broad utilization of the CoyPu solution, its intended orientation towards open standards (e.g. W3C) and reference architectures (e.g. IDS) as well as planned integration into large national initiatives (such as the GAIA-X-Cloud), sustainable positive effects for the stability and competitiveness of the German economy can be expected. By using the results provided by CoyPu, not only the decision-making ability and adaptability in economic crises themselves can be enormously improved in the future, but also the possibilities for risk assessment and resilience building in their run-up.



<https://dashboard.coypu.org/>





# Weitere Informationen

<https://coypu.org/>

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