

SciCom- Fraud in the food chain and consequences
for food safety

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EFSA activities in relation to Food Frauds

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Knowledge, Innovation and Partnership Management (KNOW)

ENGAGE Department

Trusted science for safe food





Provides independent scientific advice and support for EU risk managers and policy makers on food and feed safety



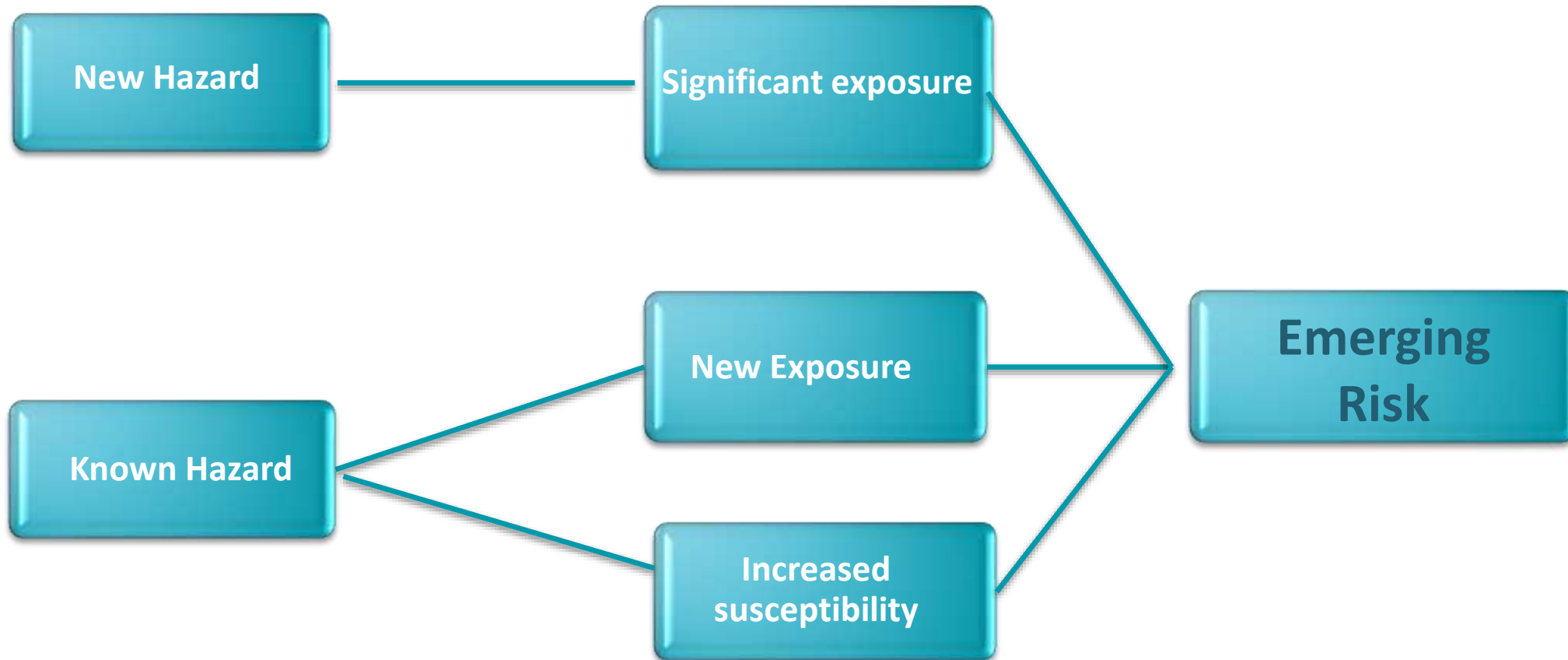
Provides independent, timely risk communication



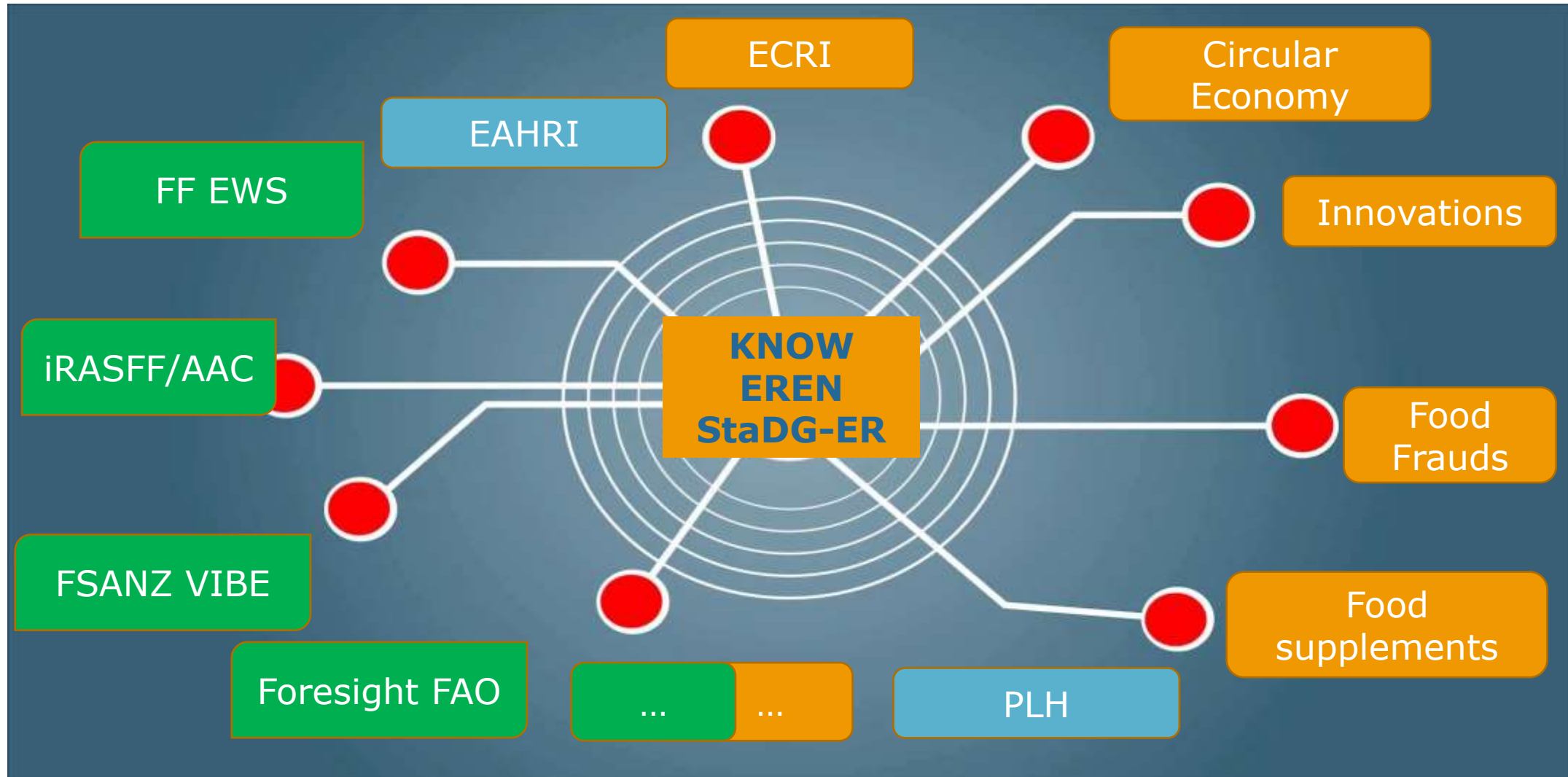
Promotes scientific cooperation

+ Emerging Risks identification

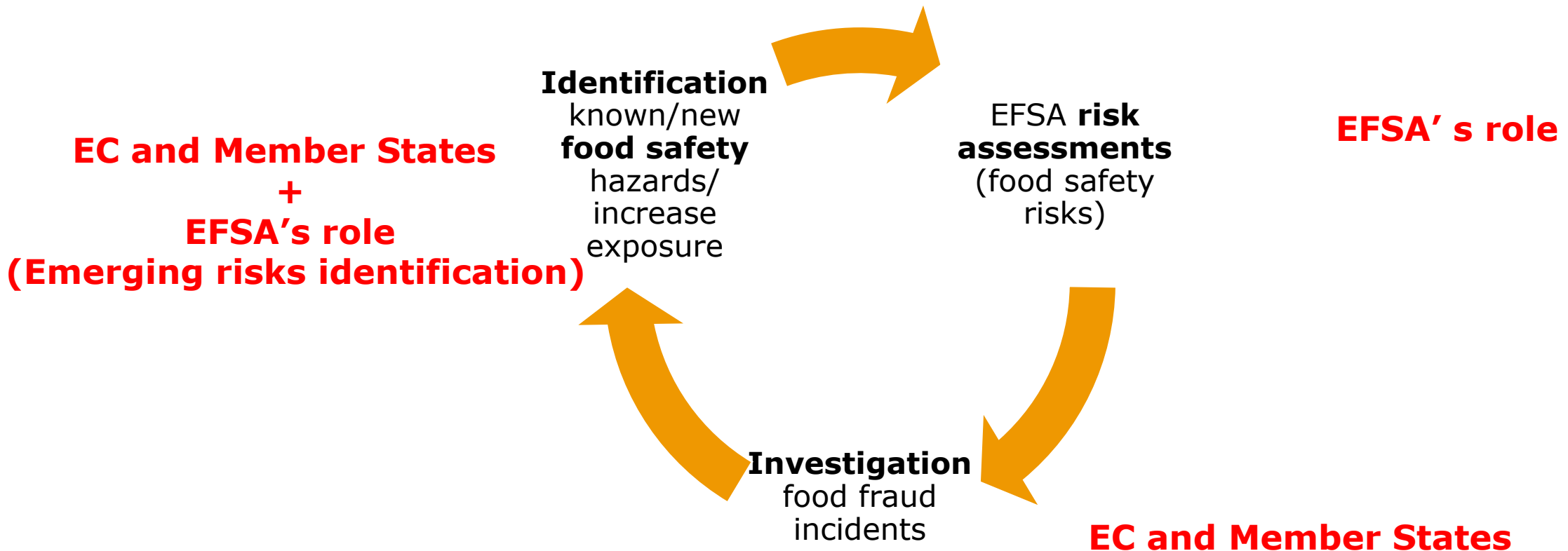
EMERGING RISK- a definition



DEFINITION - an **emerging risk** to human, animal and/or plant health and the environment is understood as a risk resulting from a **newly identified hazard** to which significant exposure may occur or from an **unexpected new or increased significant exposure and/or susceptibility** to a known hazard” (EFSA, 2019)



Food fraud incidents and non-compliances may not necessarily lead to food safety / public health issues



Food Fraud is largely a risk management issue, however

- Urgent risk assessments to support crisis/incident management.
- Anticipation of future risk assessment needs (emerging risks) that will help risk manager anticipate and even prevent future safety challenges

EFSA scientific outputs where Food fraud incidents have led to risk assessments

Melamine (2008)

- **Illegally used** - pet feed (2007) and contaminated infant milk, milk products (2008)
- **EFSA** Statement of EFSA on risks for public health due to the presences of melamine in infant milk and other milk products in China (September 2008). **Scientific Opinion** on Melamine in Food and Feed (April 2010)

Horse Meat (2013)

- **Illegally used** - substitution of beef meat
- Urgent joint risk assessment by **EFSA and EMA** (phenylbutazone). Low concern for consumers (April 2013)

Fipronil in eggs (2018)

- **Illegally used** - Detection of **fipronil residues** in eggs by Belgian authorities (July 2017)
- **EFSA output** on "Occurrence of residues of fipronil and other acaricides in chicken eggs and poultry muscle/fat ([link](#))" An analysis of food data collected following the widespread detection of fipronil residues in eggs (May 2018)

Beeswax (2020)

- **Illegally used** – Beeswax adulterated with paraffin and stearin (2019)
- **EFSA output** – Risk assessment of beeswax adulterated with paraffin and/or stearin/stearic acid when used in apiculture and as food (honeycomb) (May 2020)



Fraudulent activity – economic gain

Average price of paraffin/stearin

6 € per kg

Average price of beeswax

13 € per kg

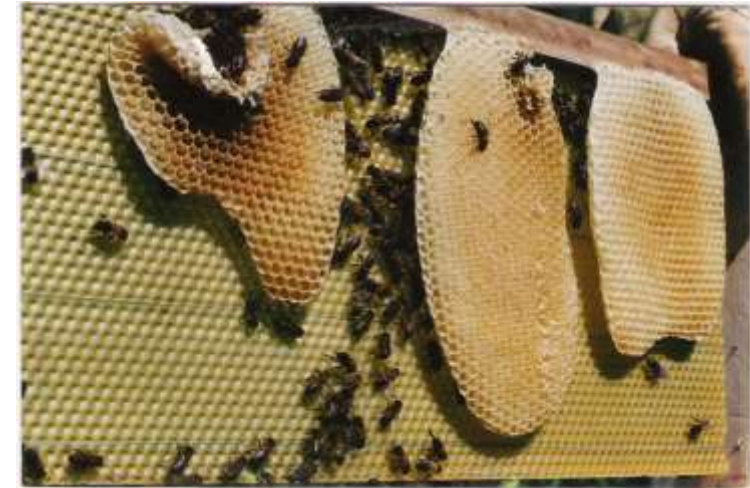
Ukrainian batch of 7 010kg: 52% of paraffin
– economic gain = 25 516 € (3,64 € per kg)

Chinese batch of 20 000kg: 5,5% of
paraffin – economic gain = 7 700 € (0,39 €
per kg)

Chinese batch of 20 000kg: 12,2% of
stearin – economic gain = 17 080 € (0,85 €
per kg)



Terms of reference – purity criteria and technical specifications, bee health, human health



Beeswax adulteration – background & outcomes

June 2017



EC informed by Belgium authorities: beeswax for apiculture adulterated (China, Ukraine) - June 2017



Official notification in RASFF - July 2017



Discussion at diverse forums – Nov 2017- July 2018 e.g. Food Fraud Network



Identification of the need for a risk assessment in human and bee health - Mandate sent to EFSA on 12 February 2019



8 WG meetings; May 2019 – April 2020



Experts (2 WG members, 1 hearing expert, 1 WG member as reviewer and 4 EFSA staff)



Publication 14 May 2020

May 2020



Potential risks – Bee health

Beeswax comb foundation adulterated with stearin or palmitin affected **brood development** with up to 80% **mortality rates**



Lack of purity criteria/ technical specifications

EFSA establishes **purity criteria** for beeswax in apiculture

Analytical methods should include at least two physico-chemical parameters and one or more chromatographic or spectroscopic analyses



Potential risks – Human health

Due to direct consumption of honeycombs contained in honey pots

Stearin as such and contaminants in food grade stearin are not expected to raise safety concerns in humans.

The presence of **paraffin** would increase exposure to contaminants of concern such as mineral oil saturated hydrocarbons.

Due to the consumption of honey contaminated with constituents of adulterated beeswax

Considering that beeswax adulterants (paraffin and stearin) and their contaminants are lipophilic, they are not expected to migrate substantially to honey.



FFRAUD-ER

Development of a Computational Model for identifying food fraud incidents as drivers for food safety Emerging Risks



Ted·eTendering

Calls for tenders from the European Institutions

OC/EFSA/SCER/2021/10



To develop, establish and test a scheme for the identification and analysis of food fraud incidents as drivers for emerging risks in food and feed safety, facilitating EFSA emerging risk intelligence gathering activities.



Objective 1

Review of available sources



Objective 2

Create a Labelled Database



Objective 3

Development of Computational Model



Objective 4

Refinement of model on the basis of expert input



Objective 5

Develop a scheme for the wider application

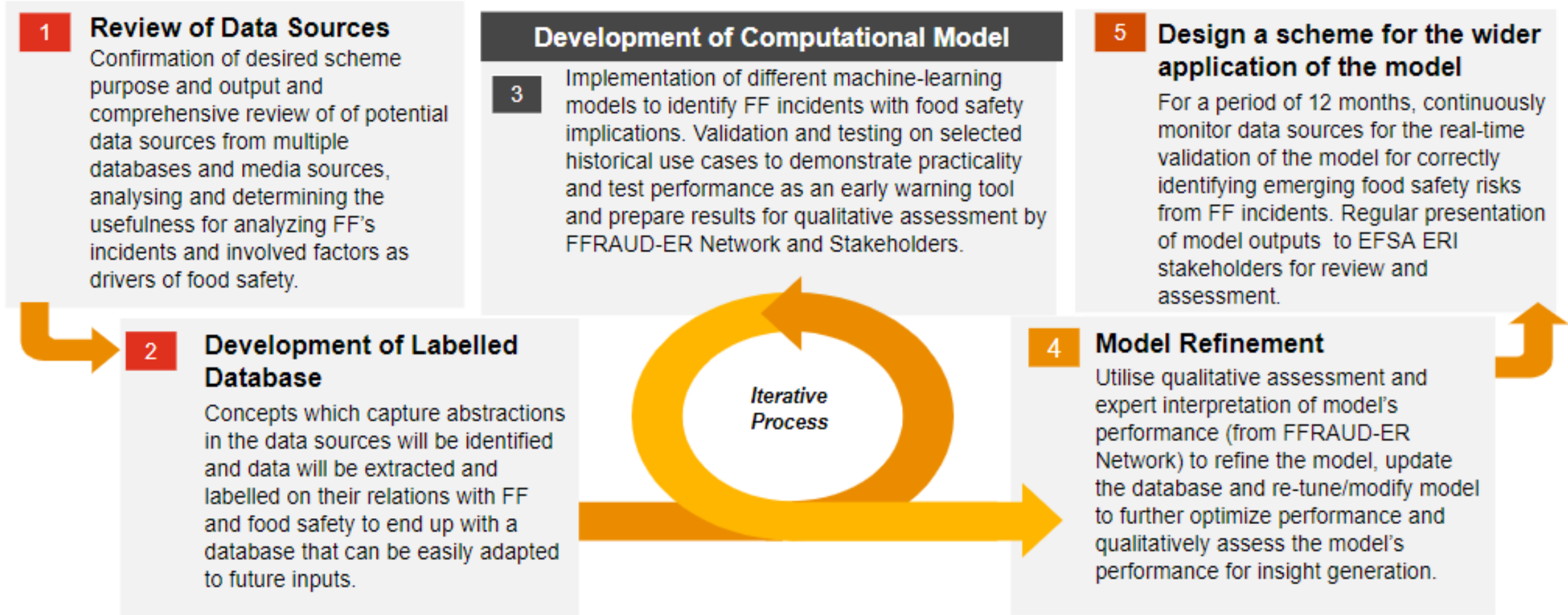
Aug 22

Feb 23

Aug 23

Feb 24

Feb 25



Data sources assessment - List of data sources

Data from the identified data sources were gathered and analysed, in order to come to a conclusion as to their usability for the computational model's training by utilising the aforementioned MCDA scoring system.

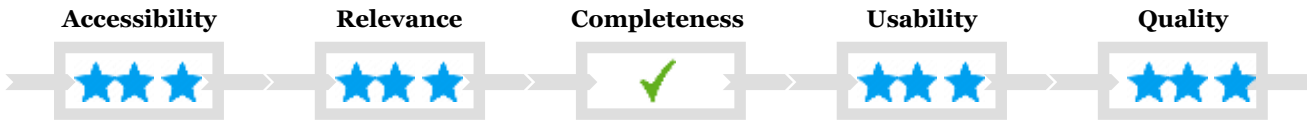


Overall, 14 data sources were primarily selected after the PRISMA approach for assessment using MCDA.

- 01 The US FDA Recalls, Market Withdrawals and Safety Alerts Database
- 02 RASFF System
- 03 Food Fraud Risk Information Database
- 04 HorizonScan
- 05 Decernis Food Fraud Database
- 06 Food Adulteration Incident Registry (FAIR)
- 07 JRC reports
- 08 UKFSS Database
- 09 Agroknow's FoodAkai
- 10 PubMed Academic Database
- 11 FADB-China
- 12 TalkWalker
- 13 MedISys-FF
- 14 Food Recall Reporter

Data sources assessment - HorizonScan

HorizonScan tool is developed by the UK government's Food and Environment Research Agency (FERA). It is widely used and includes alert systems and information about food safety, food fraud and suppliers.



HorizonScan, although a subscription-based database, scored the highest amongst the various data sources identified. Through the free trial access, the data gathered were of excellent quality, usability and completeness. Geographical relevance is provided and food fraud incidents are of a worldwide basis (covering 180 countries). Data is also very clearly structured and grouped in a consistent manner, categorising food fraud incidents by their commodity type (500 commodities). The only drawback of the HorizonScan database is its cost, however the data already downloaded (using the free trial subscription) can be used to train the computational model. For future calibrations of the dataset, a new free trial should be requested or a subscription to the database has to be obtained.



HorizonScan
Final Score
Calculation

	Accessibility	Relevance	Completeness	Usability	Quality
Weights	20%	25%	10%	40%	5%
Scoring	3.0	3.0	1.0	3.0	3.0
	Final Score				2.8

Data sources assessment - Data sources ranking (2 of 2)

Overall, the top 4 proposed data sources contain reports of a total of ~160k food fraud incidents across 196 countries, providing a large enough and diverse enough database for the development of the model.

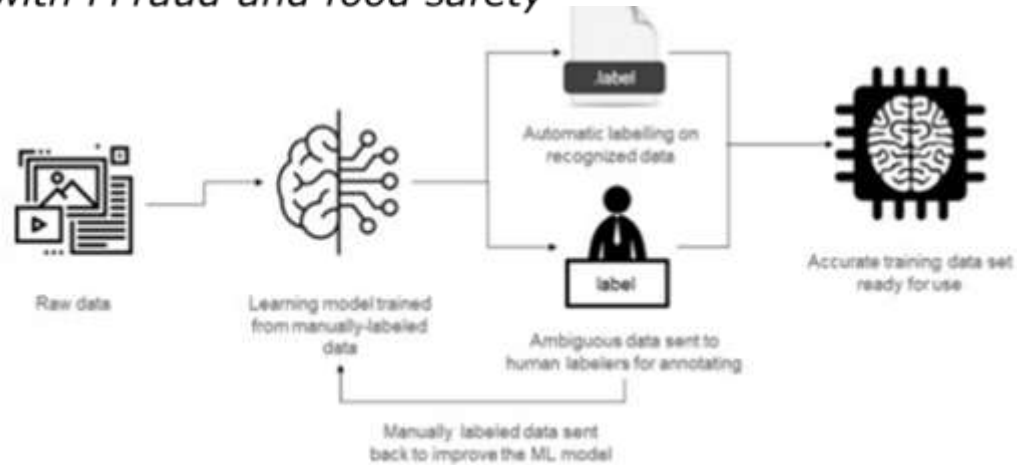


4
data
sources

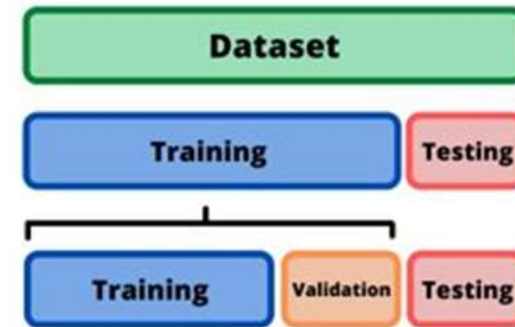
~160k
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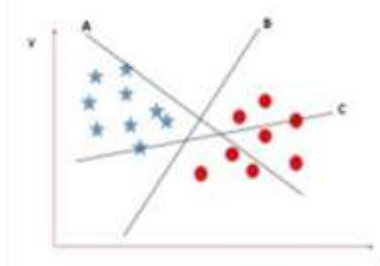
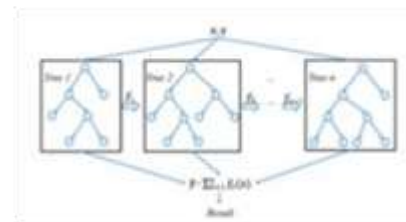
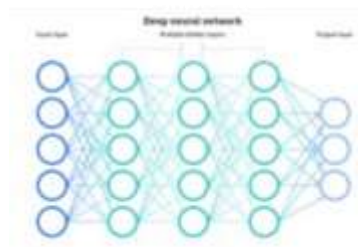
Extracting and labeling data on their relations with FFraud and food safety



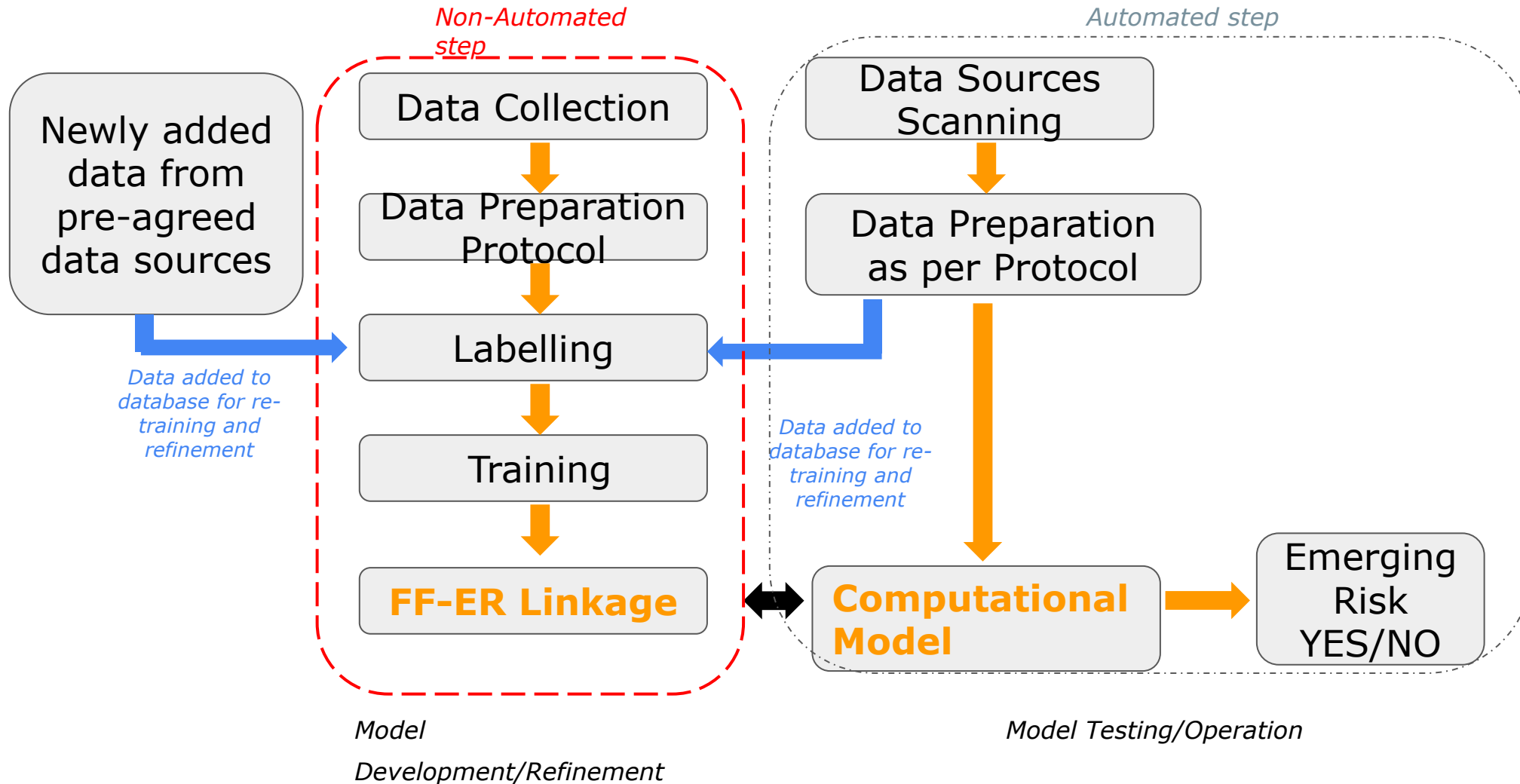
Splitting data into training, validation and testing



Selection of a range of candidate models



Database automation





THANK YOU FOR YOUR ATTENTION !

