

The climate data iceberg – A depth of information to integrate

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““ Climate risks are a source of considerable financial risks. ””*

*““ Climate change has consequences for us as a central bank pursuing our primary mandate of price stability, [...] financial stability and banking supervision.** ””*

*““ Climate change and climate policy also affect inflation and growth. [...] This will require, amongst other things, better data, which we should also demand.*** ””*

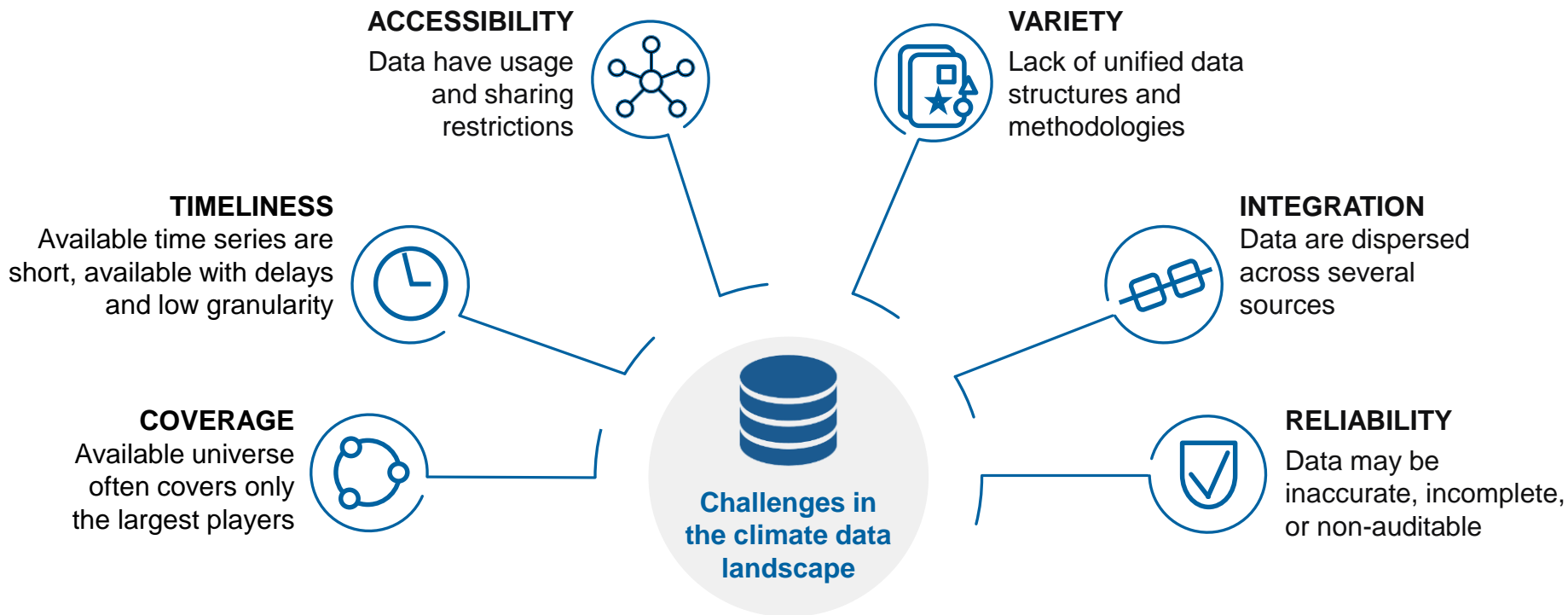
* Mauderer (2019)

** Lagarde (2021)

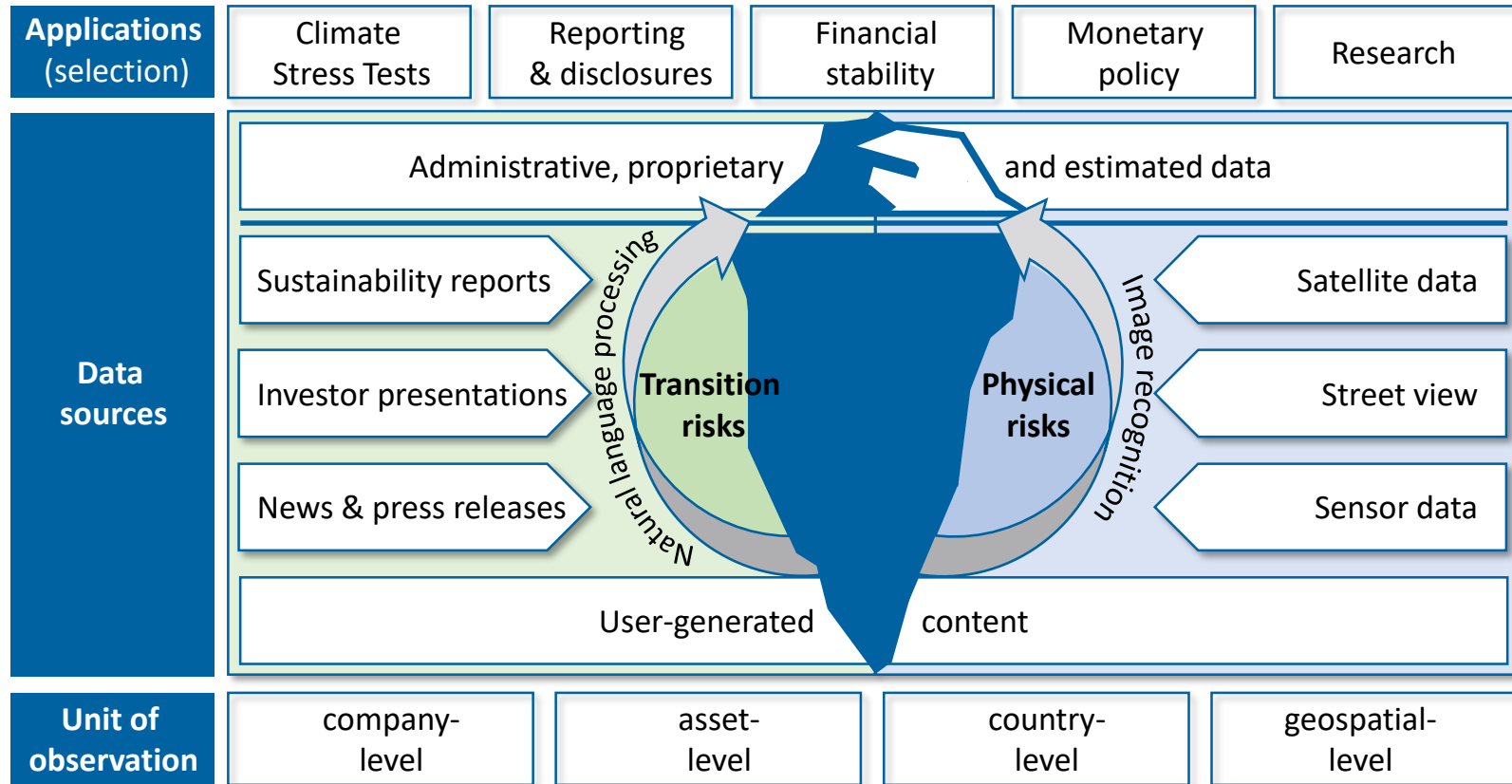
*** Nagel (2022)



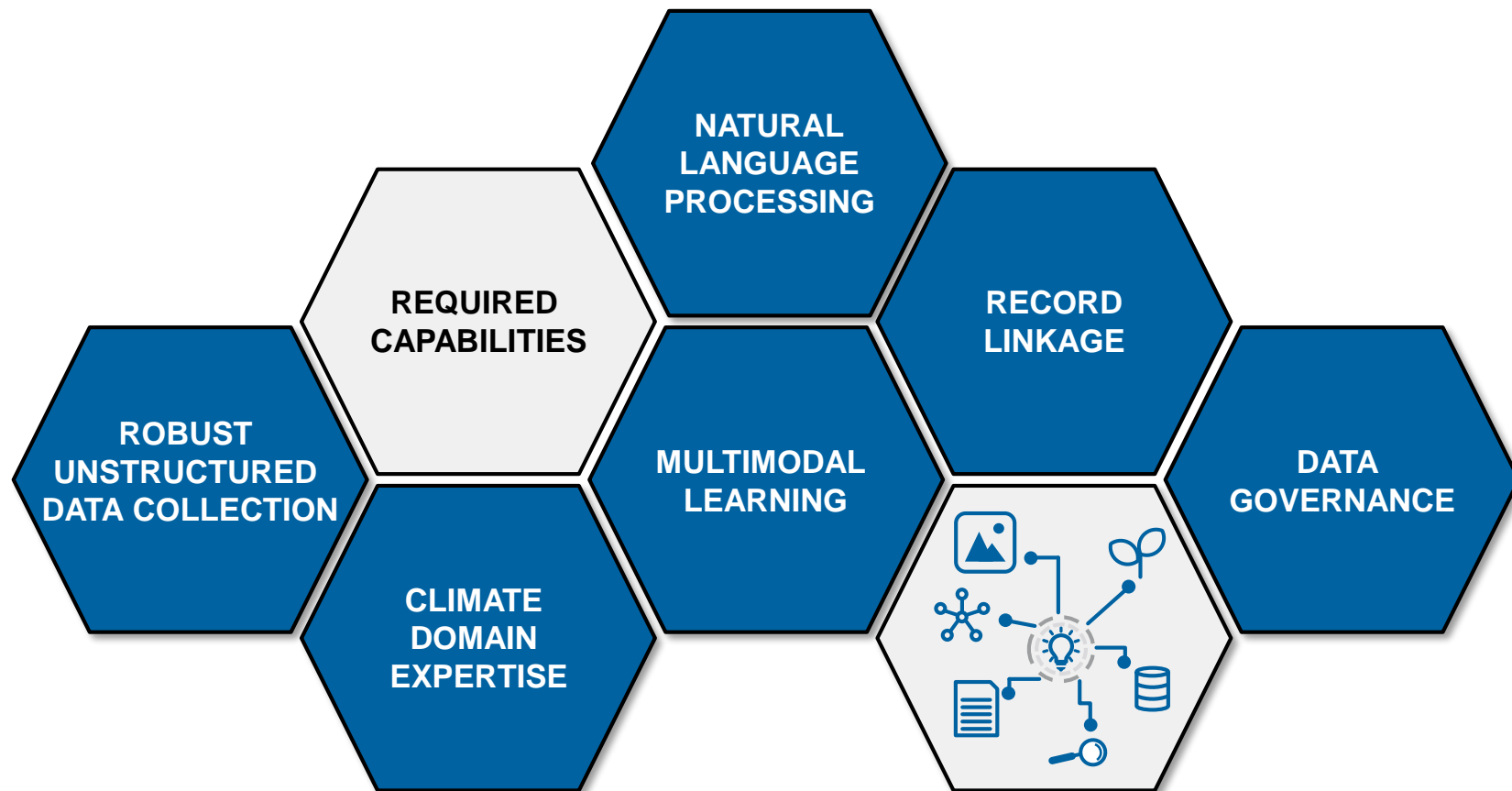
Challenges in the climate-related data landscape*



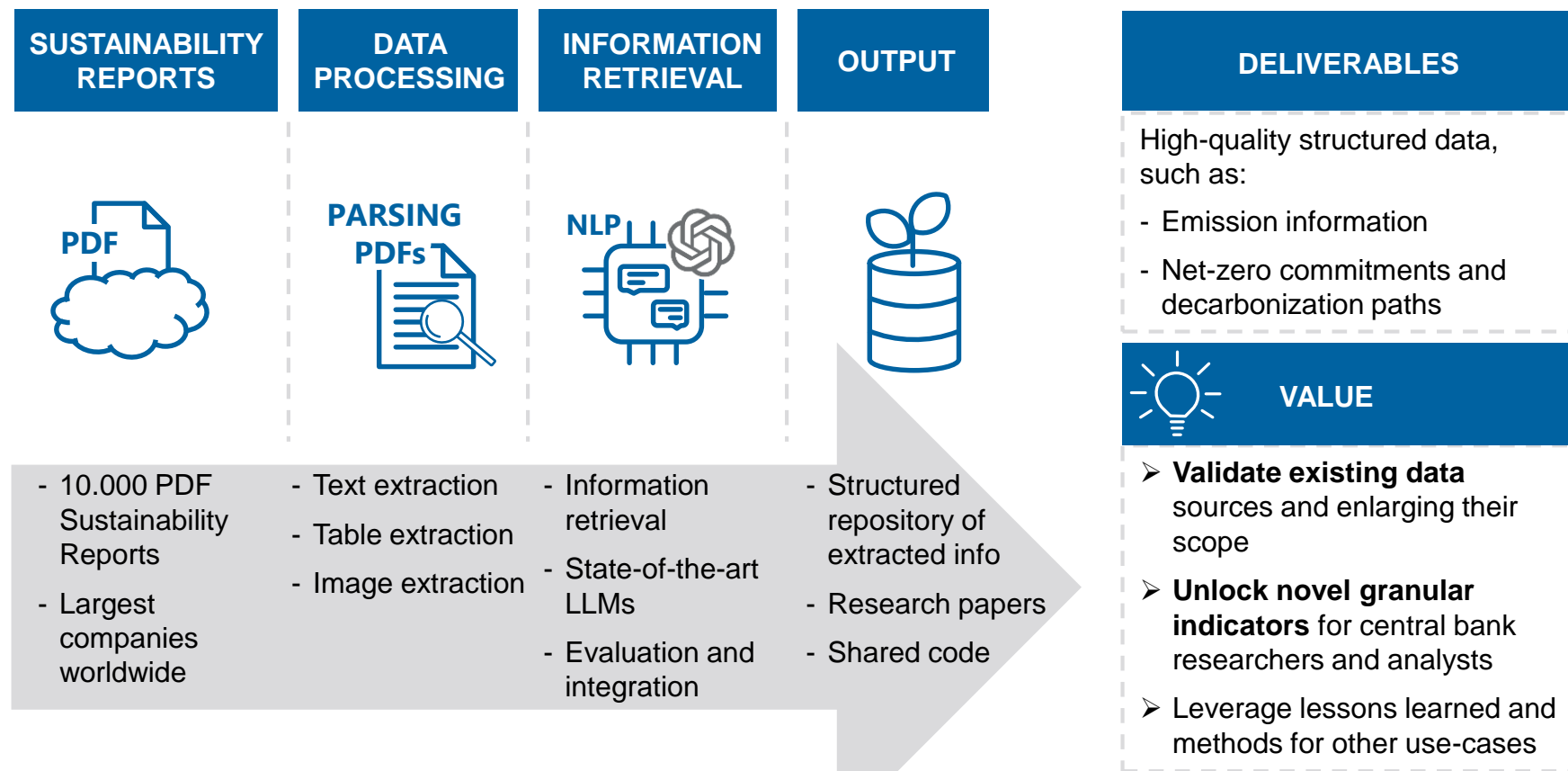
The climate data iceberg – A depth of information to integrate*



Required capabilities to assess climate-related risks with novel data sources*



Structured sustainability data through machine learning*

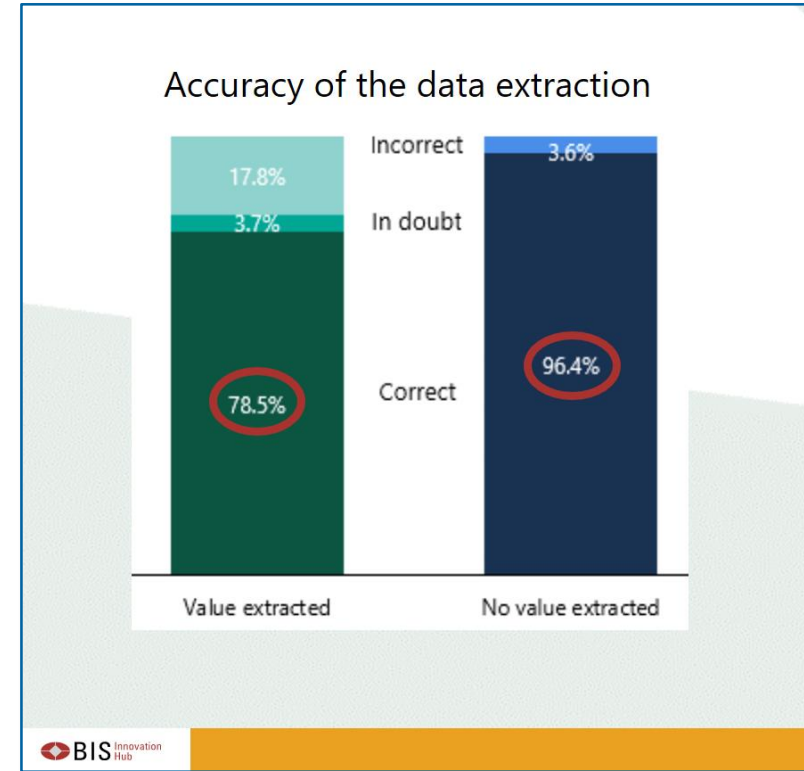


Project Gaia – Enabling climate risk analysis using generative AI*



Project Gaia makes assessing climate risk more transparent and efficient, as it uses generative AI to decipher vast unstructured data sets. If realised, Gaia has the potential to be a powerful tool for central banks in their comprehensive approach to assessing economic reality and risks.

Christine Lagarde



A picture is worth a thousand definitions*



Application

- **Multimodal deep learning** to validate secondary firm data (not collected for statistical purposes)
- Leverage **publicly available data** (e.g., satellite images, street view, data from companies' websites)

Advantages

- **Reduce effort** with manual validations and quality checks (millions of entities)

Challenges

- High effort to generate annotate **training data**
- Handling **special cases** for companies with multiple offices or activities

Target

Validate structured firm data

| ID | Firm | Street | City | Postal Code | Economic Sector | Employees | Parent Firm |
|----|--------|----------|--------|-------------|-------------------|-----------|-------------|
| 1 | Firm 1 | Street X | City A | 1234 | Car manufacturing | 500 | X |
| 2 | Firm 2 | Street Y | City B | 5678 | Car manufacturing | 400 | X |

Takeaways



NOVEL DATA FOR CENTRAL BANKS

Recent methodological advances allow leveraging information from unstructured data sources



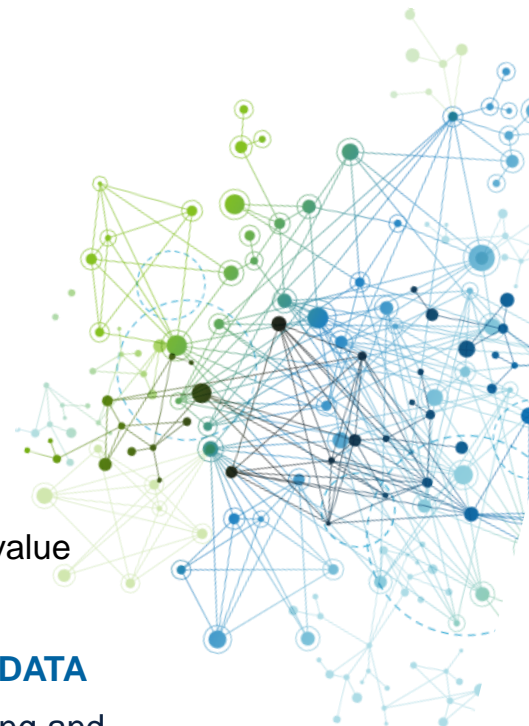
COLLABORATION TO FOSTER INNOVATION

Building a network of institutional and academic partners to join efforts and leverage interdisciplinary expertise provides value



APPLICABILITY BEYOND CLIMATE-RELATED DATA

Knowledge gained can be applied in central banking and supervision for enriching a wide range of structured data sources



References

- Alves Werb, G., Reichenbach, L., Yalcin-Roder, E., & Walter, S. (2024). A picture is worth a thousand definitions: validating company data with satellite images and street view. Deutsche Bundesbank Technical Report (forthcoming).
- BIS Innovation Hub (2024), Project Gaia: enabling climate risk analysis. Press release, 19 March 2024, [Link](#).
- Dimmelmeier, A., Doll, H.C., Schierholz, M., Kormanyos, E., Fehr, M., Ma, B., Beck, J., Fraser, A. & Kreuter, F. (2024). Informing climate risk analysis using textual data – A research agenda. Deutsche Bundesbank Technical Report, 2024-01, [Link](#).
- Doll, H. C. & G. A. Werb (2023). Innovation for improving climate-related data – Lessons learned from setting up a data hub. AStA Advances in Statistical Analysis , 17(3), 355-380, [Link](#).
- Doll, H. C., Kormanyos, E., Walter, S. & G. A. Werb (2024). The climate data iceberg – A depth of information to integrate. IFC Bulletin (forthcoming).
- Lagarde, C. (2021). Climate change and central banks: analysing, advising and acting. Speech at the international climate change conference, Venice, [Link](#).
- Mauderer, S. (2019). Central banks – a crisis manager for the climate? Speech at the second financial markets conference 29.10.2019 Frankfurt am Main, [Link](#).
- Nagel, J. (2022). Speech at the ceremony to mark the inauguration of the new President of the Deutsche Bundesbank. 11.01.2022 Frankfurt am Main, [Link](#).



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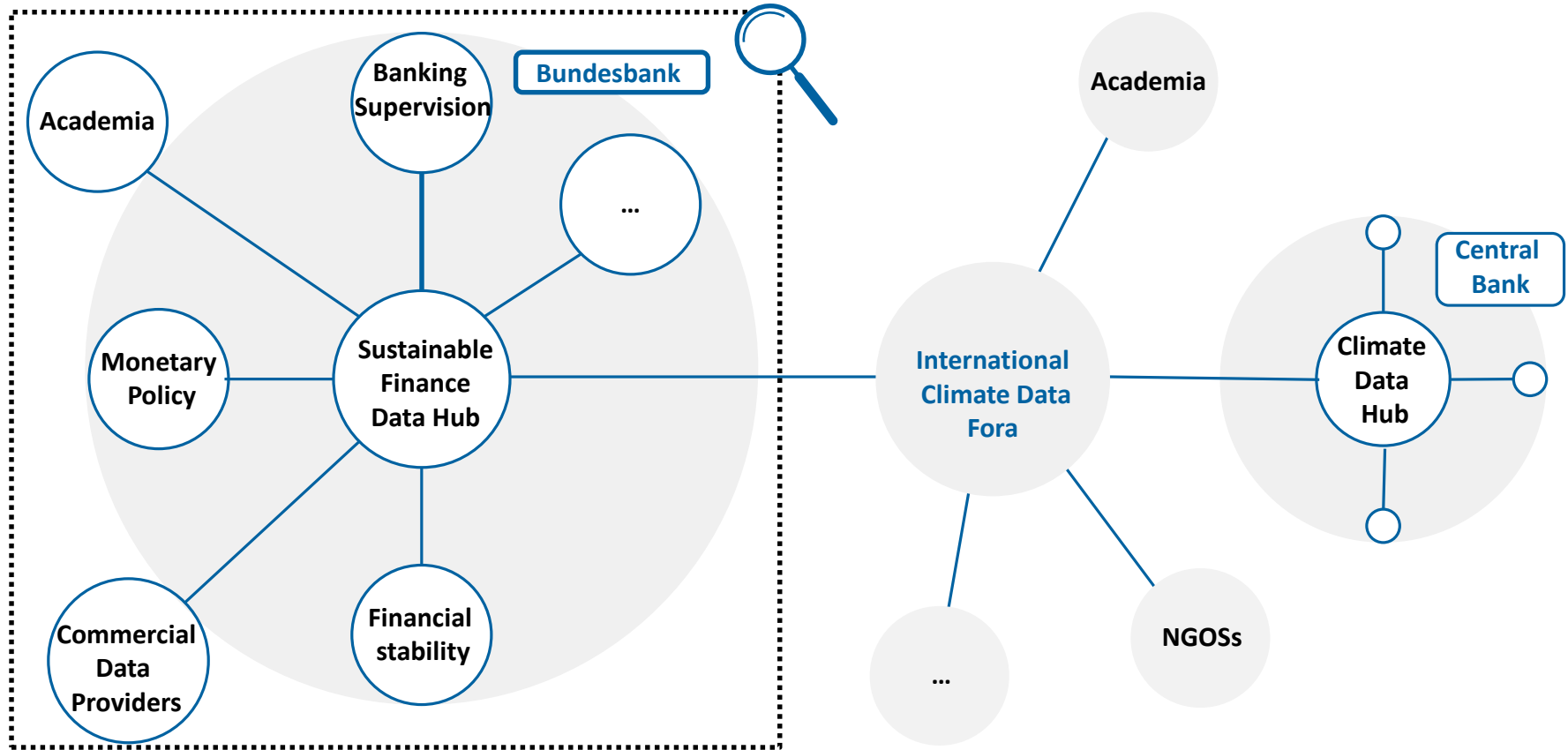
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🌐 <https://www.bundesbank.de/en/bundesbank/research/rdsc>

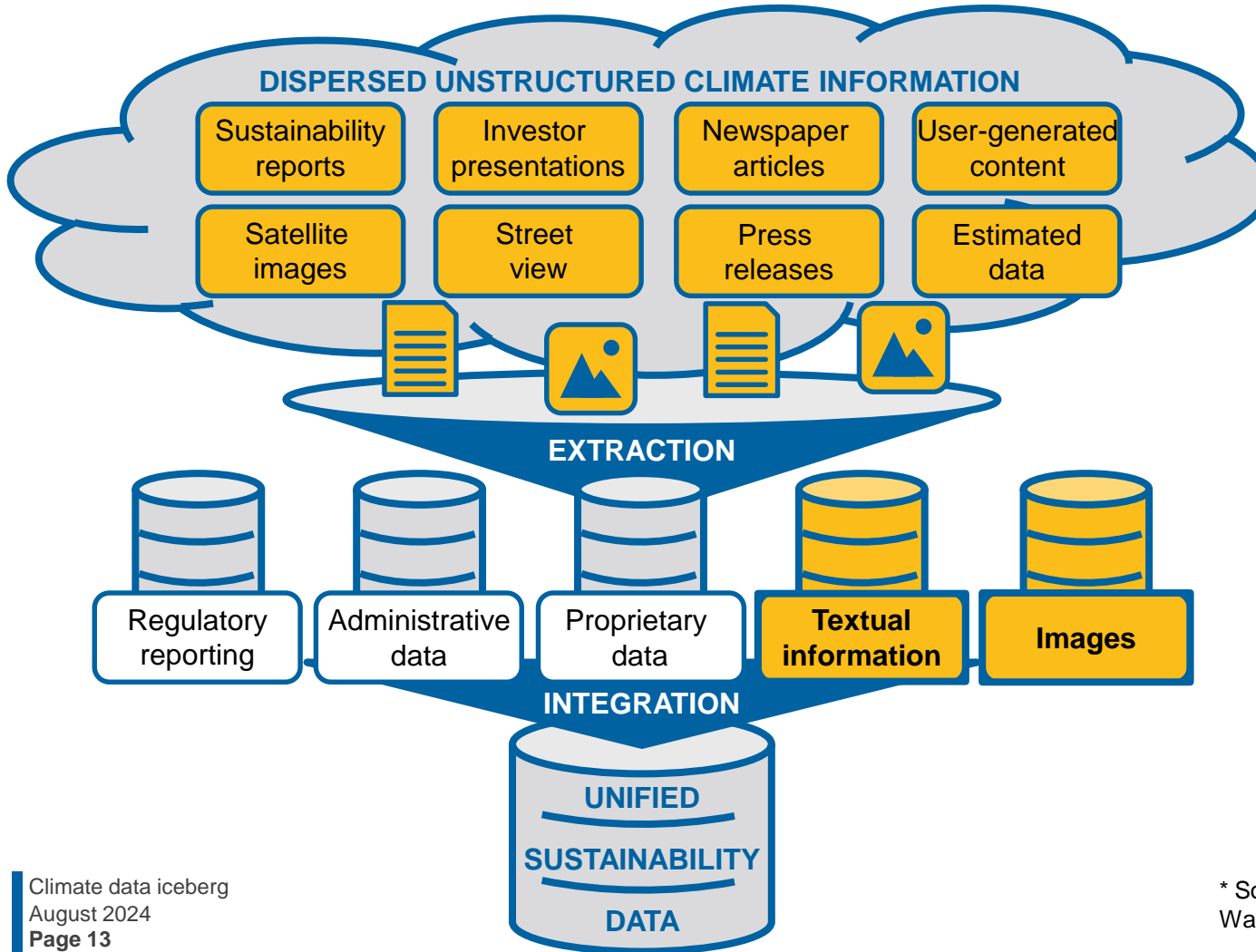


Backup

Building expertise and fostering exchange for innovation*



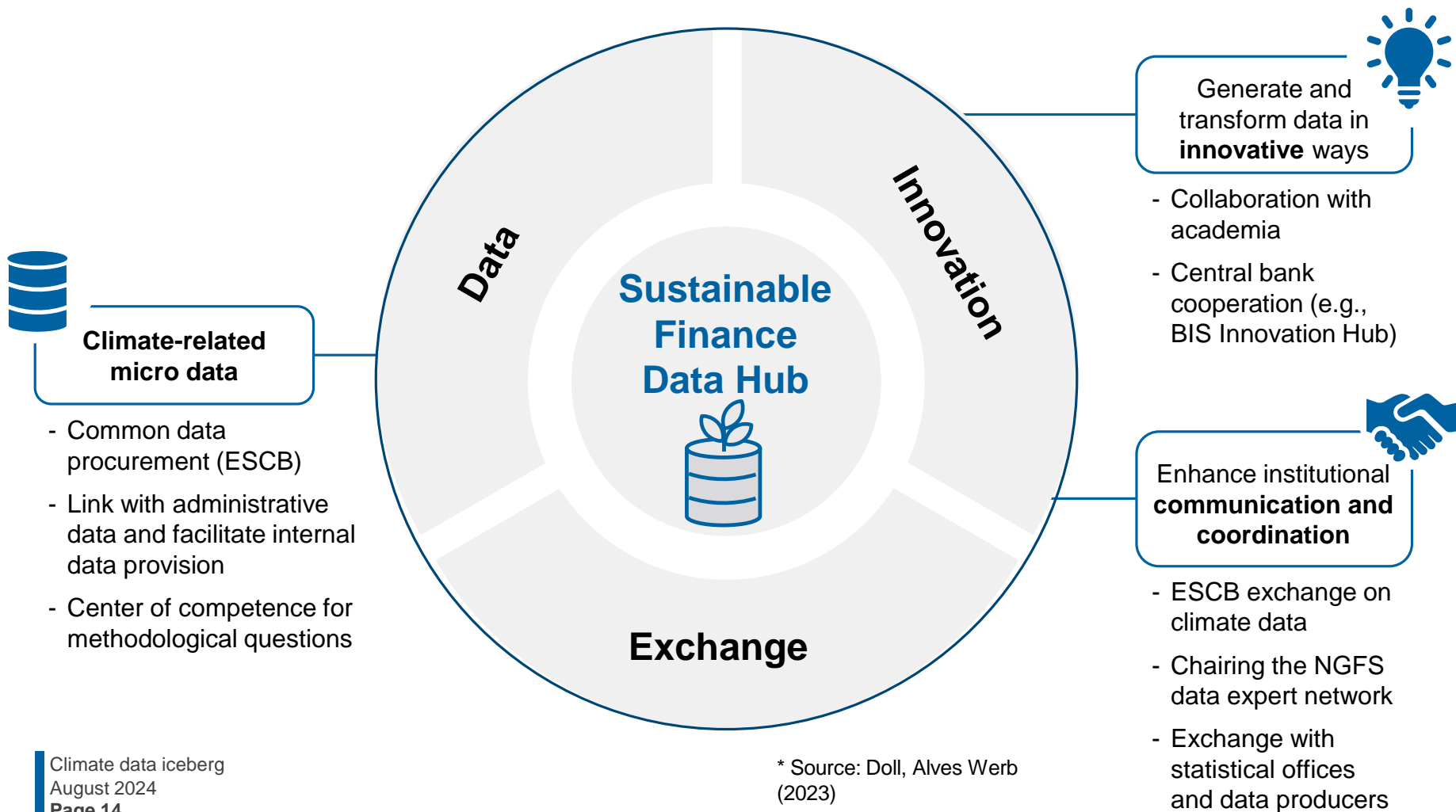
Building a comprehensive data infrastructure with unstructured data*



CHALLENGES

- Parsing
- Text extraction
- Image extraction
- Data linkage
- Evaluation

The Sustainable Finance Data Hub's focus areas*



The *Greenhouse gas insights and sustainability tracking* (GIST) project extracts and provides data from unstructured sustainability reports

STATUS QUO

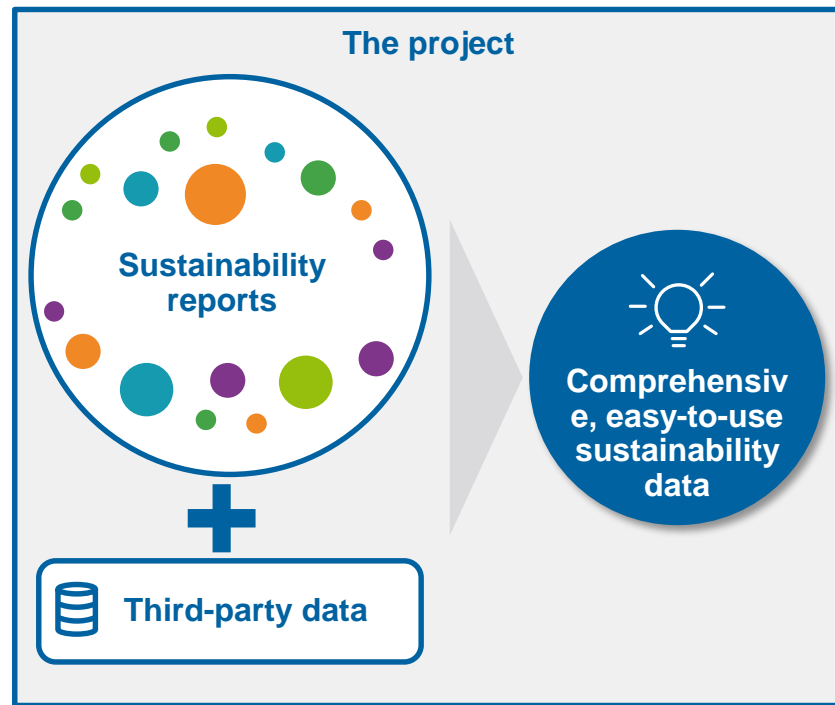
Currently, sustainability information exists as...

- Data from commercial providers ▶ Structured
- Unstructured information in sustainability reports ▶ Textual
- Social media, websites, etc... ▶ Textual

PROJECT DELIVERABLES

The project will provide high-quality structured data from sustainability reports, including...

- Emission information
- Net-zero commitments and decarbonization paths
- Sustainability measures database with objective, text-based measures



PROJECT GOAL

Scale up the usability of granular, unstructured climate-related data for central banking applications (and beyond)

Innovation spillovers beyond climate-related data

