

DATA SCIENCE IN FOOD CHAIN SAFETY DECISION MAKING: A EUROPEAN PERSPECTIVE

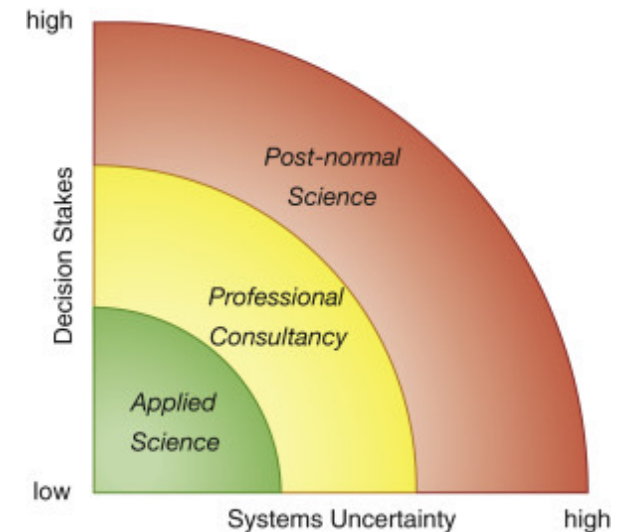
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IAFP European Symposium 2022
4th – 6th May 2022, Munich, Germany



FOOD SAFETY DECISIONS: **POST-NORMAL** SCIENCE

- Decision making problems:
 - based on uncertain facts
 - disputes over costs, ethics and values
 - urgent decisions needed
 - that may have far-reaching consequences



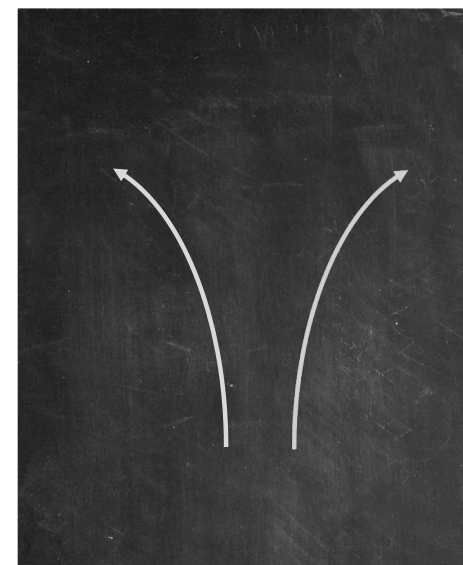
Source: Silvio Funtowicz, Jerry Ravetz: Chapter 2 - Post-Normal Science: How Does It Resonate With the World of Today? In: Science for Policy Handbook, Elsevier, 2020. <https://doi.org/10.1016/B978-0-12-822596-7.00002-4>.



Increasing
**volume &
complexity**
of the food chain



Growth of the
amount of **data**
available
for analysis



Better evidence-
based **decision**
making?



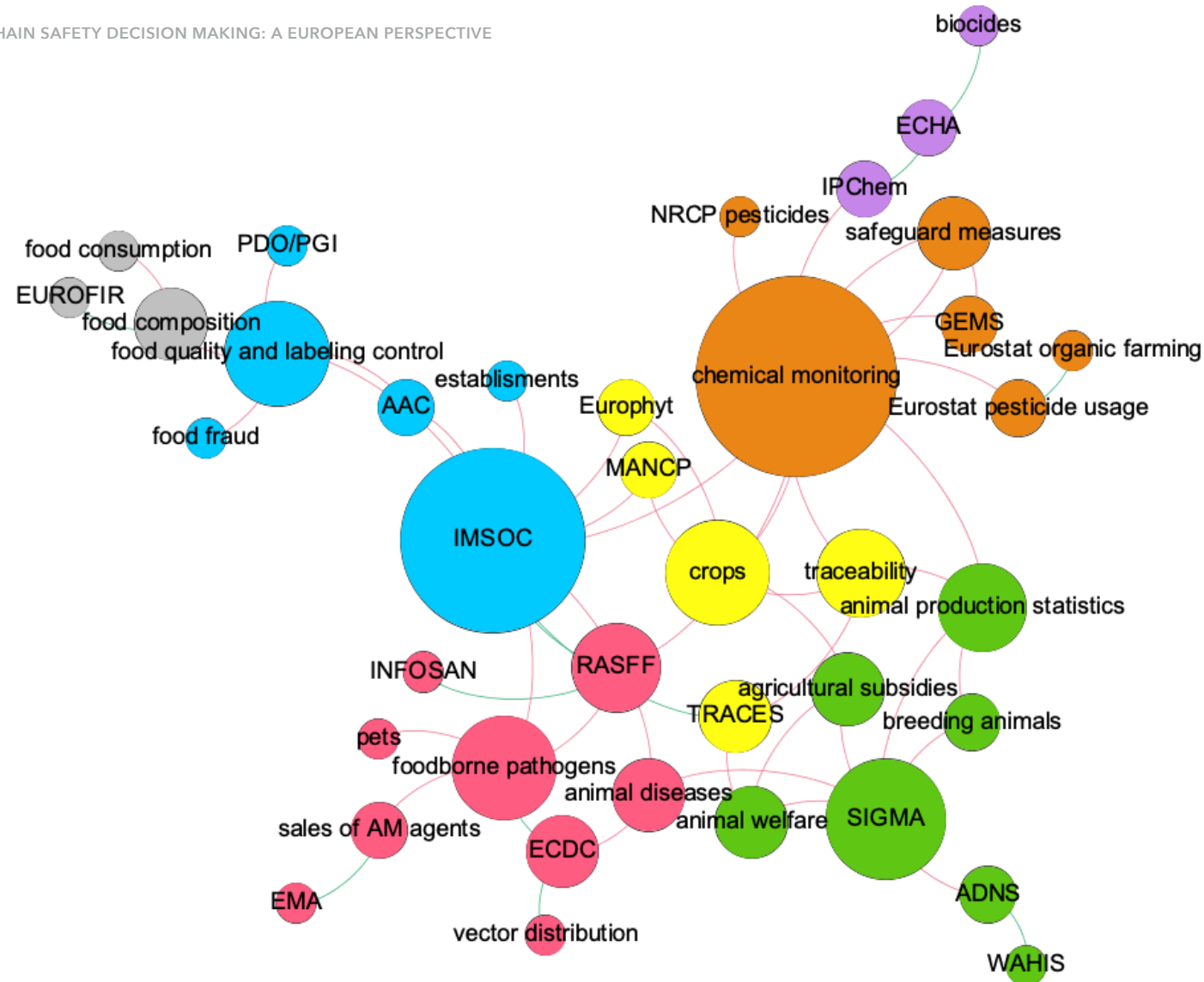
COMPUTATIONAL SCIENCE AS A SOLUTION

- Computational science:
 - Able to detect patterns which can not be detected by a smaller set of data
 - Those **emerging patterns** can be surprising & counter-intuitive
- 'more is different'

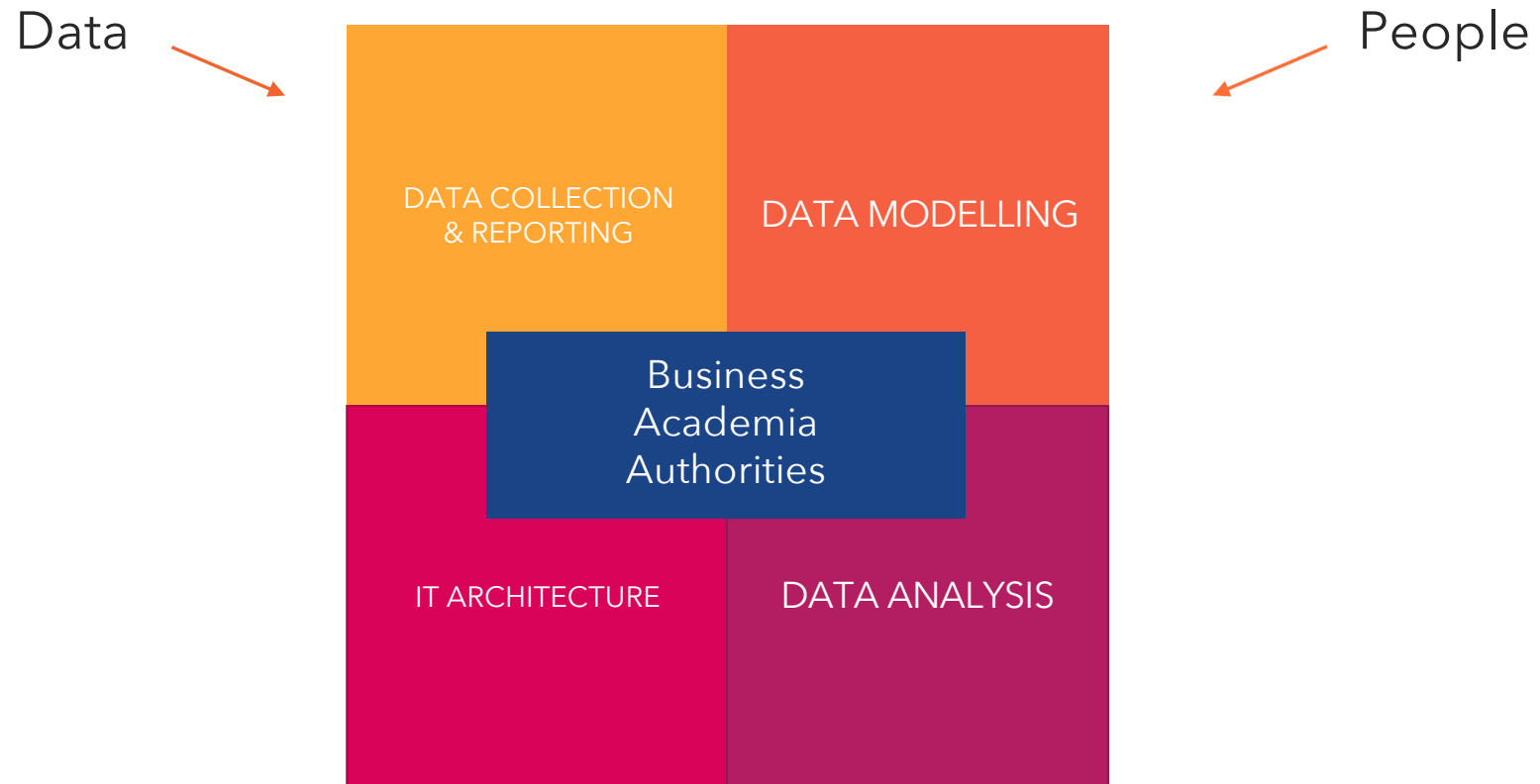
HOW DATA SCIENCE HELPS IN ENSURING FOOD CHAIN SAFETY?

- More data → deeper insight into food chain processes
 - **Finding high risk** businesses and trade routes in the network of businesses (e.g. animal farms) with network analysis
 - **Optimising** food production and minimising loss with machine learning
 - **Predicting the spreading** of hazards (e.g. animal epidemics) along the food chain with network analysis and spatiotemporal spreading simulation tools
 - **Finding emerging (upcoming) risks** with social network analysis, text mining, AI and other computational science tools
 - ...

EFSA **ADVISORY GROUP ON DATA**



DATA ANALYSIS FRAMEWORK



EFSA ADVISORY GROUP ON DATA

- Act as a governance body providing recommendations
 - <https://doi.org/10.2903/sp.efsa.2020.EN-1901>
- Act as a Think Tank providing input on project ideas
- Act as a channel providing access to knowledge, expertise, competencies and staff in Member States
- Provide strategic input on and oversight of alignment of EFSA's data roadmap

STRATEGIC **RECOMMENDATIONS**

- Achieve **critical mass of data literacy** by supporting and encouraging data related education activities
- EFSA, and also other institutions should continue their activities towards **becoming data driven organisations**
- Initiate discussions on a common “**European food safety data model**” along the food chain
- Initiate discussions also on the applicability of **solutions other than relational databases**
- Explore deeper the potential use of **traceability data** (including blockchain based solutions)

STRATEGIC **RECOMMENDATIONS**

- Encourage **process automation** for data exchange and data analysis by investing in standardised and openly available tools and analysis program codes
- **Collaborative joint projects** and **sharing best architecture practices** should be encouraged
- All national and EU systems being built today should be built with **interoperability** in mind
- Discussions should be initiated on designing the '**future food safety data ecosystem of Europe**'

STRATEGIC **RECOMMENDATIONS**

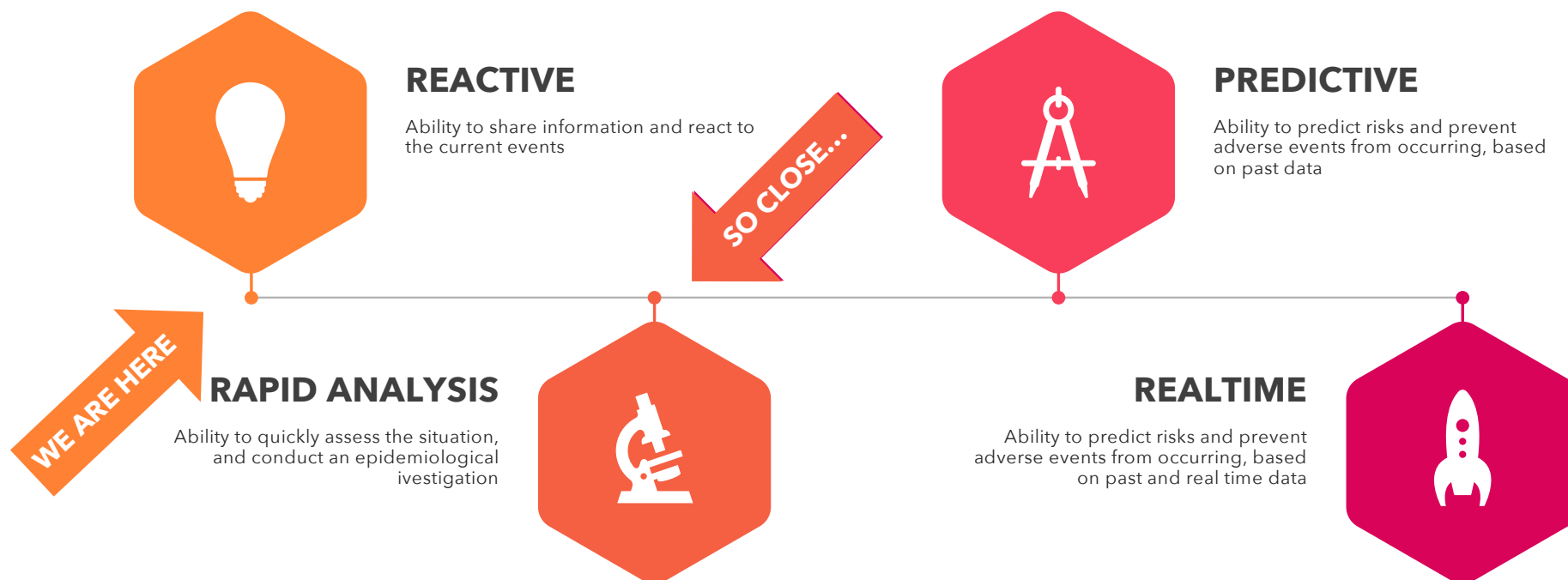
- Support the development and application of **novel data analytical approaches**, including user-friendly tools and frameworks
- Initiate discussions on **application of results produced by computational science solutions** in risk management and policy decision-making
- Good practices of **data visualisation** should be identified and also capacities in data visualisation should be built
- Future problems caused by **'black boxes'** produced by AI solutions should be addressed

ARE WE READY?

ARE WE **READY?**

- We need to invest in **data sharing** and **exploring capacities**
- We need careful **strategic planning** for multiple timelines
- Building the future may destroy some of the current investments/achievements
- IT systems become obsolete after 7-10 years
→ build from scratch is better than patching
- **Expectation management & Change management**

ARE WE READY **FOR THE FUTURE?**



FOOD SCIENTISTS WILL NOT BE REPLACED BY AI... ...THEY WILL BE REPLACED BY FOOD SCIENTISTS USING AI

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