

**ISSI 2023, Bloomington, Indiana**

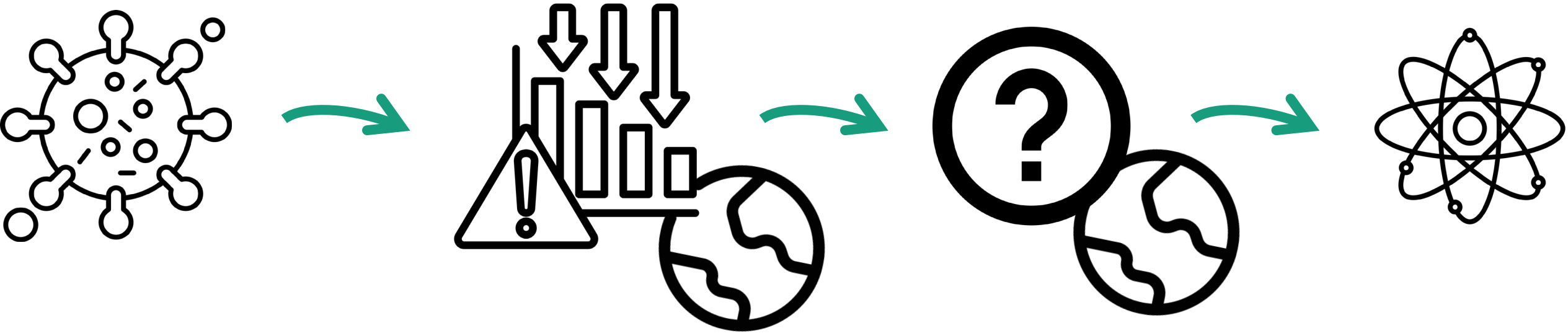
**Philipp Baaden, Vanessa Hollmann, Milos Jovanovic**

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Analysis of the research activity of European countries and RTOs related to the SARS-CoV-2 pandemic using a new iterative method

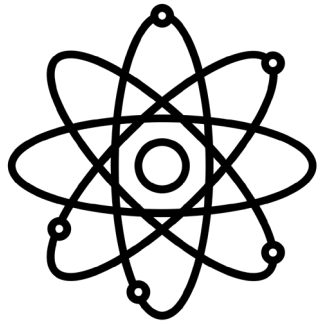
# Background and Motivation

Comparison of the crisis response of the science system in different countries



# Background and Motivation

Comparison of the crisis response of the science system in different countries



Comparing country specific differences for

- Austria
- Germany
- Netherlands
- Sweden



- Basic research reaction in terms of publication output
- Applied research reaction in terms of projects of Research and Technology Organizations (RTO)

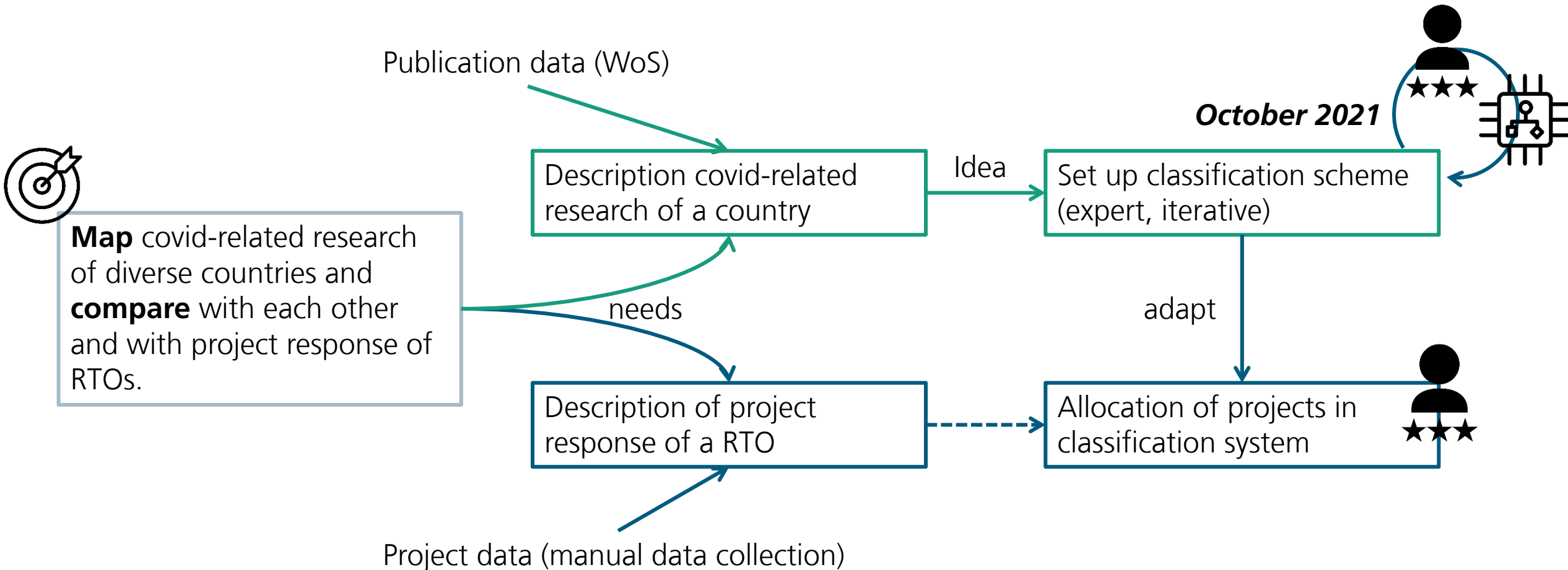
Research aim:

Use a data driven approach to

1. compare the COVID-19 related responses among countries research systems at an early stage within the crisis
2. compare the COVID-19 related crisis response of a country's research system with the RTO response
3. guide researchers and policy makers in rapidly changing crisis situations

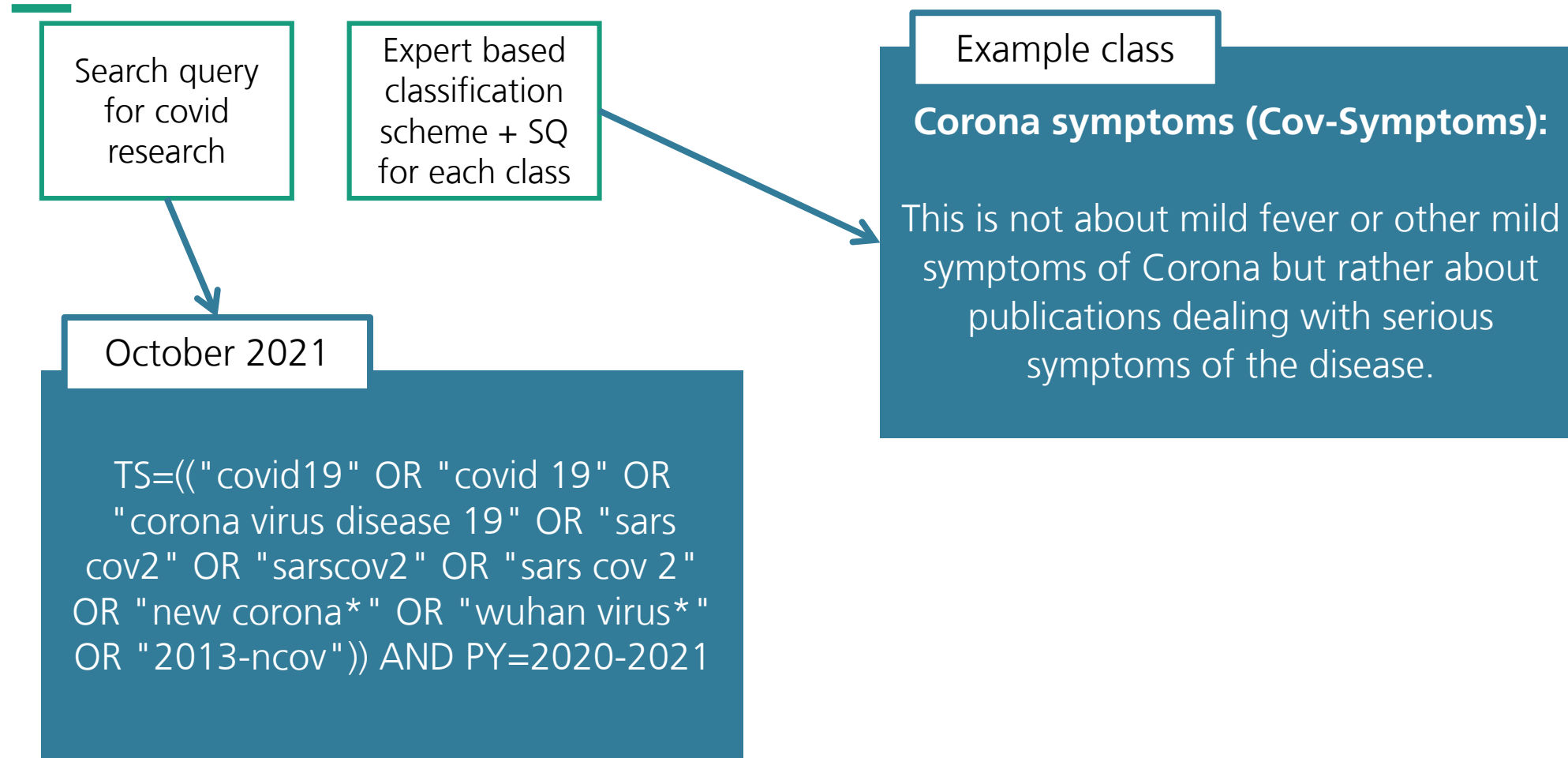
# Idea

Comparison of the crisis response of the science system in different countries



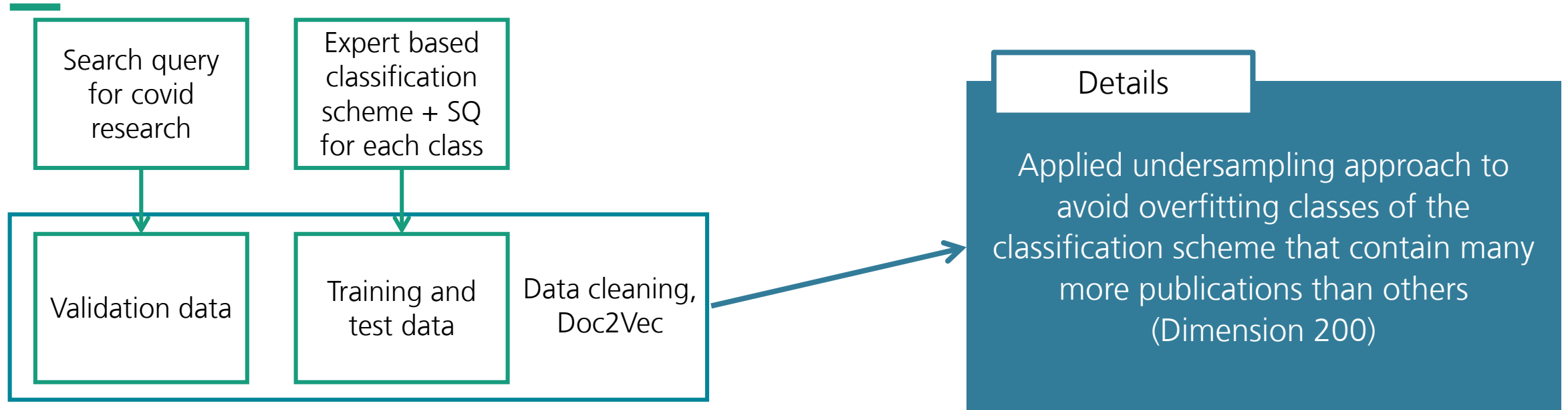
# Methodology – deriving the classification scheme

An iterative, expert-based procedure combined with machine learning using Web of Science data



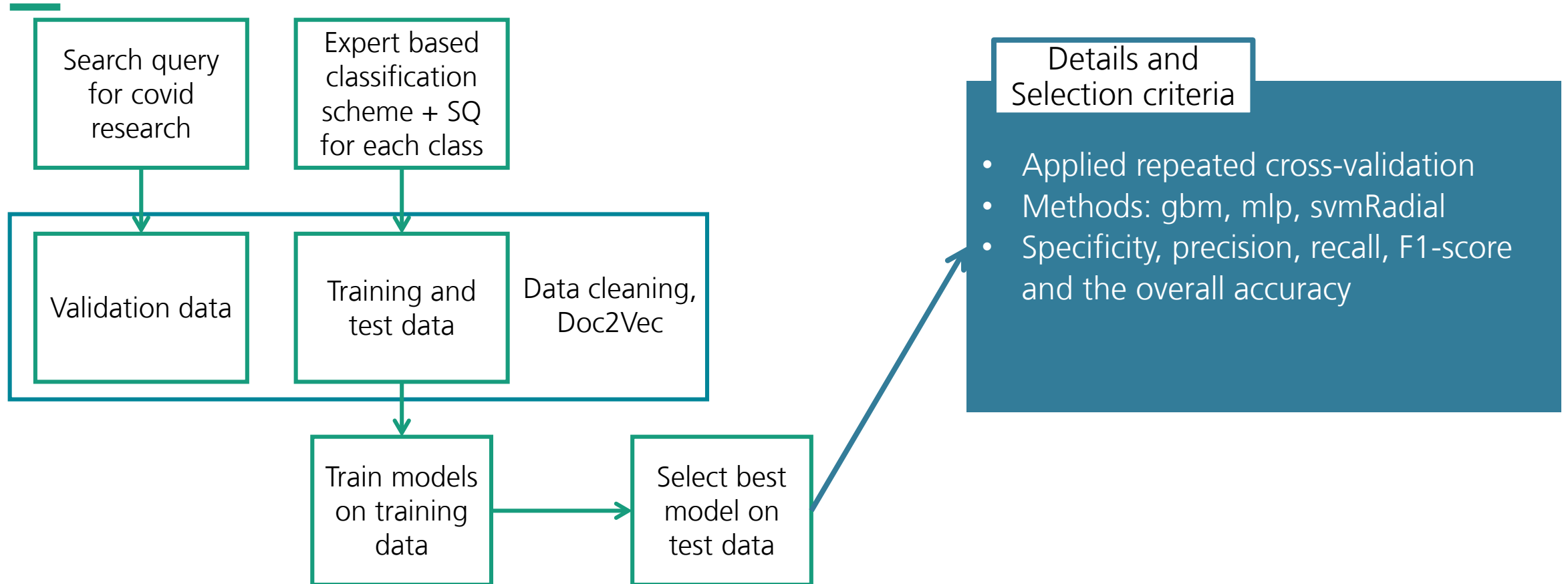
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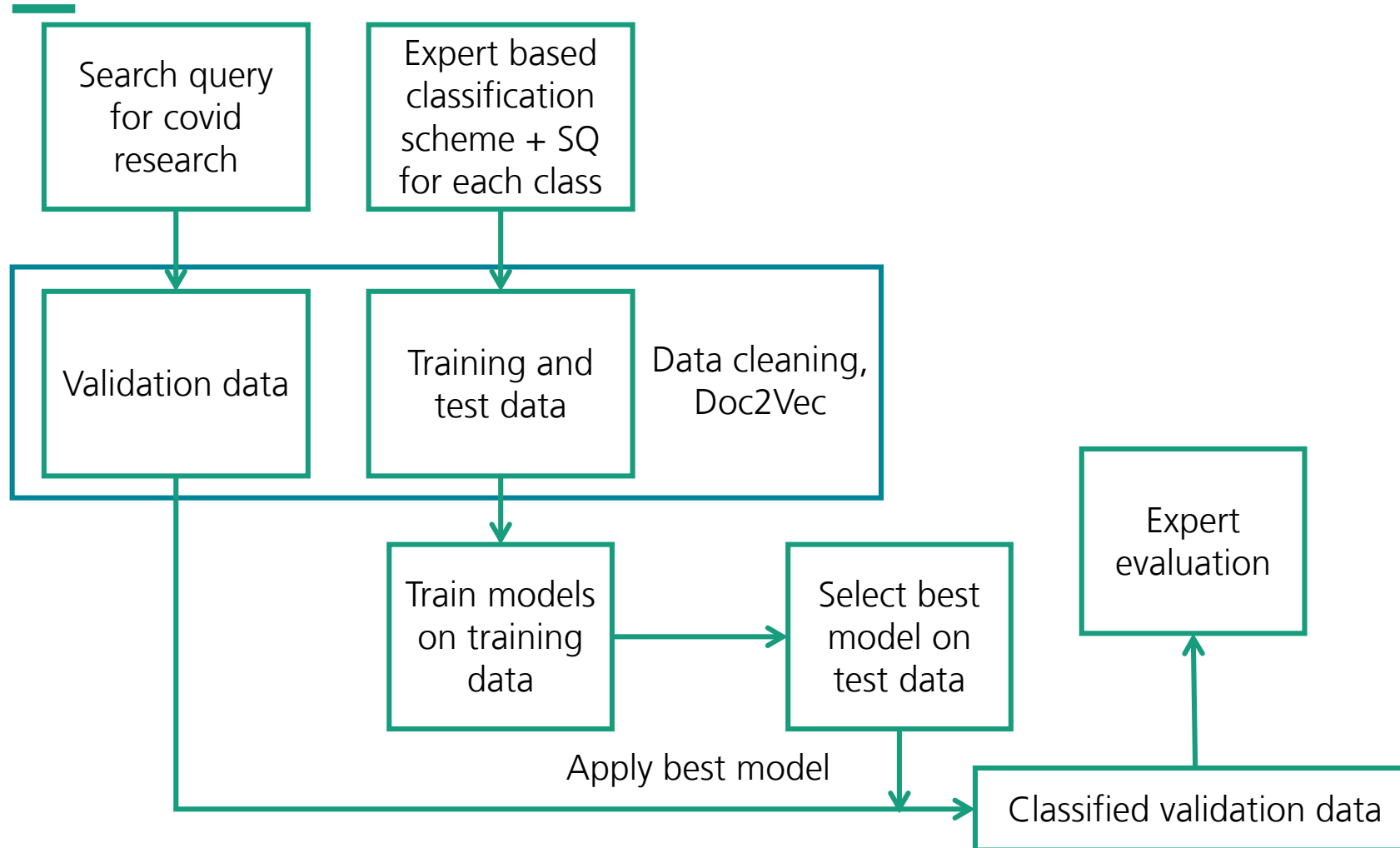
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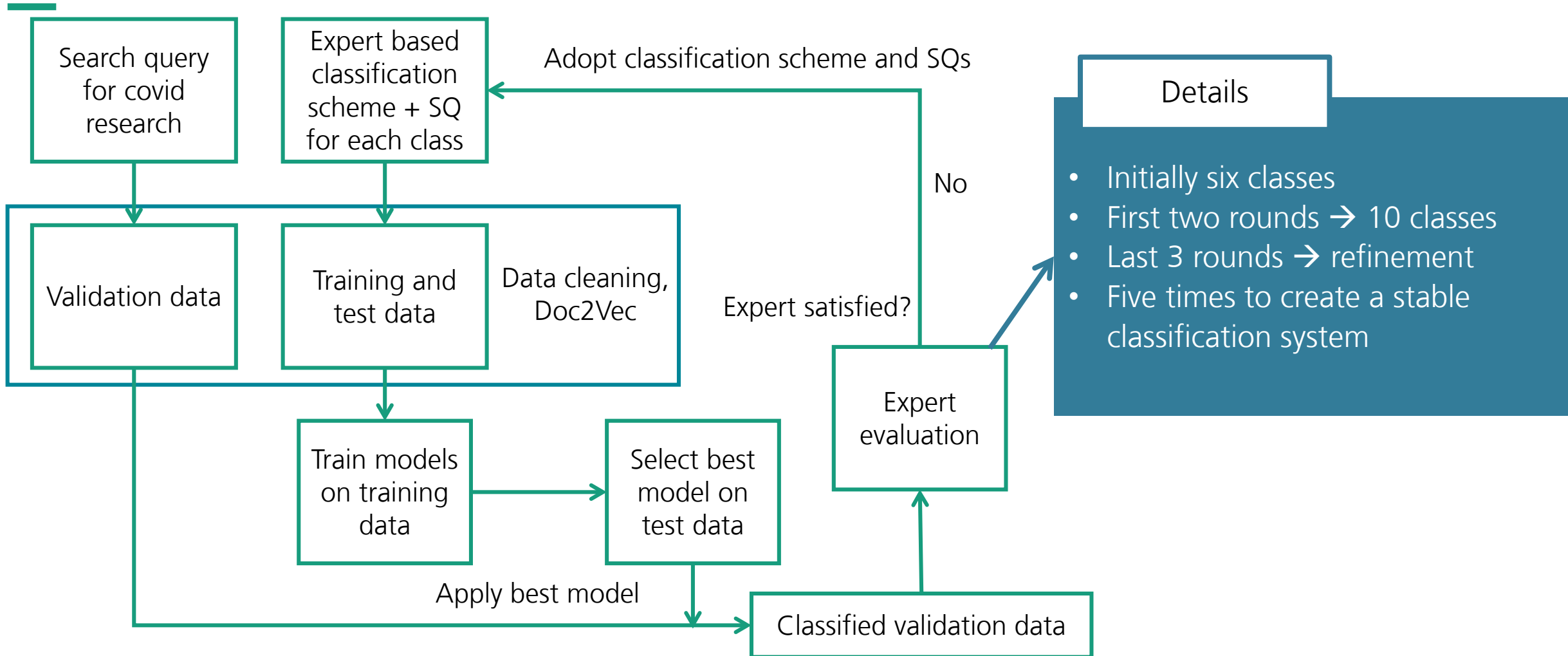
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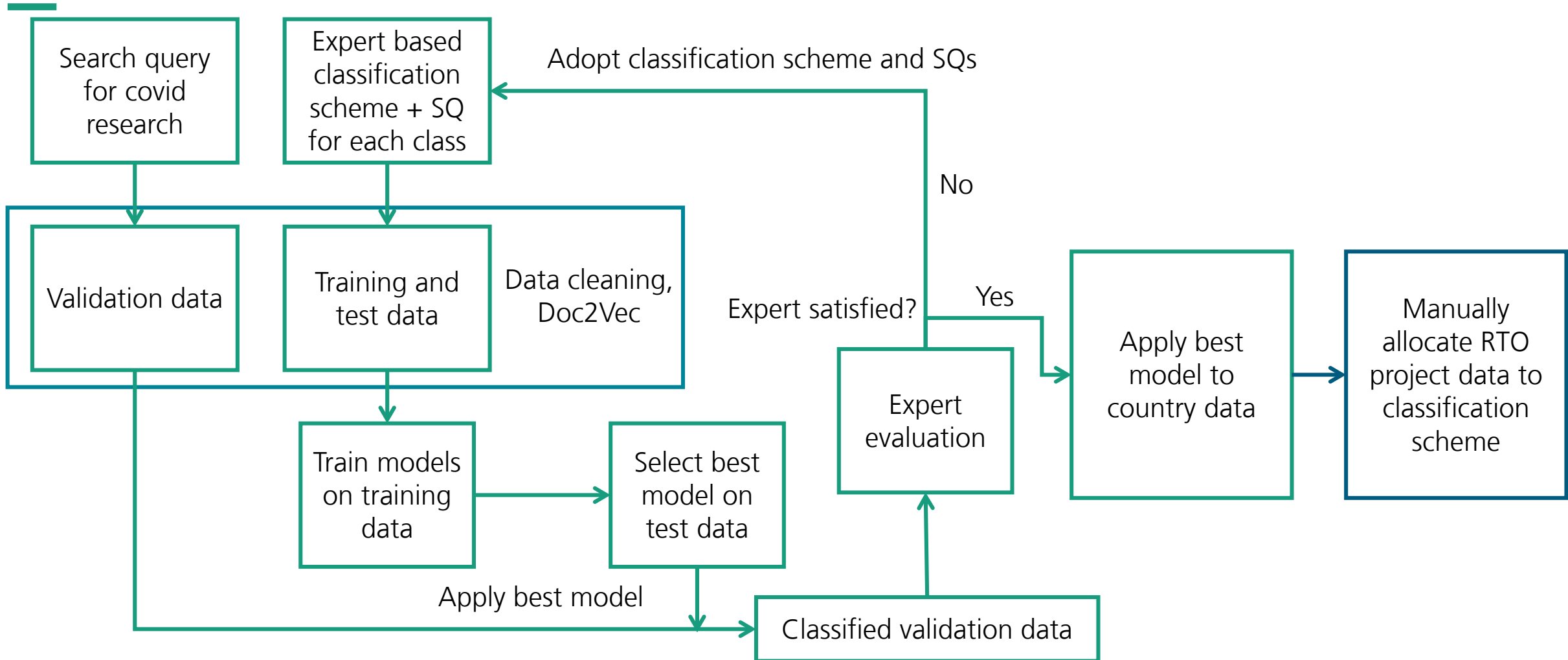
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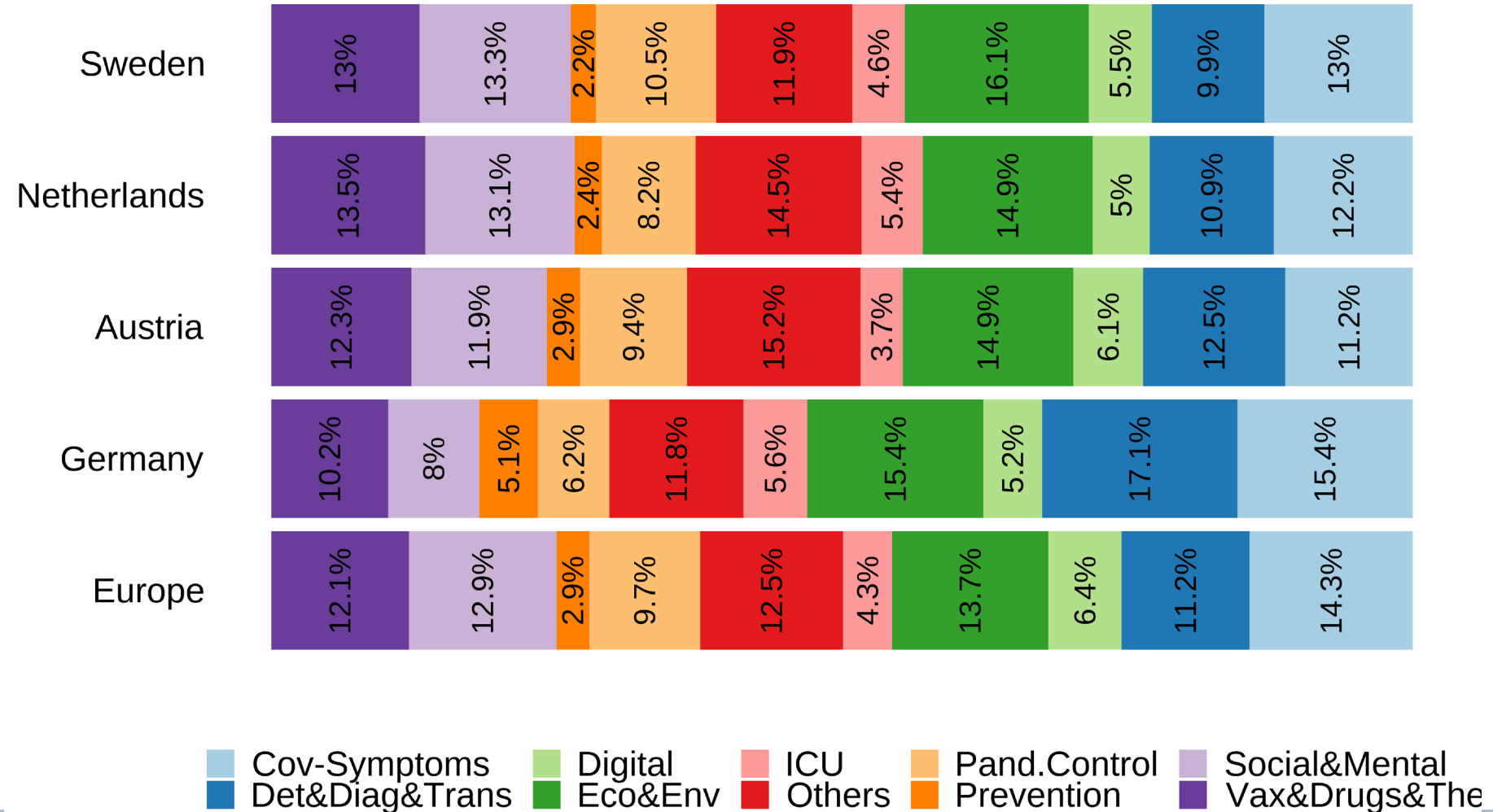


# Results

## Comparison of research activity in the countries and in Europe

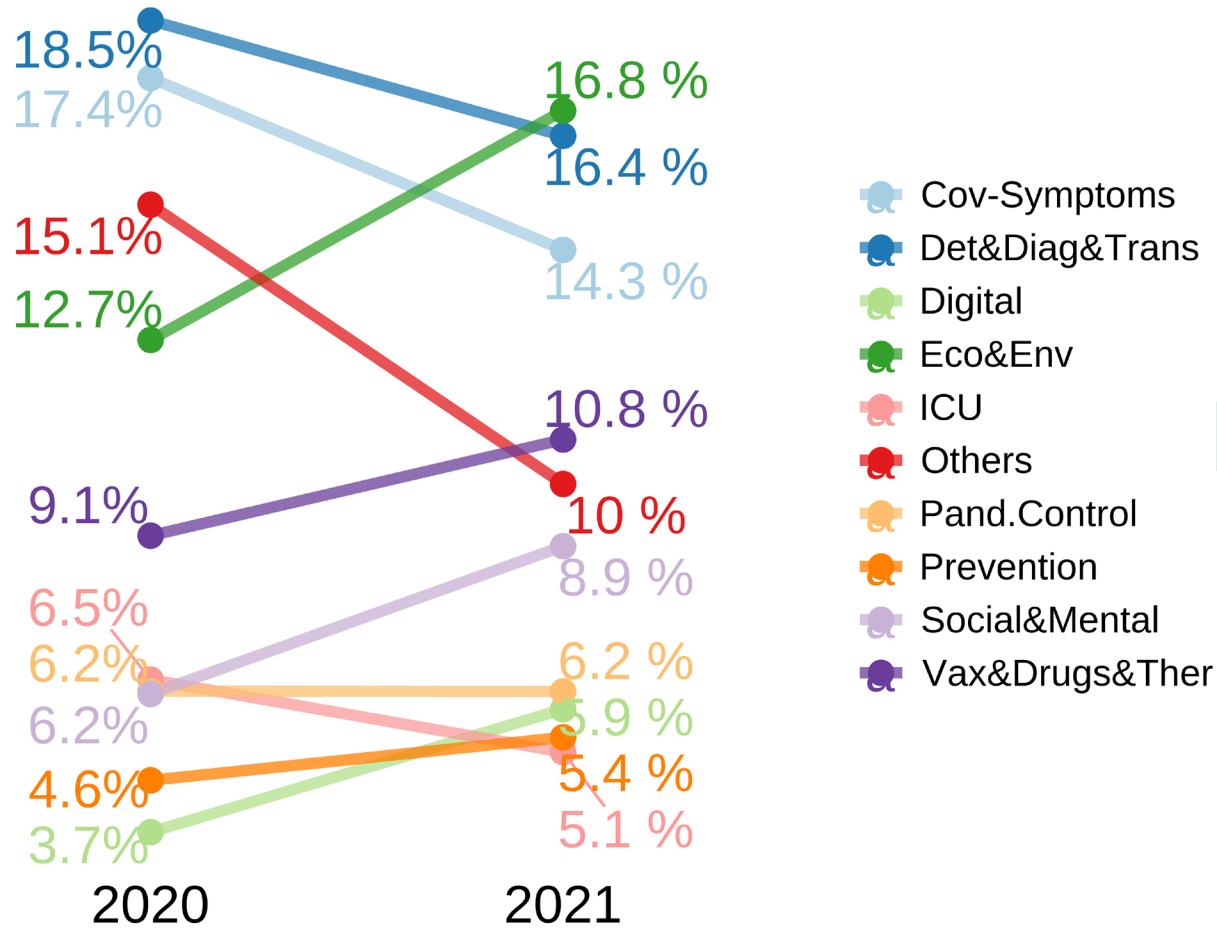
### Classification scheme:

1. Digital processes influenced by Corona
2. Vaccine, drug and therapy
3. Others influenced
4. Corona symptoms
5. Intensive care ventilation
6. Prevention measures
7. Pandemic control
8. Detection, diagnostics and transmission
9. Social studies and mental health
10. Industry, Economy and Environment



# Results – Focus Germany

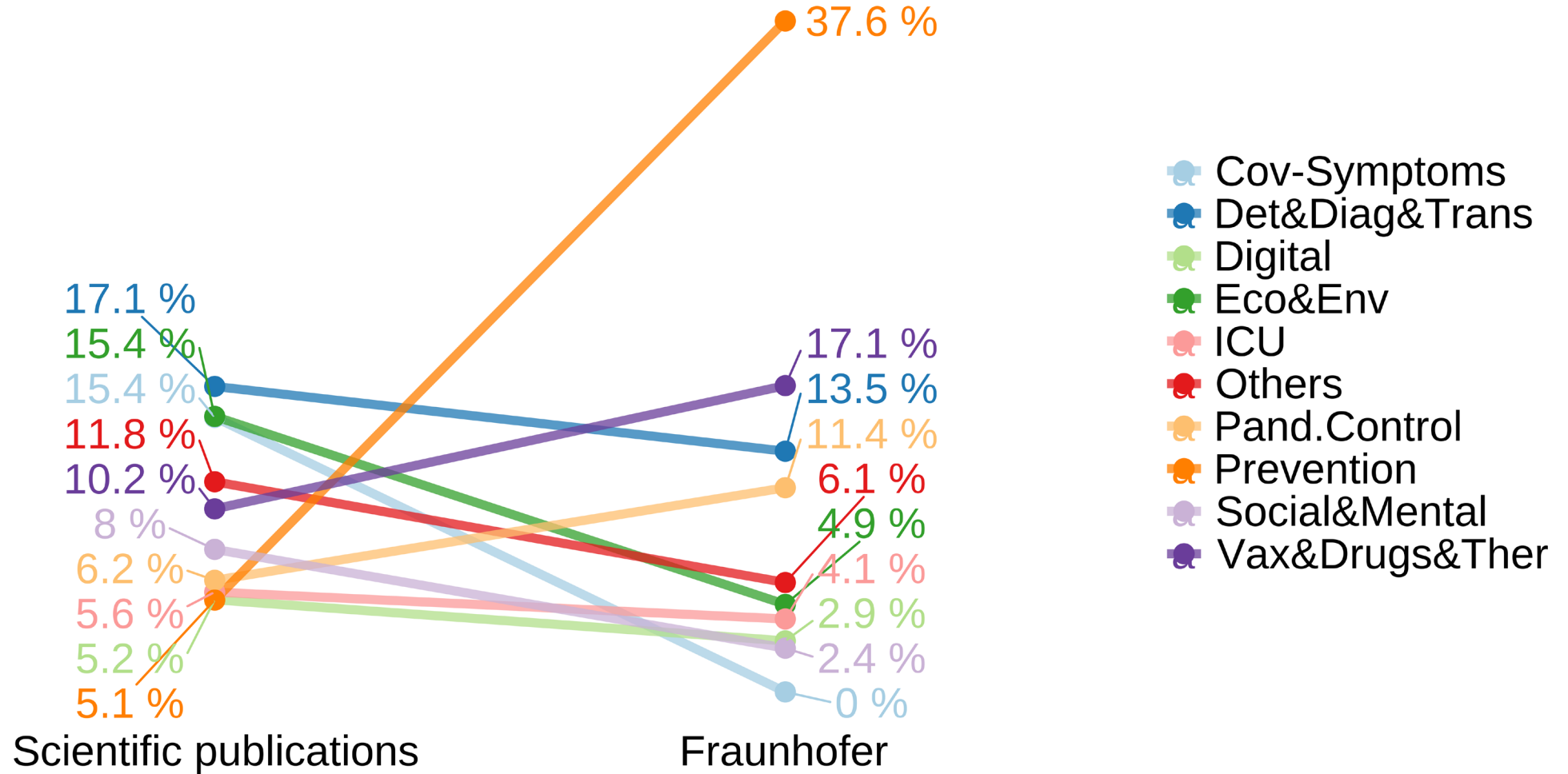
Focus corona research Germany: 2020 vs. 2021



- Differences across countries can be found (e.g. german focus on detection and diagnostics studies, less social and mental studies)
- Absolute increase in all classes (though data collection in October 2021!)
- Shift in focus towards ...
  - ... economy and environment related topics
  - ... social and mental health related studies and
  - ... studies related to digitalization
- Less studies (relatively) related to e.g. other diseases influenced by covid (see "Others")

# Results – Focus Germany

Corona research Germany: scientific output vs. Fraunhofer projects



# Conclusion

## Comparison of the crisis response of the science system in different countries

### Methodology:

- Classification more elaborate through iterative, expert-based machine learning approach
- 5 iterations → 10 classes
- Quite high effort of the semi-automated process is worth it
- A country's research activities can be captured and compared with project response

### Results:

- Homogeneous picture of corona research
- Country-specific research shifts as pandemic unfolds
- Long-term topics such as
  - Social&Mental,
  - Eco&Env and
  - Digital are on the rise
- Acute issues such as cov symptoms and others decrease
- Focus of RTOs: Prevention, Vax&Drugs&Ther, Cov Symptons

### Implications:

- Approach that can be adopted to other crisis situations
  - + allows early detection of crisis response of research system
  - requires expert input
- Approach can be used, e.g. to support decisions on the distribution of research funds in crisis situations by providing an overview early in the crisis

# Contact

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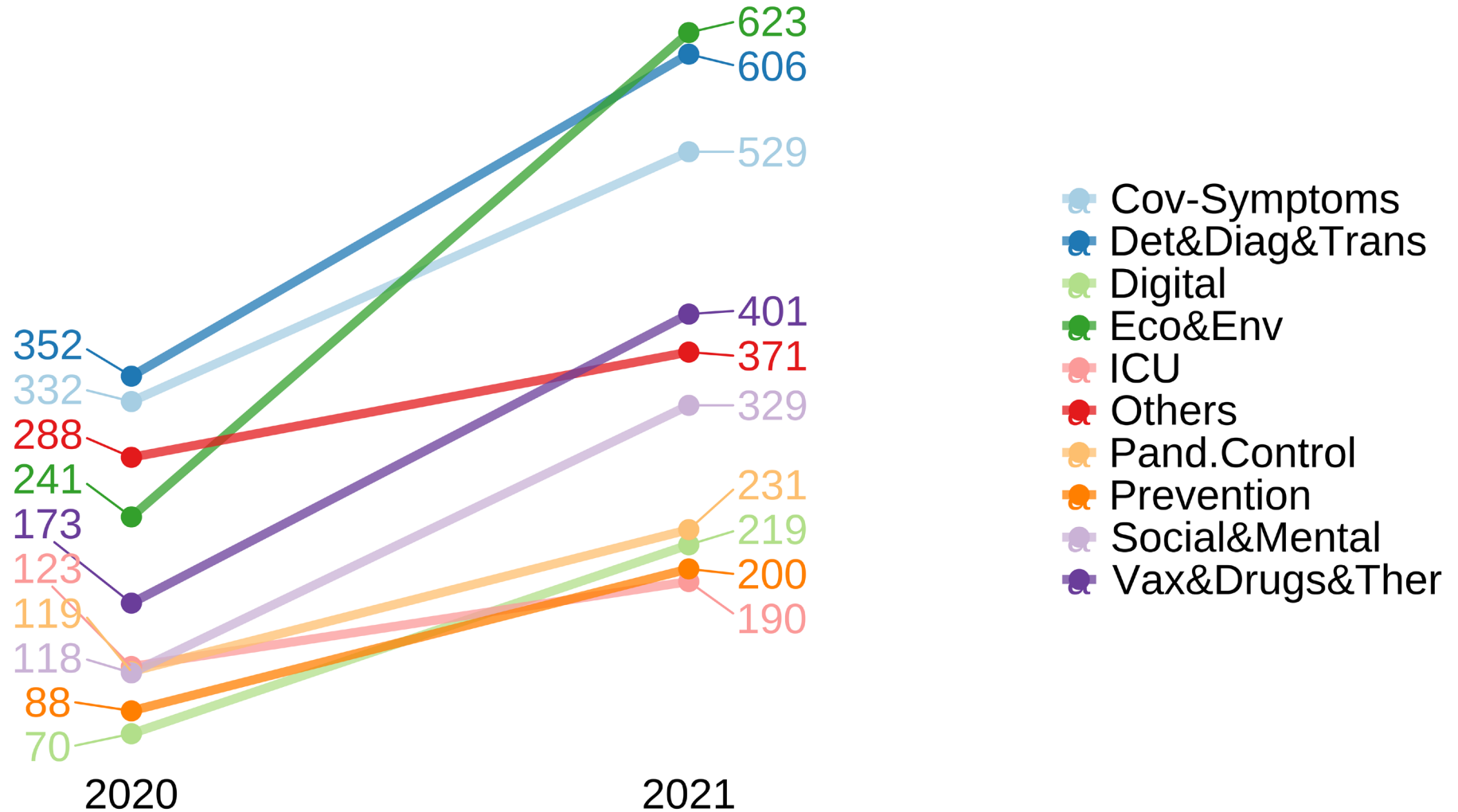
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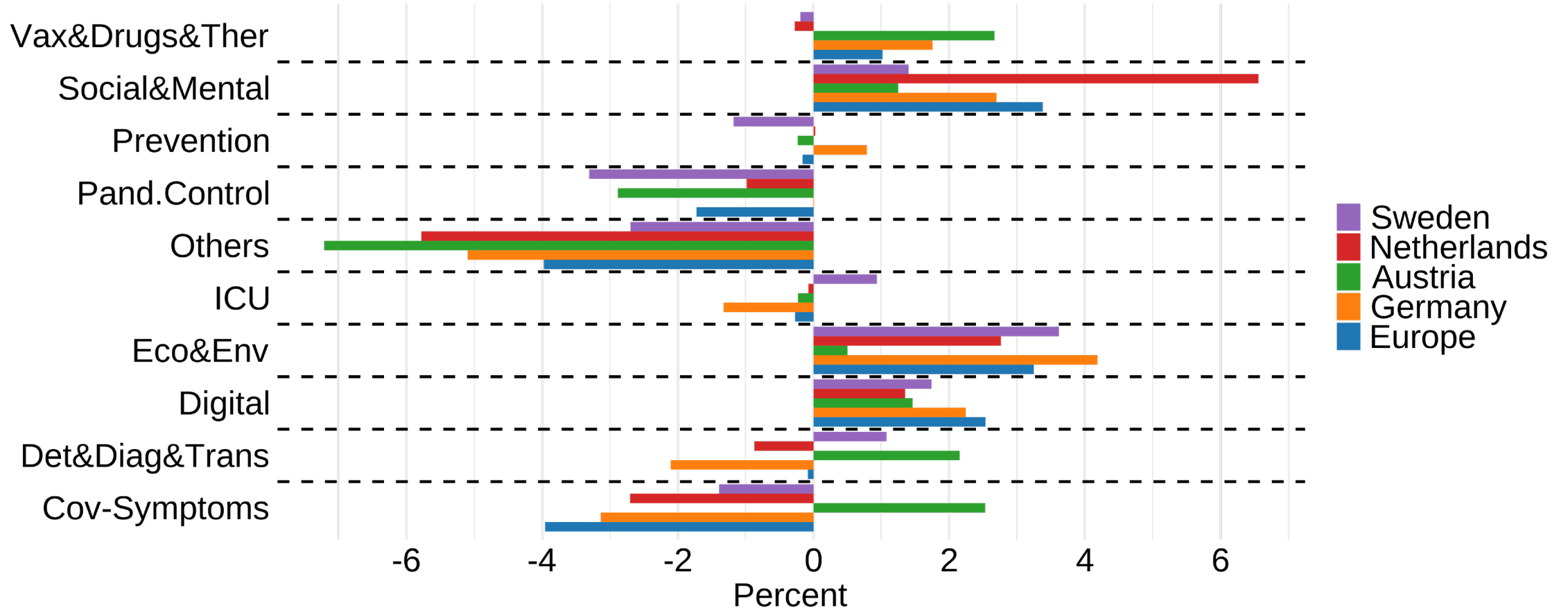
# Results – Focus Germany

Focus corona research Germany: 2020 vs. 2021

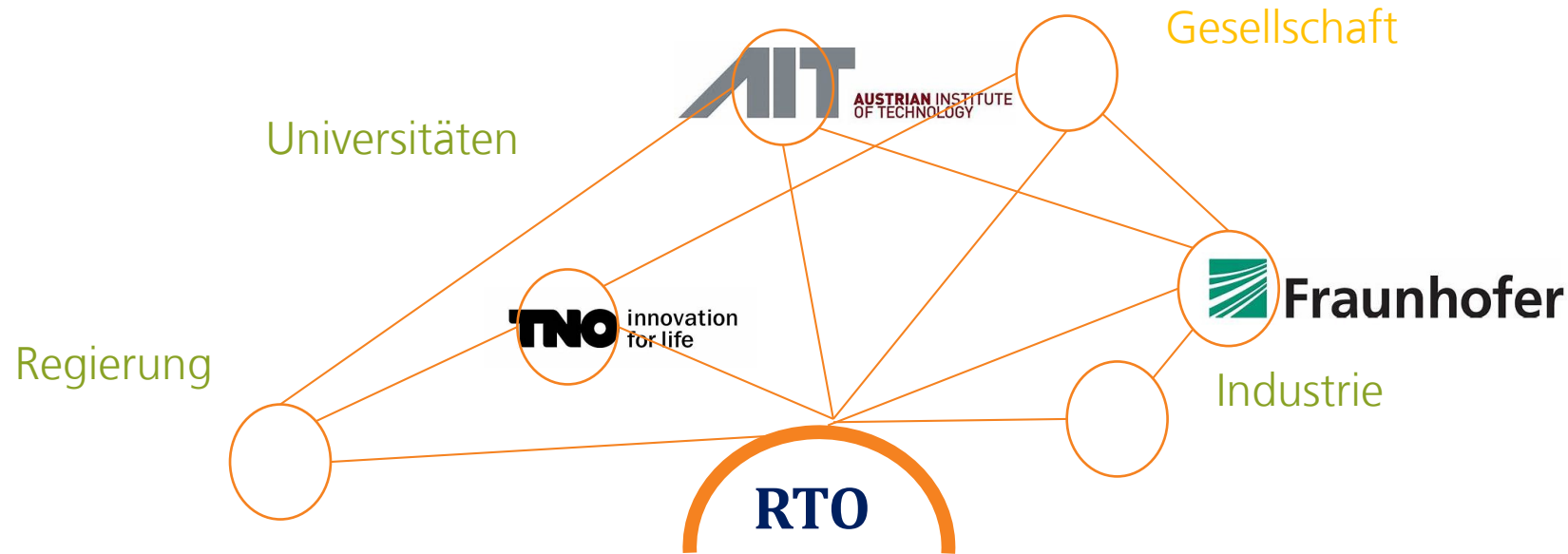


# Results

All countries shift 2020 vs. 2021



# Angewandte Forschungsorganisationen (RTOs) erfüllen zentrale Funktionen in Innovationssystemen



**Etabliert: Brückenfunktion zwischen Forschung und Markt**

**Neu / Zusätzlich: Beitrag zu gesellschaftlichen Herausforderungen / politischen Missionen**

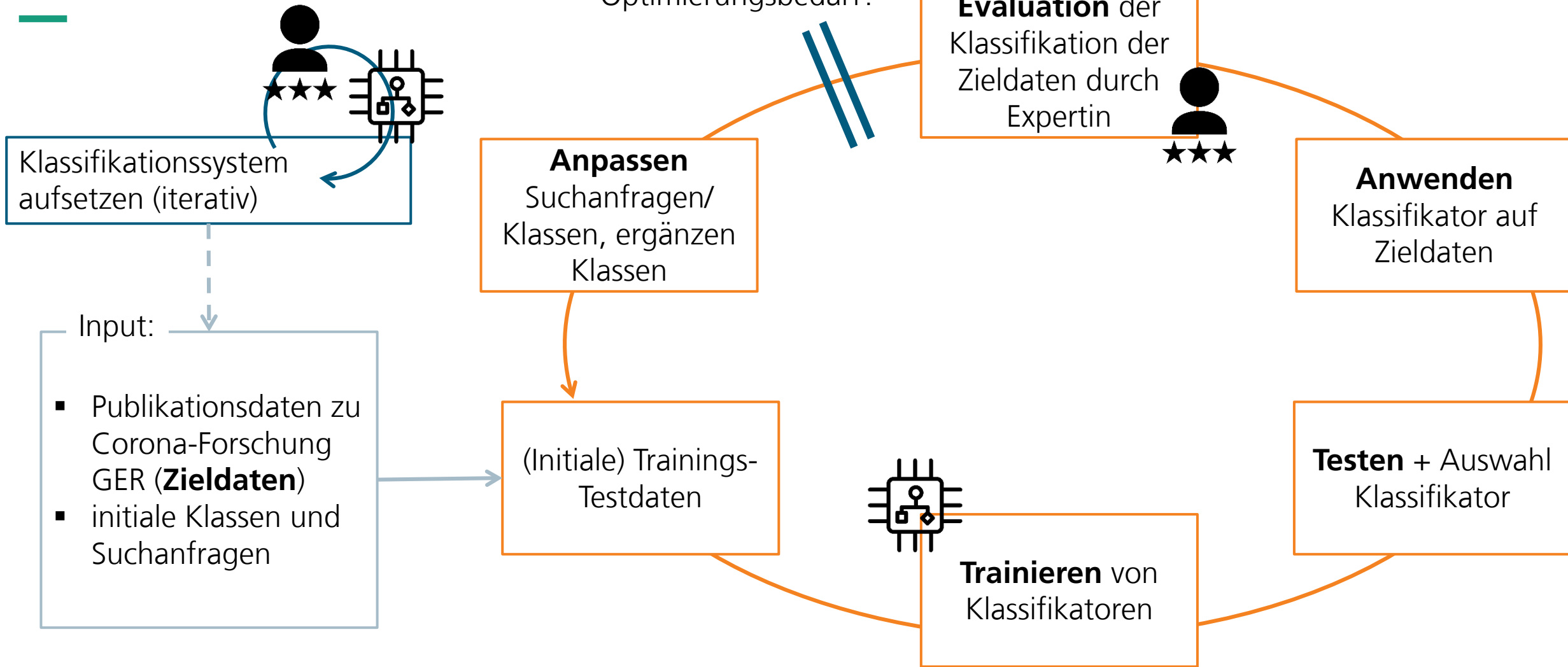
## Forschungsfragen:

Ob und wie sind RTOs in der Lage, ihre Aktivitäten an schnell entstehende Bedürfnisse in der Covid-19-Krise anzupassen und zur Neuausrichtung des Innovationssystems auf langfristige gesellschaftliche Bedürfnisse beizutragen



# Forschung vs. RTO

## Iteratives Klassifikationssystem



# Mini-Styleguide

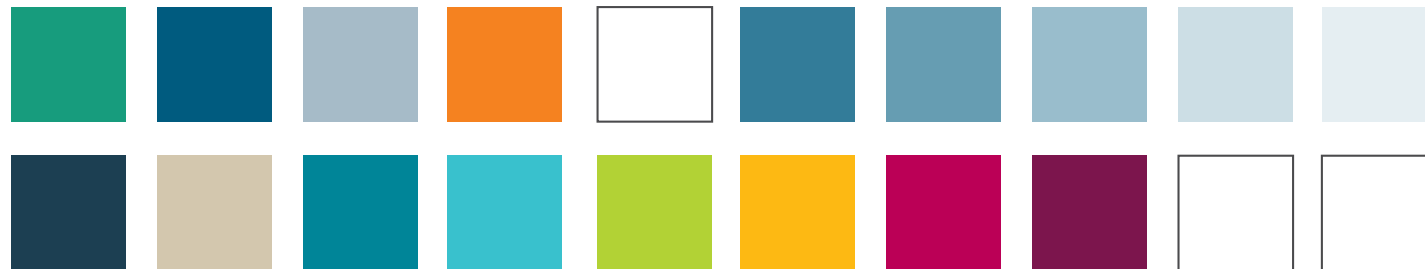
## Designfarben



### Designfarben



### Benutzerdefinierte Farben



### Farbreihenfolge in Diagrammen

