Connecting Business Models across Safe and Sustainable by Design-, Open Innovation Test Beds- and Digital Product Passport- initiatives

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DigiPass
Know Your Products!

COORDINATION AND KNOWLEDGE SHARING ACROSS MATERIALS DEVELOPMENT COMMUNITIES (CSA):
DigiPass CSA project has been funded by the European Commission for the programme HORIZON-CL4-2023-RESILIENCE-01, Grant Agreement No **101138510**
WIKKI LIMITED, UK participant in Horizon Europe Project DigiPass, is supported by UKRI grant number 10100819: **DigiPass**

Outline

- OITB – Open Innovation Test Bed
- SSbD – Safe and Sustainable by Design
- DPP – Digital (Materials) and Product Passport
- Introduction to Digital Business Models
- Data - the common value?
- Link to DPP needs
- Example on crosslinks
- Business Models Needed?

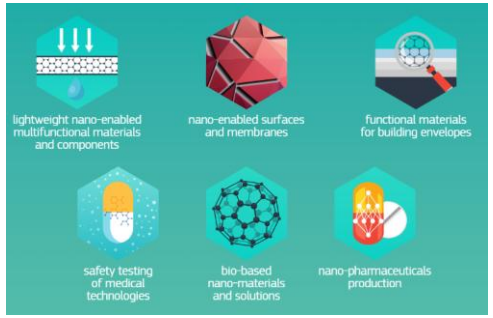
OITBs in a nutshell

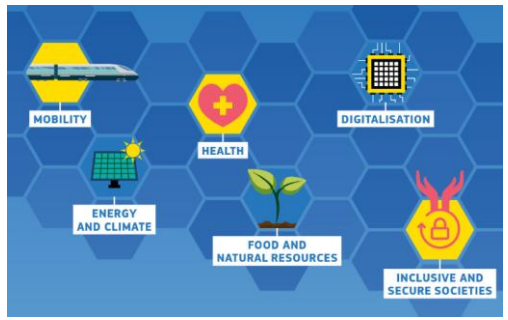
Who they are?

- Physical facilities for development, testing, upscaling of innovative advanced materials
- From validation in laboratory - TRL4, to prototypes in industrial env. - TRL 7
- Facilities and services accessible to industry at fair costs and conditions
- Harmonizing procedures for materials development, testing and upscaling

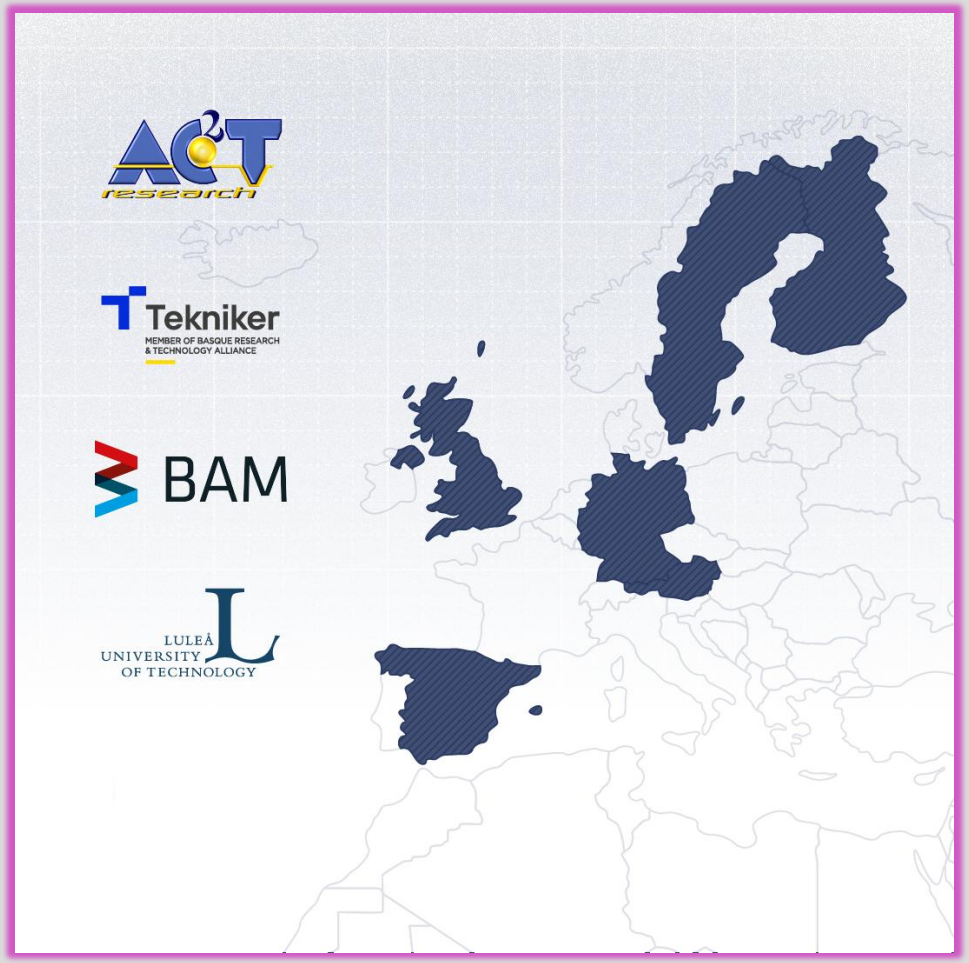
HORIZON 2020

- ~ € 300M invested
- 27 projects in different fields
- Average # beneficiaries: 15
- Average duration: 49 months
- Average EU contribution: EUR 12Mio
- Around 35% SMEs





Example OITB



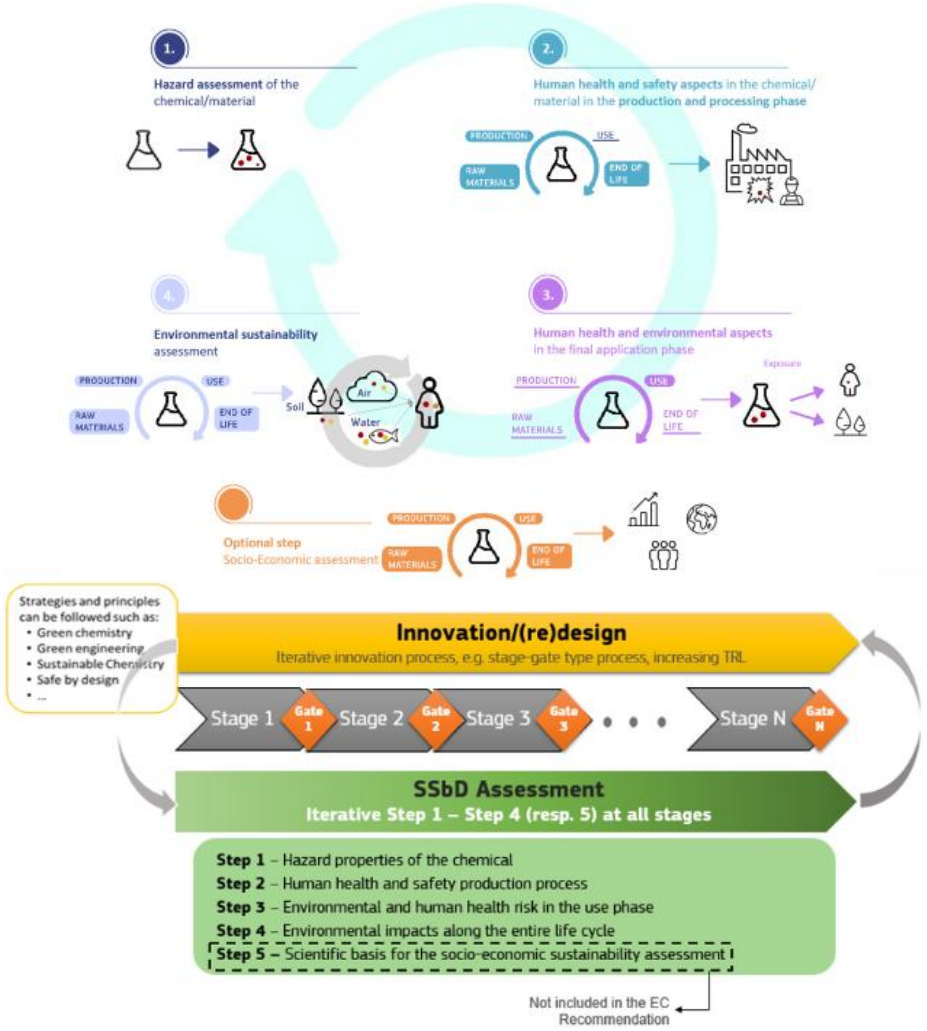
i-TRIBOMAT
THE EUROPEAN TRIBOLOGY CENTRE

- World's largest provider of tribological characterisation services of materials
- More than 100 tribometers and additional advanced characterization methods
- More than 250 experts
- 5 European Service Providers
- Platform based business process from service request to service closing
- Data Hub for tribological materials data

SSbD in a nutshell

Framework for (re)design

- **Chemicals and materials design:**
  focus on developing new substances with safer & more sustainable properties
- **Process design:**
  focus on creating new or improved processes to minimize substance use
- **Product design:**
  focus on specific functions within the product



source: doi:10.2760/28450 KJ-NA-31-942-EN-N

Example SSbD

Coordinator

Tekniker
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

https://sitolub.eu/

Partners

ACT research
ProtoQSAR Computational toxicology: fast, economical and ethical
ASCORA Software Development - Research
GreenDelta
BECHEM LUBRICATION TECHNOLOGY
i-TRIBOMAT THE EUROPEAN TRIBOLOGY CENTRE
Fraunhofer ITALIA
FGS
MOTOREX Oil of Switzerland
UNIVERSITY OF BIRMINGHAM
RS Clare & Co Ltd Innovation since 1748

SITOLUB

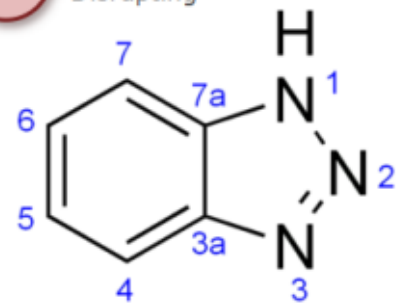
Create a virtual platform, based on integrated computational models with built-in artificial intelligence (AI) features, to predict the safe and sustainable lubricant's features and performance in a tribological system and to facilitate the formulation of lubricants to overcome the challenge posed to the European industry by new market demands, regulatory requirements or shortage of raw materials.

WORKING FLOW

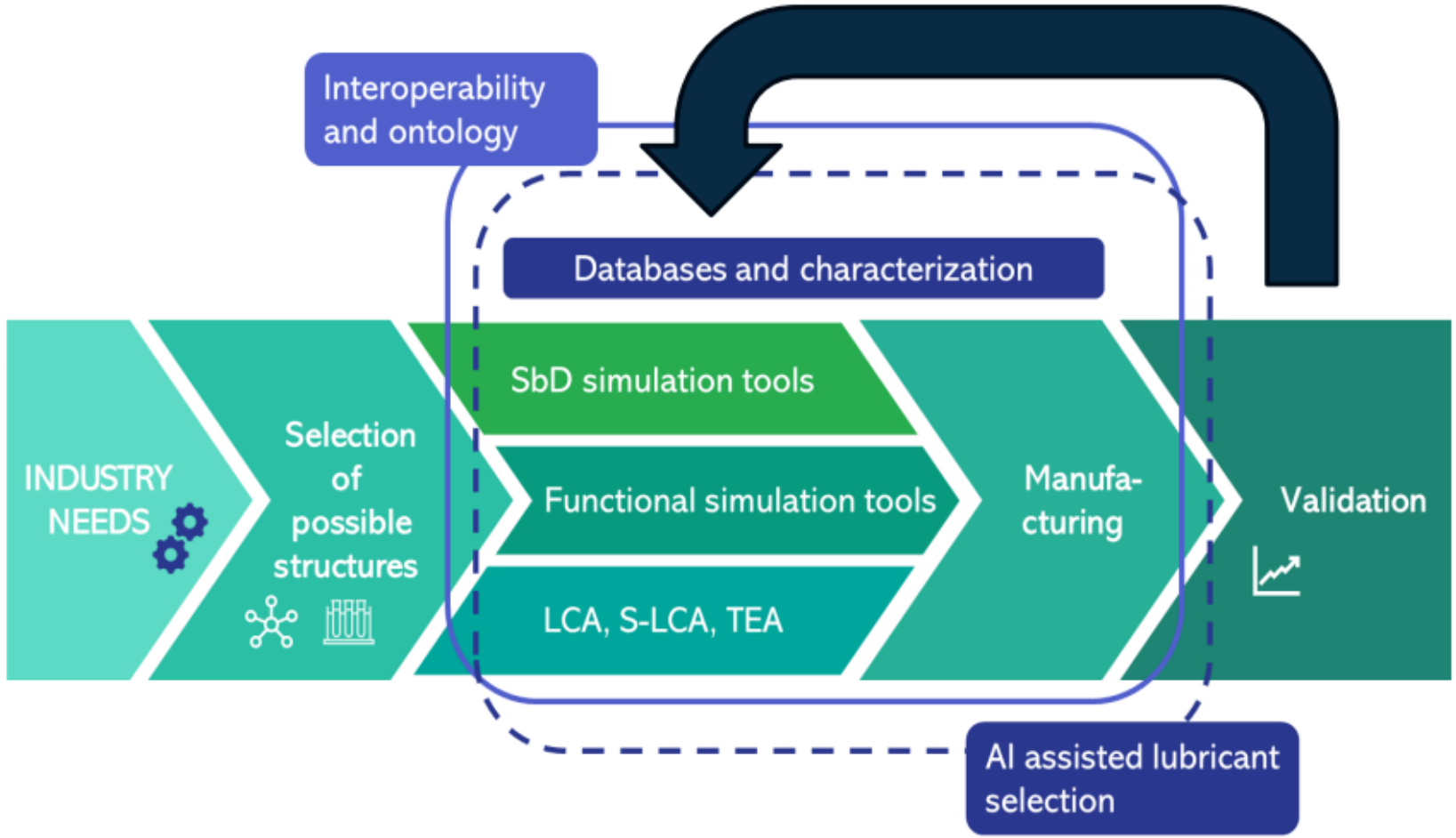
Properties of concern

PBT — Under assessment as Persistent, Bioaccumulative and Toxic

ED — Under assessment as Endocrine Disrupting



benzotriazole



Co-funded by the European Union

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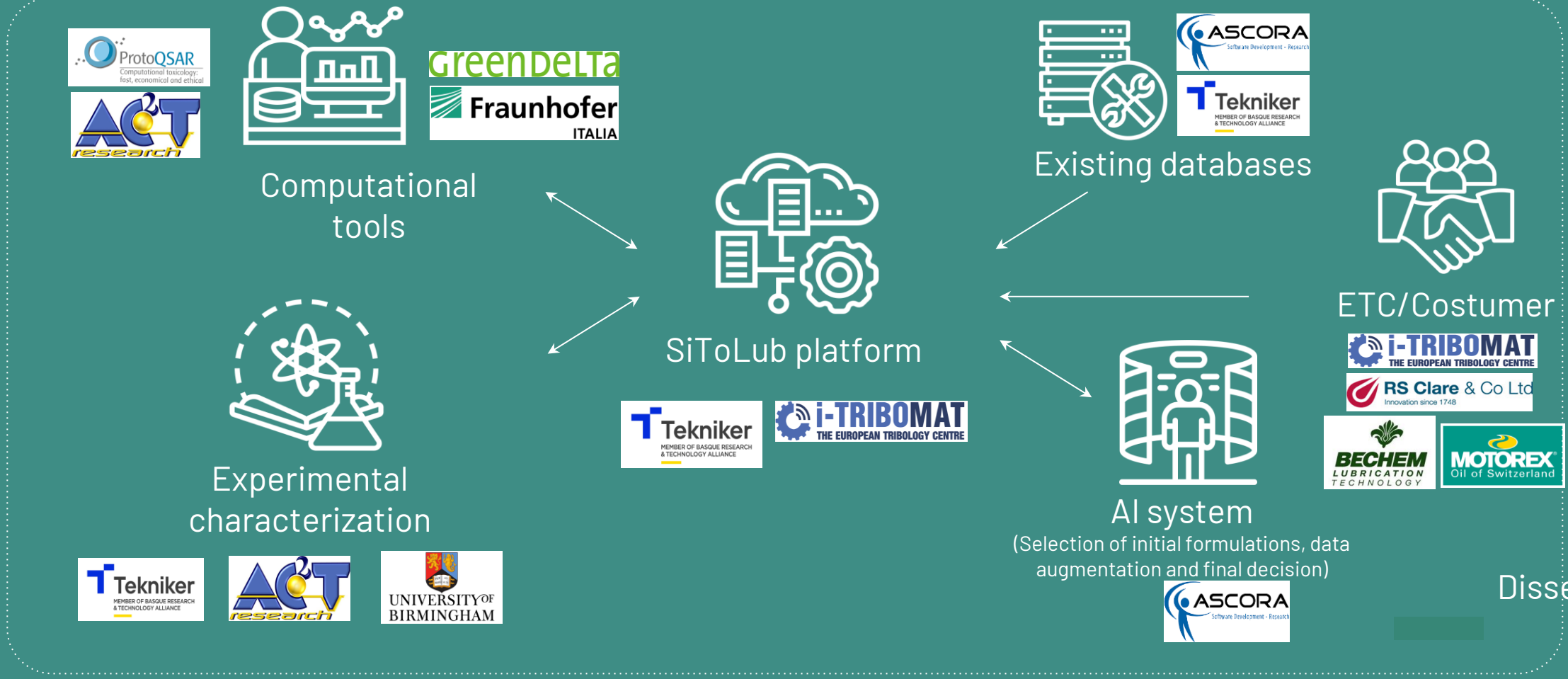
PATHWAY TO SUCCESS

SiToLub



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D(M)PP Digital Materials and Product Passport

Driven by Regulation

- **The DPP is part of the Ecodesign for Sustainable Products Regulation (ESPR)**
- **A framework that sets general information/performance requirements for products:**
  - Specific requirements for individual product groups are described in delegated acts
  - A list of eco-design criteria indicates possible information requirements
  - For products sold in EU, Responsible Economic Operator (REO) is liable

Example D(M)PP DigiPass

- **Fostering** digitalization of innovative advanced materials
  - **Strengthening** the digital maturity
    - **Harmonizing** materials data sources and infrastructures
      - **Ensuring Interoperability** and standardization of materials data
        - **Enabling Digital Materials and Product Passport**
          - **Digital Product Passport:** legislation/ regulation; openly accessible
          - **Digital Material Passport:** finetuned access rights → used in co-innovation processes

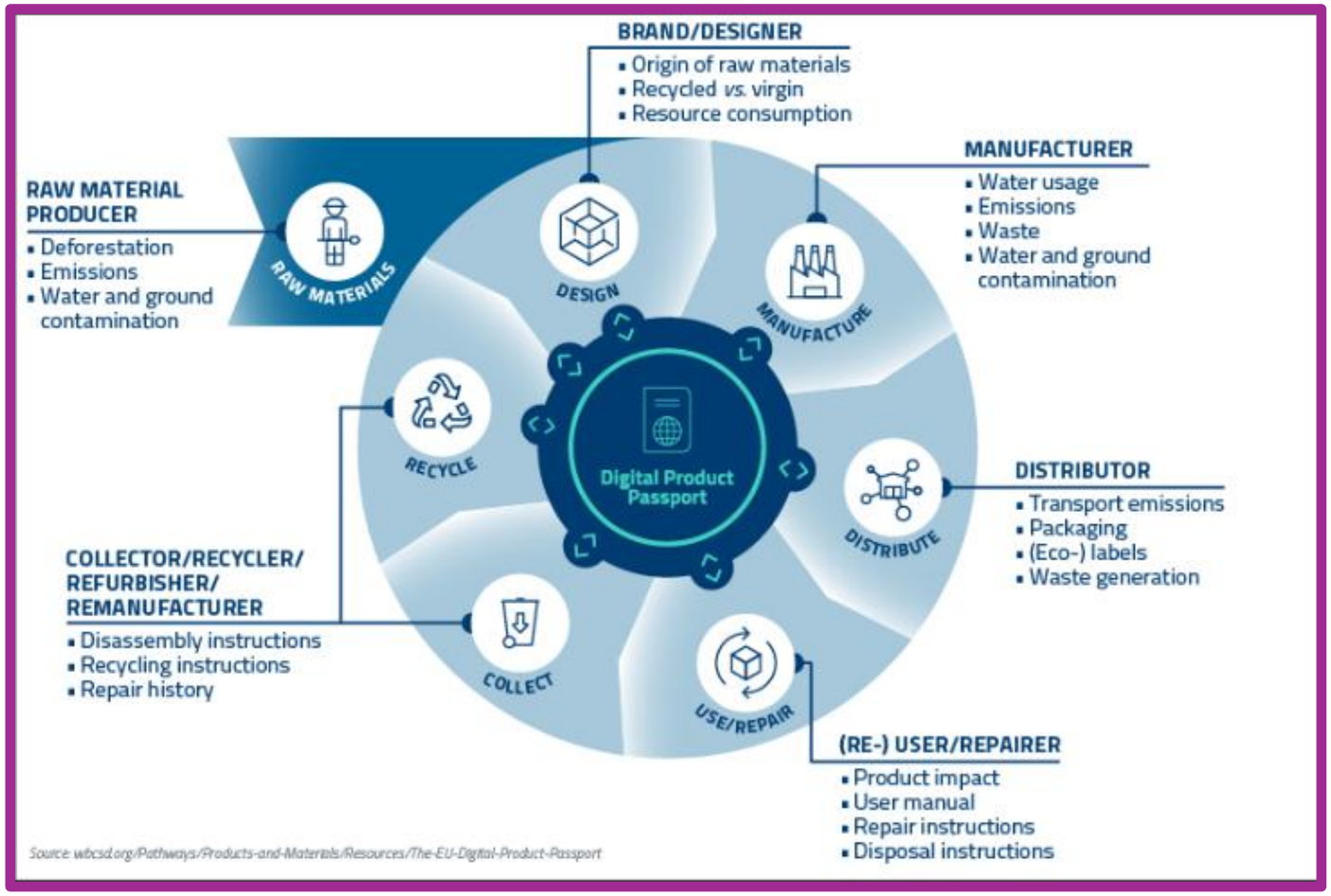
DigiPass – Services – DPPaaS

- **Digital tools** for creating and utilizing **DMPPs**
- **Interoperable** data management system
- **Standardized** data formats and protocols
- **Harmonized** materials modelling and characterization methods
- **A common language** and method for data documentation
- **Collaboration environment** open innovation framework - digital platform
- **Training** for stakeholders

ESPR – DPP - requirements

Data needed

- RAW material information
- Manufacturing & Process
- Design, Assembling…
- Transport
- Use phase
- Re-X, re-cycling, re-use…
- …..

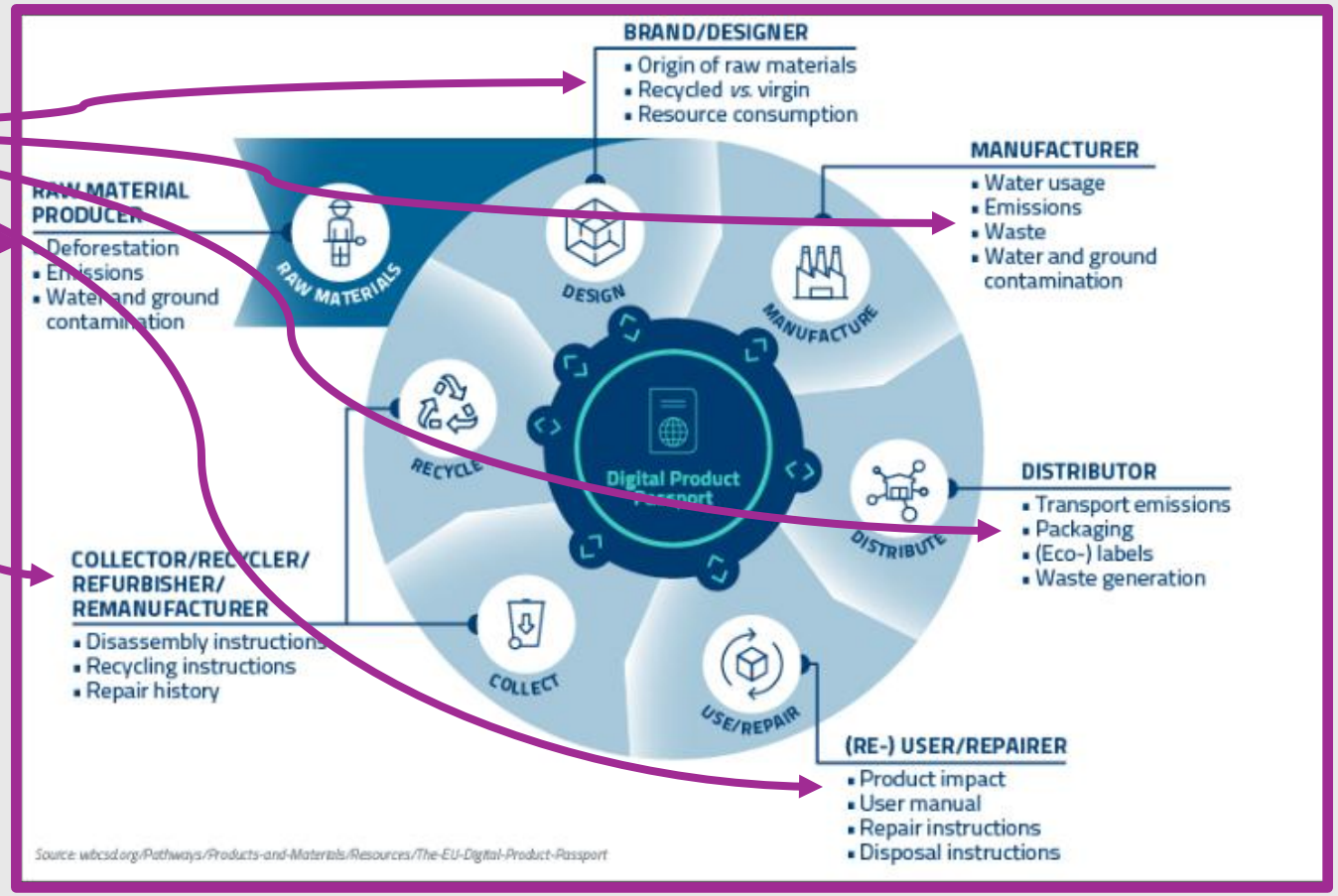


Materials Data enabling DPPs

(Raw) Materials Data

Tool steel, AISI W5 (water-hardening)

General information		
Designation	Tool steel, AISI W5 (water-hardening)	
Condition	Normalized & annealed; brine or water quenched; tempered at 175-345°C	
UNS number	T72305	
US name	AISI / SAE W5	
EN name	~125Cr1, ~125Cr2, ~85Cr1, ~90Cr3	
EN number	~1.2002, ~1.2004, ~1.2056	
Tradenames	Fortuna; Witten	
Typical uses	Cutting tools, Single-point types, Milling cutters, Drills, Reamers, Taps, Threading dies, Form cutters Hot-forging tools and dies, Dies and inserts, forging machine plungers and piercers Cold-forming dies, bending, forming, drawing, and deep-drawing dies and punches Shearing tools, Dies for piercing, punching, and trimming, Shear blades Structural parts for severe service conditions Battering tools hand and power	
Composition overview		
Composition detail (metals, ceramics and glasses)		
Price		
Physical properties		
Density	7730 ≤ x ≤ 7880	kg/m^3 (estimate)
Mechanical properties		
Impact & fracture properties		
Thermal properties		
Electrical properties		
Magnetic properties		
Optical, aesthetic and acoustic properties		



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Materials Data Example for DPP

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Tool steel, AISI W5 (water-hardening)

Healthcare & food

Food contact	No	
Guidance for MRI Safety	Caution - Strong Interaction	

Restricted substances risk indicators

RoHS 2 (EU) compliant grades?	Yes	
REACH Candidate List indicator (0-1, 1 = high risk)	0	
SIN List indicator (0-1, 1 = high risk)	0	

Critical materials risk

Abundance risk level	Low	
Sourcing and geopolitical risk level	High	
Environmental country risk level	High	
Price volatility risk level	Medium	
Conflict material risk level	None	

Tool steels

Processing properties

Durability

Corrosion resistance of metals

Stress corrosion cracking	Slightly susceptible	

Primary production energy, CO2 and water

Embodied energy, primary production (virgin grade)	20.7 ≤ x ≤ 22.9	MJ/kg (estimate)
Embodied energy, primary production (typical grade)	13.3 ≤ x ≤ 15.5	MJ/kg (estima
CO2 footprint, primary production (virgin grade)	2.19 ≤ x ≤ 2.42	kg/kg (estima
CO2 footprint, primary production (typical grade)	1.3 ≤ x ≤ 1.53	kg/kg (estima
Water usage	46 ≤ x ≤ 50.9	l/kg (estimate)

Processing energy, CO2 footprint & water

Casting energy	10.9 ≤ x ≤ 12	MJ/kg (estimate)

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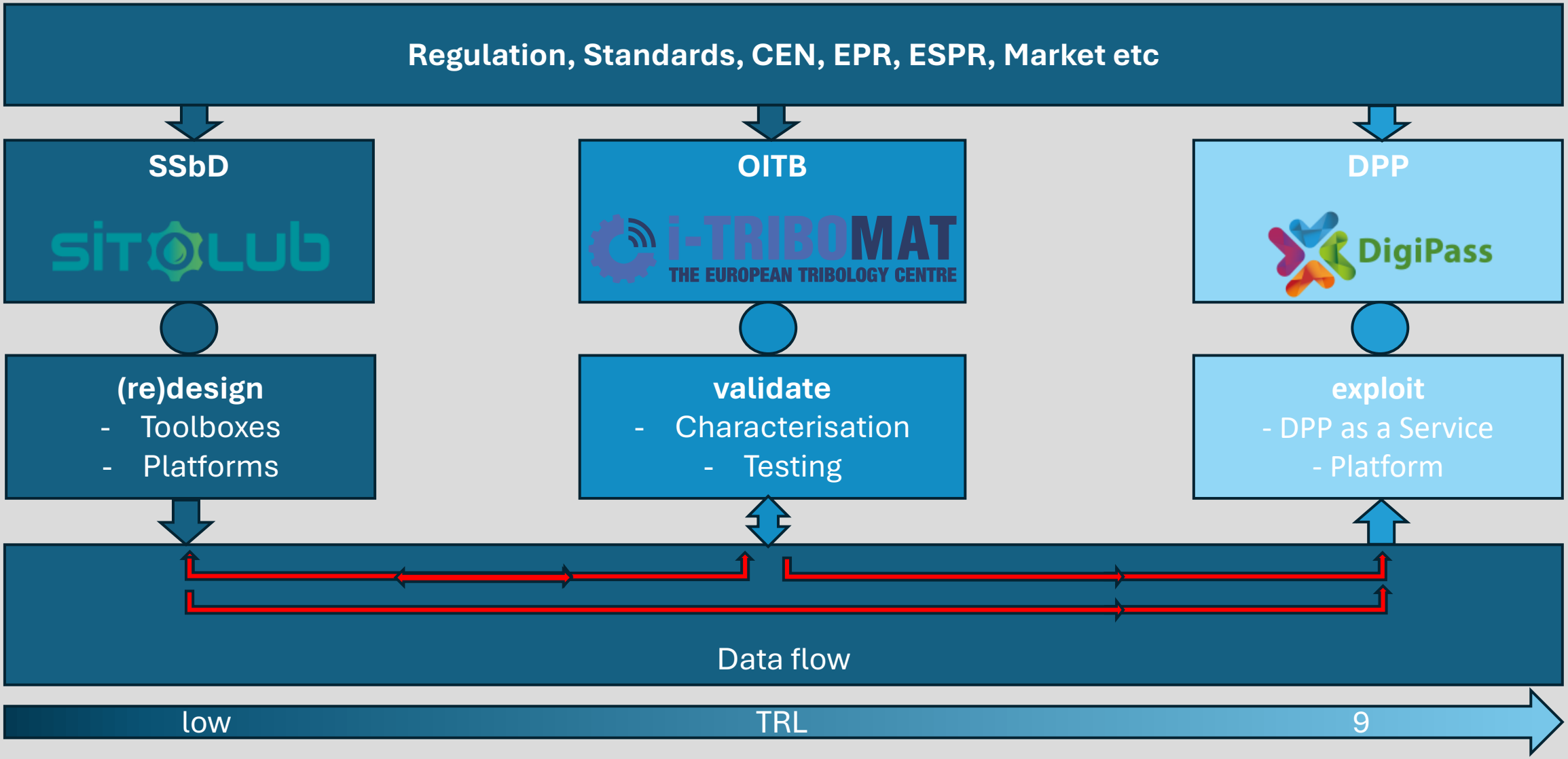
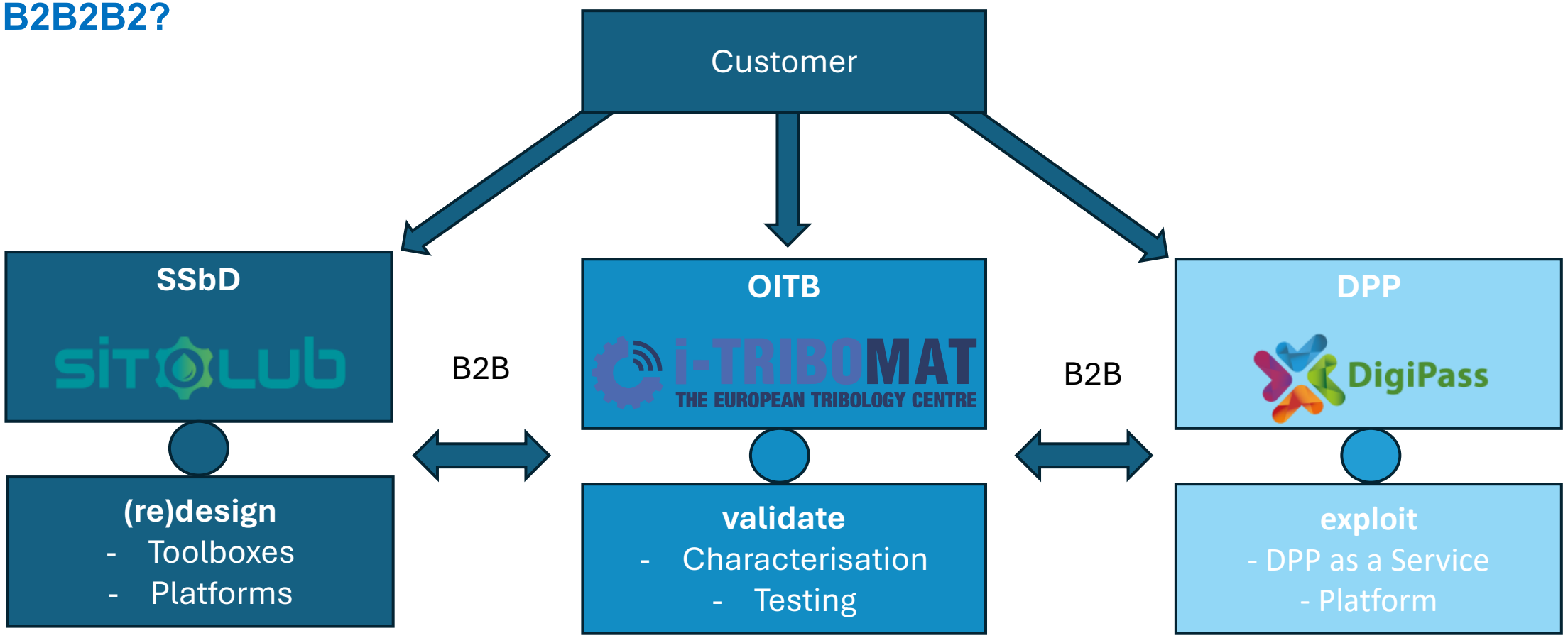
Data - The Common Value?



Interaction with Customer?

B2B2B2?



Conclusio

Connecting Business Models between
SSbD – OITBs – DPP Initiatives

One Eco-System - Visibility

Creating added value

Single Entry Point – one face to your customer
Seamless Data exchange
Cross selling
…

Saving ressources

Acknowledgement

- **DigiPass CSA,** HORIZON-CL4-2023-RESILIENCE-01-39, GA No. 101138510, WIKKI LIMITED, UK participant in Horizon Europe Project DigiPass, is supported by UKRI grant number 10100819.
  https://ms.hereon.de/digipass/index.php.en
- **SiToLub:** HORIZON-CL4-2023-RESILIENCE-01-23, GA No. 101138807,
  Title: Simulation Tools For The Design Of Safe And Sustainable Lubricants
  https://sitolub.eu/
- **i-TRIBOMAT** OITB, H2020-NMBP-TO-IND-2018-2020, GA No. 814494,
  Title: Intelligent Open Test Bed for Materials Tribological Characterisation Services
  https://i-tribomat.eu/

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Helmholtz-Zentrum hereon

ACT research

Fraunhofer ITWM

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WIKKI

COMPOSITES UNITED

ecca prepaintedmetal.eu

IRES

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oet ORGANIC ELECTRONIC TECHNOLOGIES

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