



Centre for Innovative Human Systems (CIHS)

Building Socio-Technical Risk Evidence Bases During Covid

The Access Risk Knowledge (ARK) Platform in St James's Hospital and Dublin Fire Brigade

23 May 2022

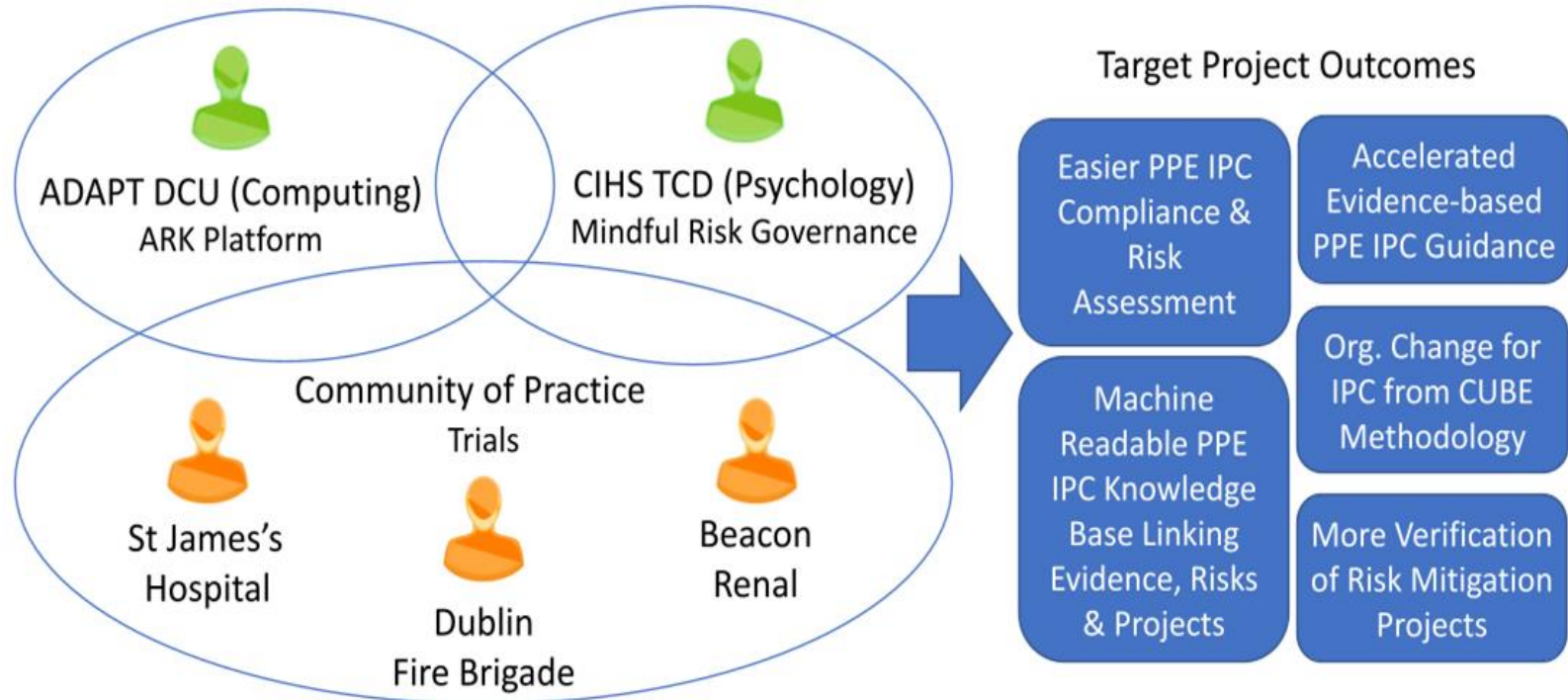
This project is supported by SFI under the COVID-19 Rapid Response Funding grant 20/COV/8463 and the ADAPT Centre for Digital Content Technology which is funded under the SFI Research Centres Programme (Grant 13/RC/2106_R2) co-funded under the European Regional Development Fund.



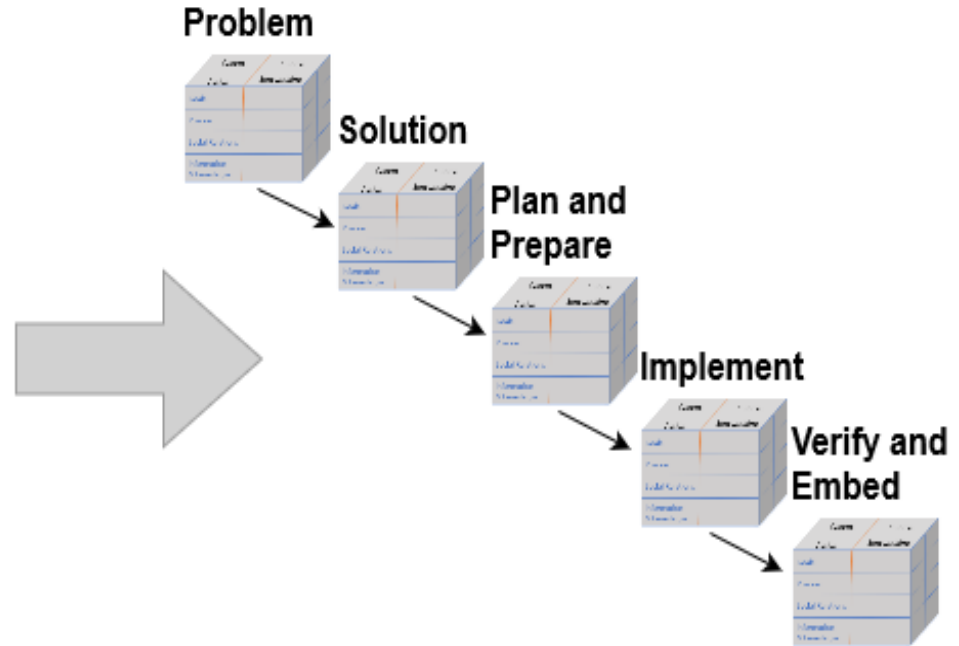
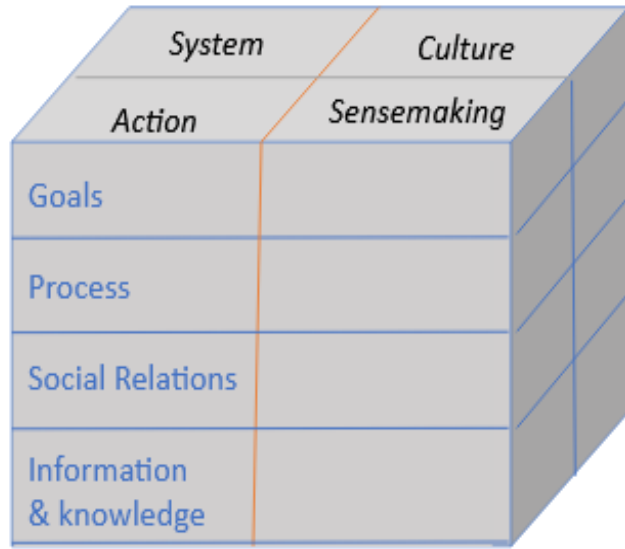
Agenda

- ARK-Virus Project Overview
- CUBE Socio-Technical Systems Analysis
- ARK (Access Risk Knowledge) Platform
- Covid Use Cases
- Building the Unified Risk Graph
- Technical Challenges and Standards-based Solutions
- Conclusions and Interim Impacts

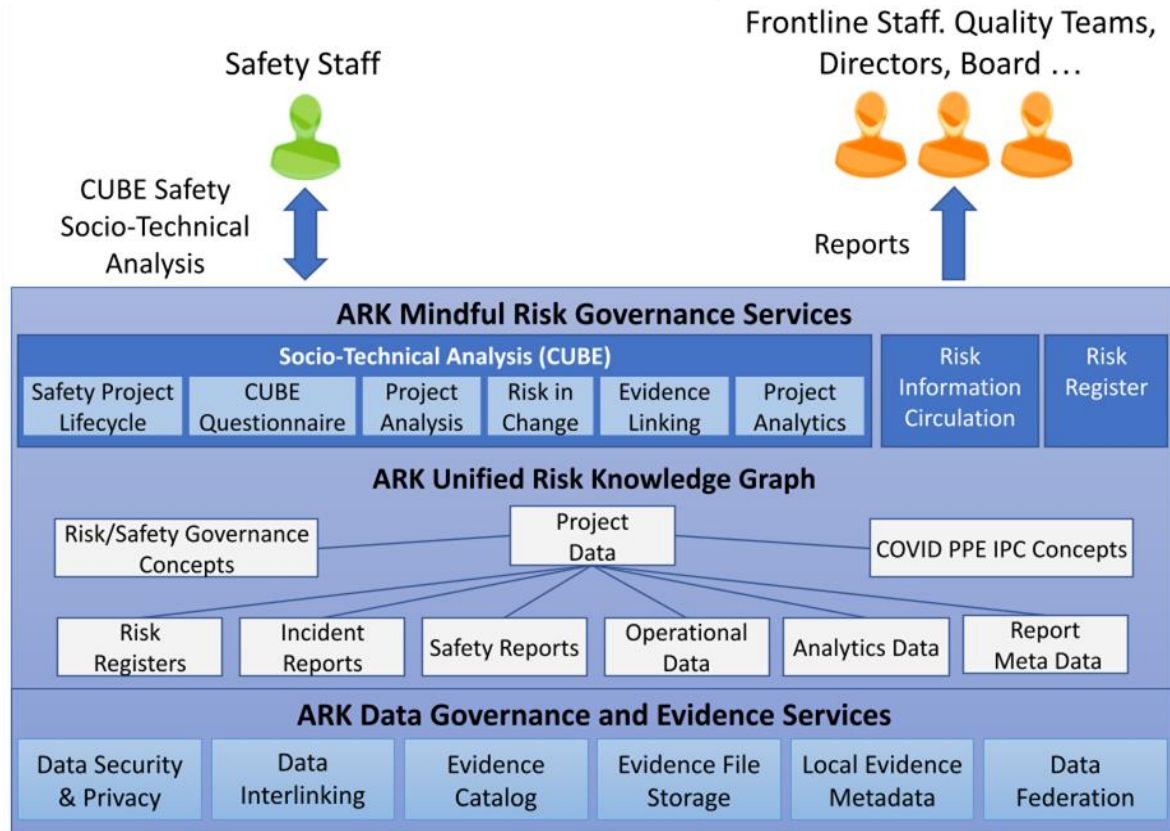
ARK Virus Project Overview



Cube Socio-Technical Systems Analysis Framework



ARK (Access Risk Knowledge) Platform



Deployment Use Cases During Covid

St James's Hospital:

Activity: Oversight, monitoring of Environment Hygiene element of PCHCAI (Prevention and Control of Healthcare Associated Infections) programme.

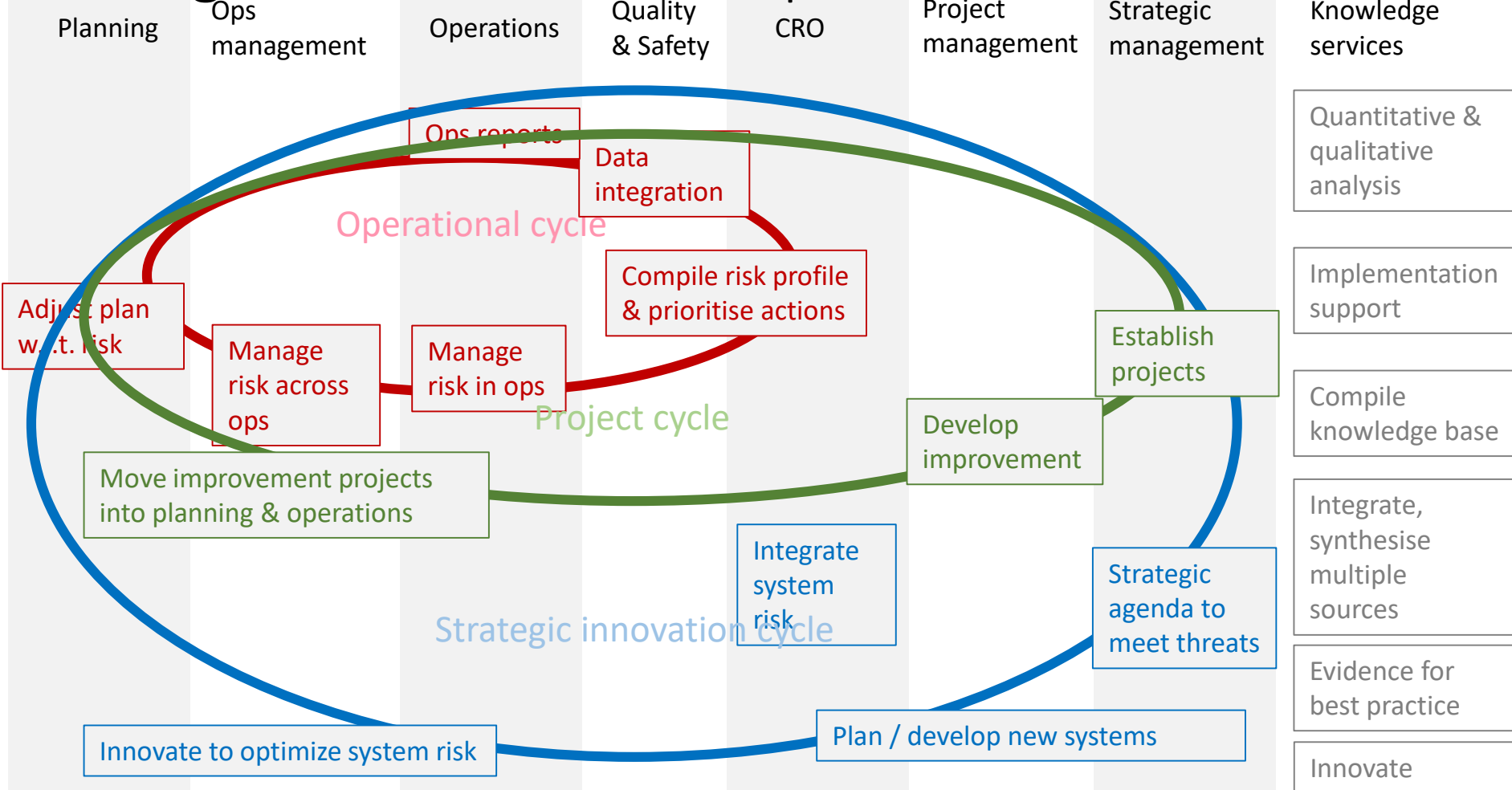
Safety staff: SJH Quality and Safety Improvement Directorate

Dublin Fire Brigade:

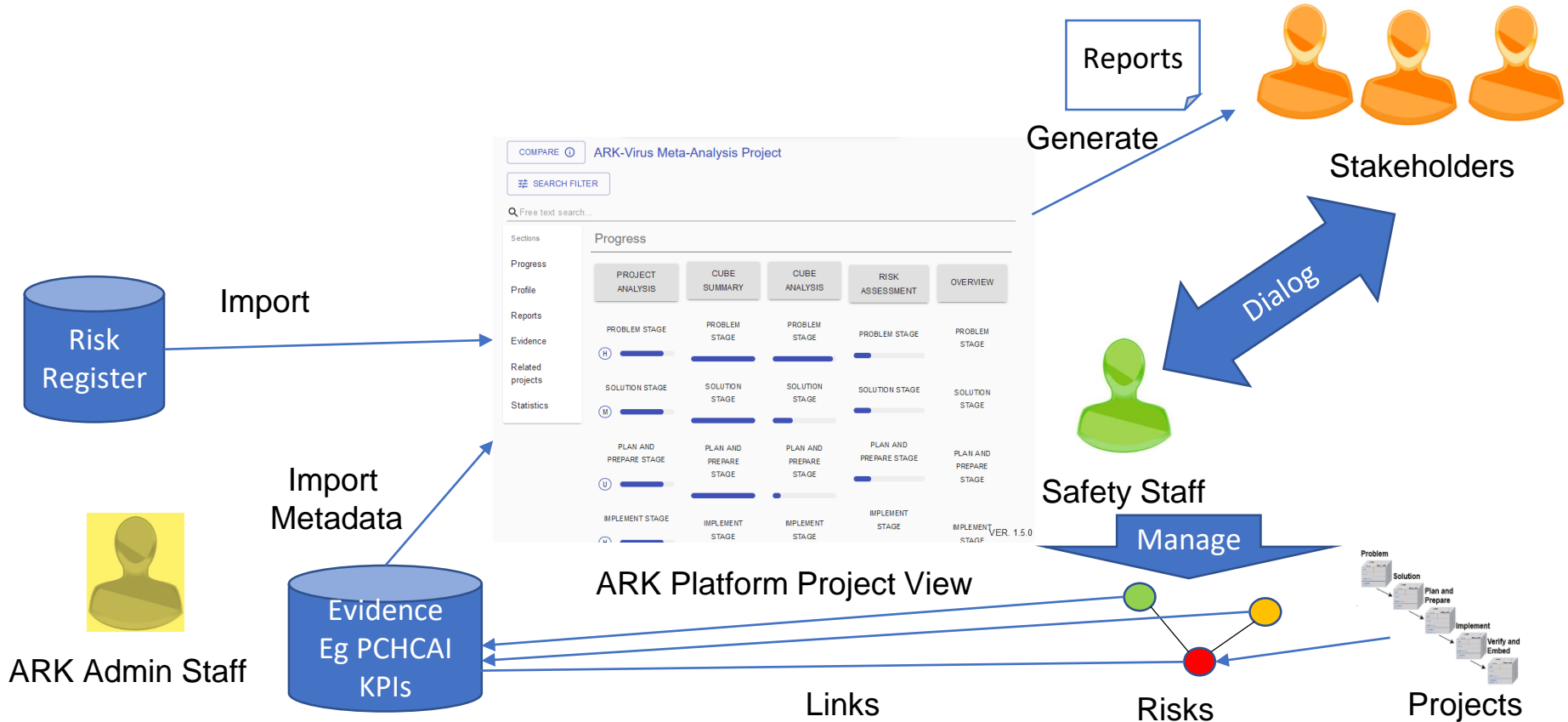
Activity: Managing high numbers of on-station close contacts and associated staff shortages, especially on ambulance service

Safety staff: DFB Health and Safety

Building the Unified Risk Graph



What does this look like in Practice?

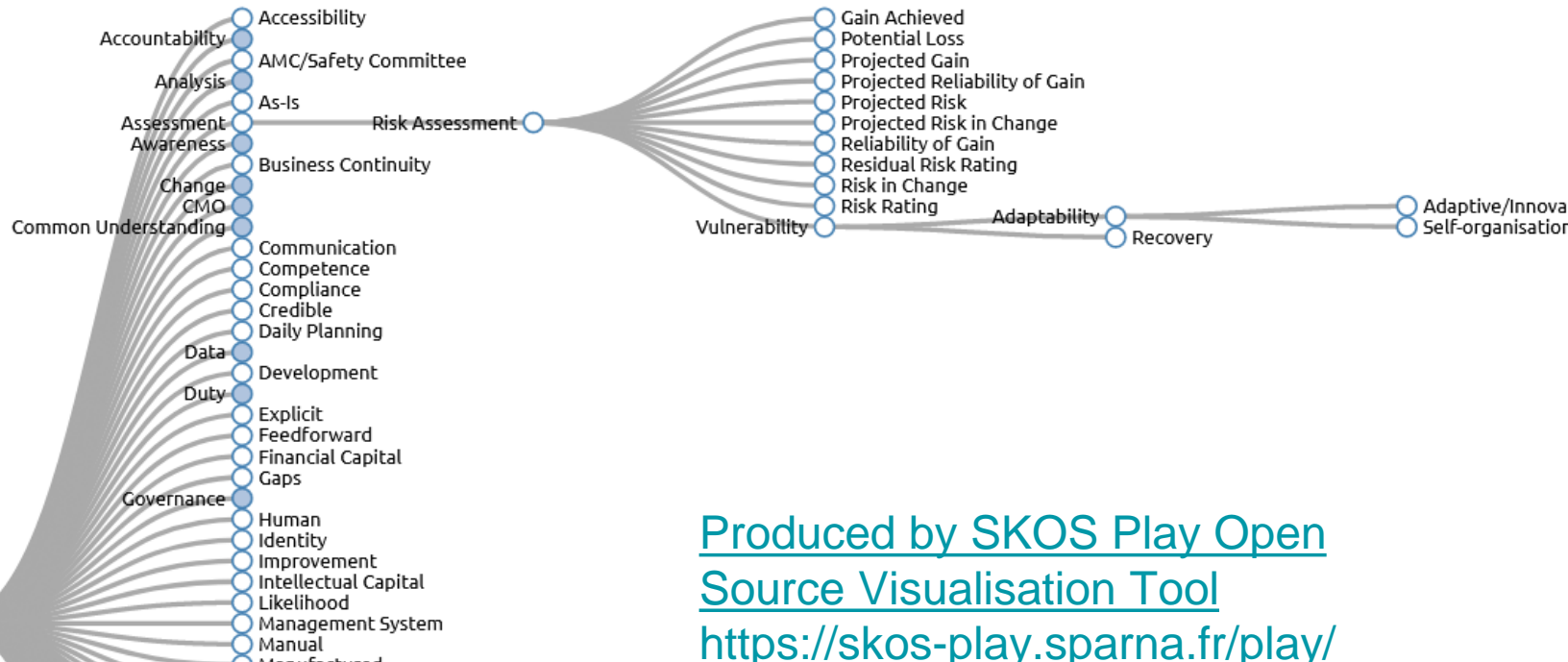


Technical Challenges and Standards-based Solutions

- **Sensitive data sharing** – W3C DCAT Metadata-based data linkage, W3C community specification DPV
- **Knowledge interoperability** – W3C OWL, W3C SKOS ontologies and taxonomies, ISO 31073:2022 Risk management — Vocabulary, HSE Integrated Risk Management Policy
- **Risk lifecycle** - W3C PROV, ISO 31000 Risk management, HSE Integrated Risk Management Policy
- **Data Governance** - W3C DCAT, W3C PROV, W3C DQV, W3C SHACL

Open Tool Chains: A Benefit of Standards

[help](#)



Produced by [SKOS Play Open Source Visualisation Tool](#)
<https://skos-play.sparna.fr/play/>

Conclusions and Interim Impact

- Standards at core of our work
- Platform impacts
 - Engages users and range of evidence and analysis
 - Reports improve workflow, help synthesis & aid communication
 - Supports culture of data governance
- Community of Practice impacts
 - Weekly and monthly meetings act as supportive CoP
 - Building sharable evidence

ARK-Virus Team

DCU: Rob Brennan (PI), Lucy McKenna, Junli Liang, Julio Hernandez, Maryam Basereh, Malick Ebiele

TCD: Nick McDonald (co-PI), Brian Doyle (also DFB), Rebecca Vining, Natalia Duda

St. James's Hospital: Una Geary, Marie Ward, Mary Fogarty, Una Healy

Dublin Fire Brigade: John Guilfoyle, Brian Doyle, Chris Tallon

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Read More

1. ARK Platform website: <https://openark.adaptcentre.ie/>
2. McDonald, N.; McKenna, L.; Vining, R.; Doyle, B.; Liang, J.; Ward, M.E.; Ulfvengren, P.; Geary, U.; Guilfoyle, J.; Shuhaiber, A.; Hernandez, J.; Fogarty, M.; Healy, U.; Tallon, C.; Brennan, R. Evaluation of an Access-Risk-Knowledge (ARK) Platform for Governance of Risk and Change in Complex Socio-Technical Systems. *Int. J. Environ. Res. Public Health* **2021**, *18*, 12572. <https://doi.org/10.3390/ijerph182312572>

ARK Ontologies for Risk Knowledge Capture and Sharing

- **ARK Cube** (OWL): this module defines the concepts and relationships used in the CUBE risk management methodology and the HSE Risk Management Model.
- **ARK Terminology** (SKOS): this module defines the additional terms used in the ARK system, in the socio-technical risk management domain.
- **ARK Platform** (OWL) defines platform concepts like user permissions
- **ARK Health** (SKOS) defines additional HSE Risk Management and Clinical Domain terms, especially Covid PPE IPC.
- **AIR (Adverse Incident Report) ontology** (OWL)– supports knowledge extraction from SJH AIRs
- **AIR Categories Taxonomy** (SKOS) – describes SJH taxonomy of AIR categories
- <https://openark.adaptcentre.ie/>