Your pragmatic and value adding road to a **Digital Product Passport** (DPP)

OPEN INDUSTRY 4.0 ALLIANCE

Ecodesign for sustainable products regulation (ESPR)

Enhance sustainable production

Extend product lifetimes

Optimise product use

Support consumers in making sustainable choices

Boost materials and energy efficiency

Support authorities to verify compliance
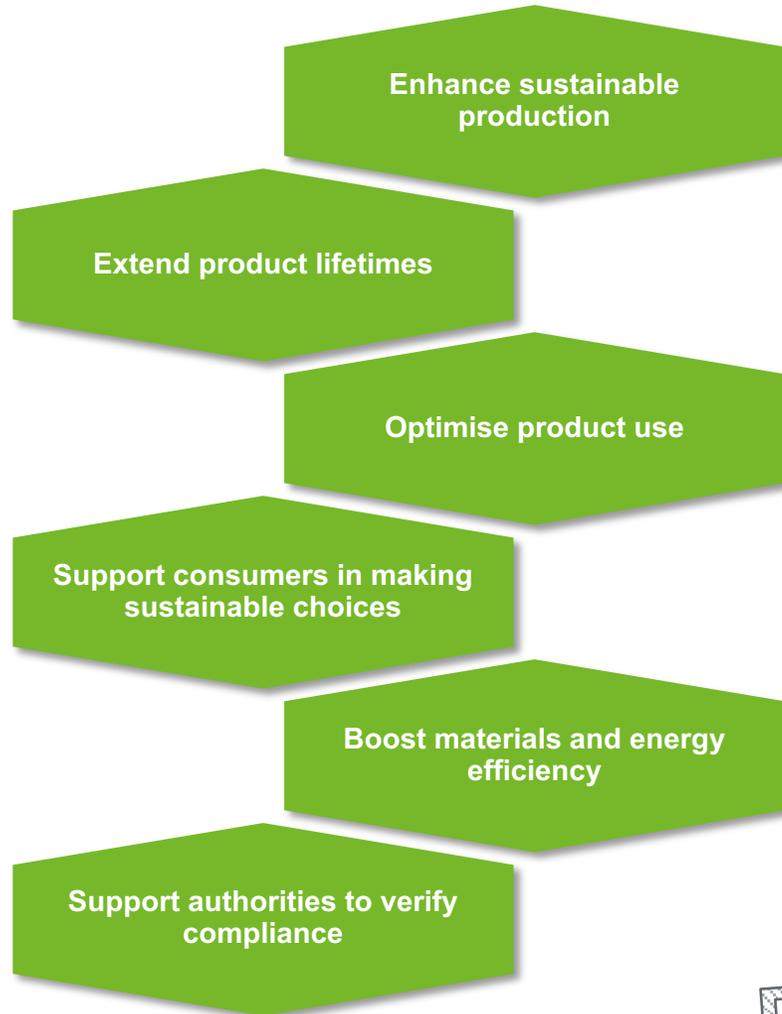
- The new *Digital Product Passport* will provide information about **products' environmental sustainability**.

- This information will be easily accessible by **scanning a data carrier** and it will include attributes such as the **durability** and **reparability**, the **recycled** content or the availability of **spare parts** of a product.

- It should help consumers and businesses **make informed choices** when purchasing products, **facilitate repairs** and recycling and **improve transparency** about products' life cycle impacts on the environment.

- The product passport should also help public authorities to better **perform checks and controls**.

„DPP purpose"

European Commission

Yes! Not **but**, but …

"…transform the European Union into a fair and prosperous society, with a modern, competitive, climate-neutral and circular economy and toxic-free environment …"

"… make sustainable products the norm …"

"… build a fairer, greener and more digital Europe. …"

"… wide range of requirements …"

"… another strain on the economy and competitiveness …?!"

But with

OI4 Community
Together.Connected.

- **Make a virtue of necessity!**

- **Get inspired!**

- **Be efficient!**

- **Gain competitive advantage!**

The content of a DPP will be industry specific and is not yet defined

But we can make already some assumptions

"… The Digital Product Passport (DPP) will be **structured collection** of product related data with **pre-defined scope** and agreed **data ownership** and **access rights** conveyed through a **unique identifier** and that is accessible via electronic means …"

The intended scope of the DPP is information related to
- **sustainability,**
- **circularity,**
- value retention for **re- use**,
- **remanufacturing**, and
- **recycling**.

N what are example fields of an digital product passport?

A digital product passport typically includes the following information fields:

1. Product Name
2. Brand Name
3. Manufacturer
4. Production Date
5. Product Type
6. Model Number
7. Serial Number
8. Product Description
9. Materials Used
10. Country of Origin
11. Certifications and Standards
12. Recycling Information
13. Energy Efficiency Ratings
14. Maintenance and Repair Information
15. Warranty Information

Note: The exact fields included in a digital product passport can vary based on the product, industry, and jurisdiction.

There are many other projects/working groups dealing with the DPP

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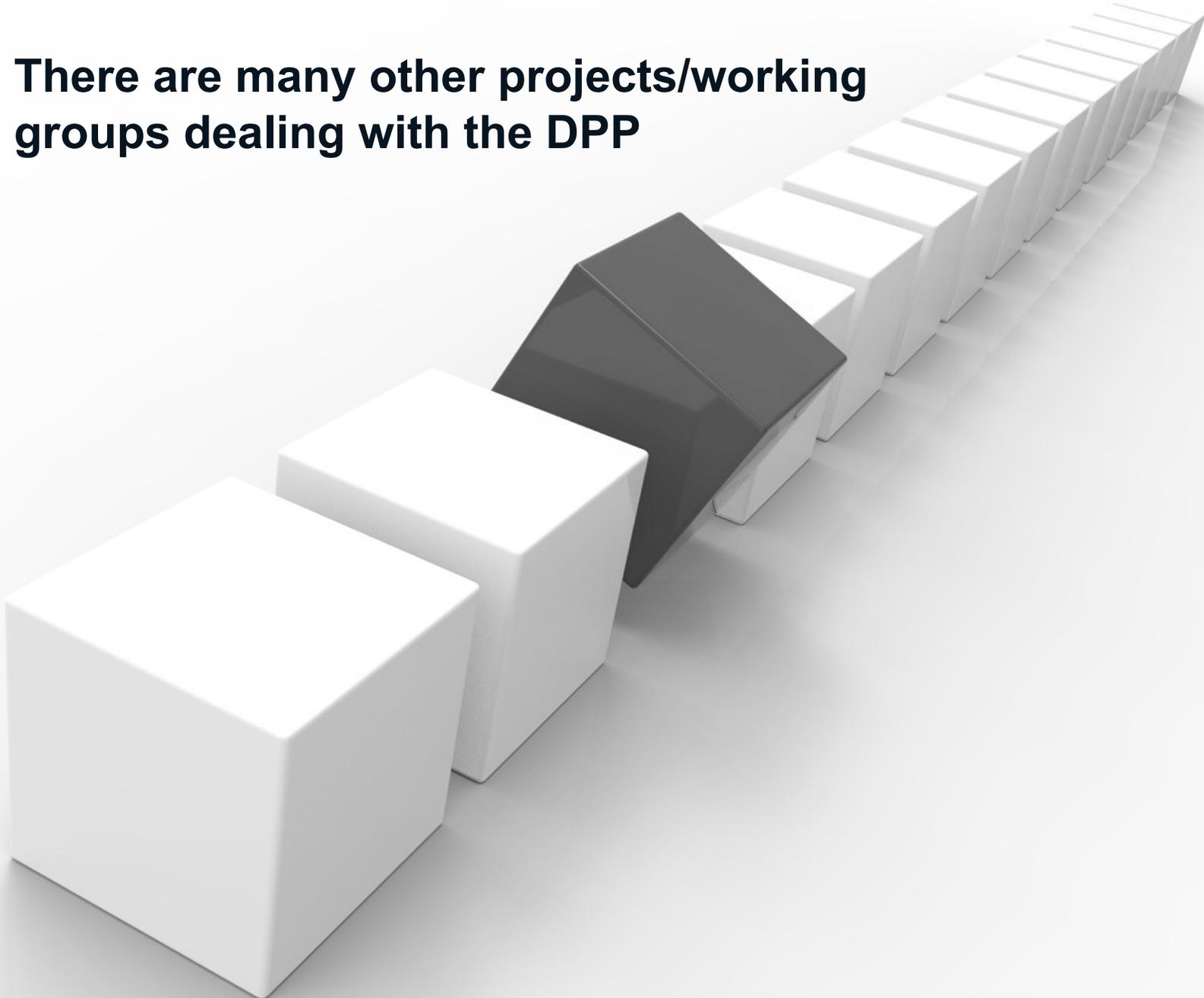
Why is the OI4 DPP Project adding value for its members?

Focus on business processes in context of DDP and infrastructure topics to "make a virtue of necessity"

Members of OI4 not only discuss topics like…

(1) Which **infrastructure** is feasible and required to deliver a DPP?

(2) How can I **minimize the effort** to fulfill the requirements – can I make use of best-practices?

(3) Can I **benefit from introducing the DPP** e.g., by identifying synergies, process optimizations, decision basis …?

(4) Daily **operations** – e.g. how to deal with change management and lifecycle of DPP (content and spec. evolution)?

… any much more …

…they also implement.

Why is the OI4 DPP Project adding value for its members?

Digital Product Passport & AAS – hit two birds with one stone

ZVEI-Concept „DPP4.0" based on two new IEC-standards
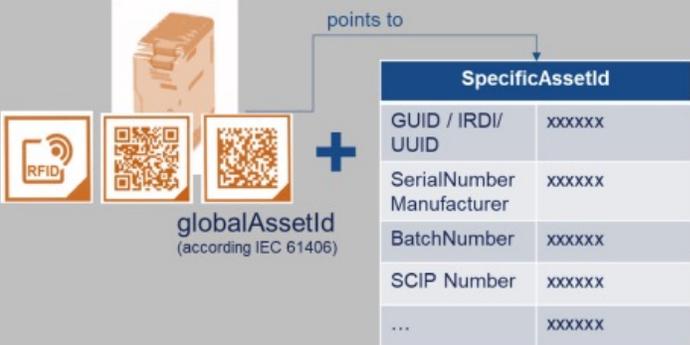
zvei
electrifying ideas

DPP4.0

Digital Product Passport 4.0

DNP4.0
Digital Nameplate 4.0
(according IEC61406-1)

points to

globalAssetId
(according IEC 61406)

+

SpecificAssetId	
GUID / IRDI/ UUID	xxxxxx
SerialNumber Manufacturer	xxxxxx
BatchNumber	xxxxxx
SCIP Number	xxxxxx
...	xxxxxx

AAS
Asset Administration Shell
(according IEC63278)

AAS

Industrial Digital Twin Association
IDTA

IDTA Digital Twin Conference | Frankfurt, 22.03.2024 | Dieter Wegener

Official definition of the EU Digital Product Passport

STATUS QUO

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cen CENELEC
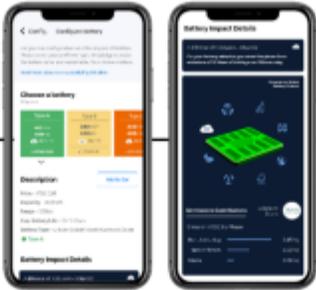
Mandate of the
"Joint Technical Committee"
(JTC) 24

DPP Data

DPP data sector specific for:

- Batteries
- Electronics
- Textiles
- Construction Materials

→ Defined in different regulations
(e.g., the Battery Regulation with further information available in the Battery Passport Content Guidance)

DPP System

Harmonized technical system for all DPPs:

Data Storage

Data Carrier Identifier

Trust / Security / Sovereignty / Access
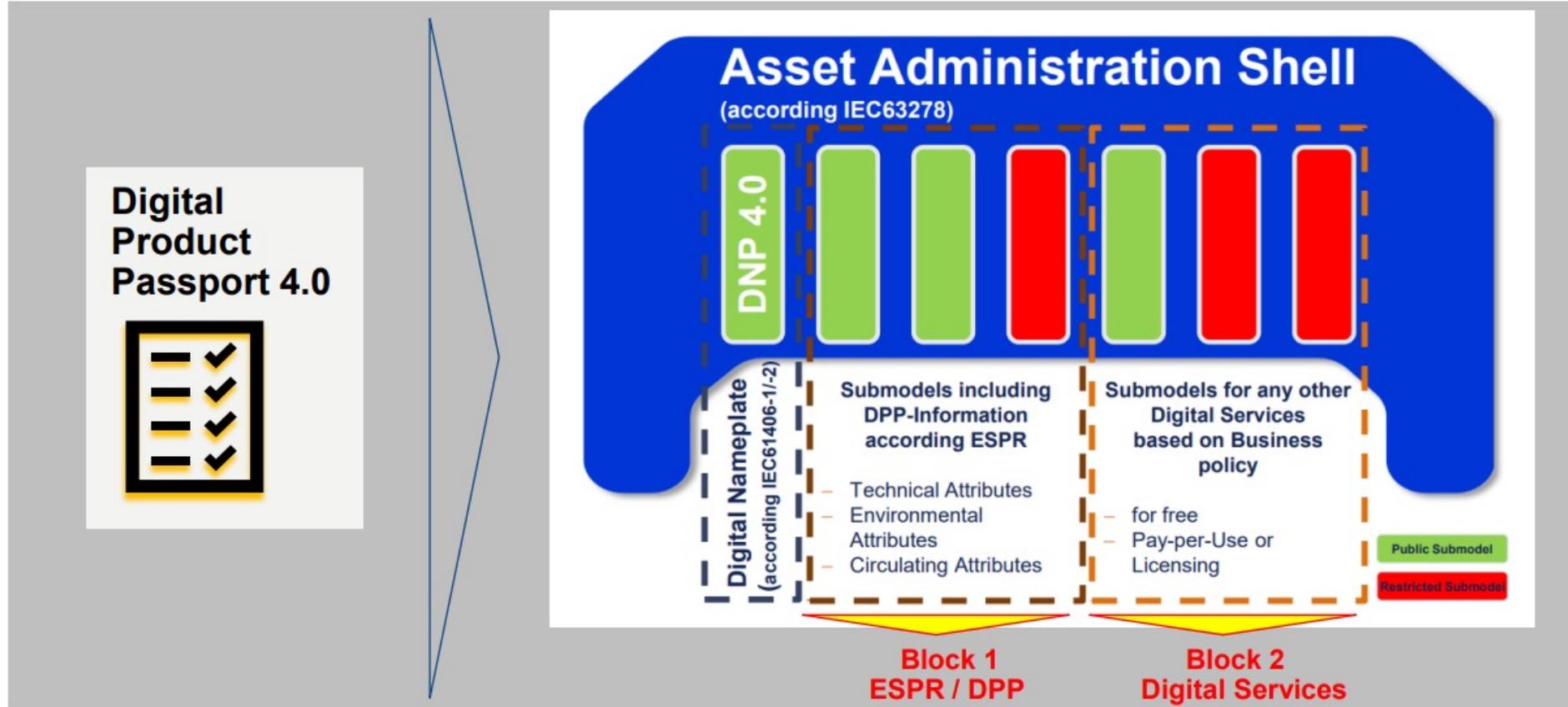
Data Exchange

IT Services / APIs

Workflows and Data Processing

DPP 4.0 Project by ZVEI and IDTA – we are on the same page

DPP4.0 will be enabling any Producer / Manufacturer worldwide (1) to fulfill ESPR/DPP-requirements and (2) to deliver Digital Services to any Stakeholder in the Market

You need to introduce the DPP for your products?

Property	Business ideas & potentials (from perspective of the manufacturer/distributor)
Production Date	- E.g. basis for individual statements regarding **expected lifetime**, - anchor for a **spare parts offering to customer**, warehousing and shipping decisions etc.
Product Type	E.g. anchor for precise **up-selling** und **cross-selling offerings** to customers
Model Number	Reference for precise **certifications, declaration of conformity**

You need to introduce the DPP for your products?

Property	Business ideas & potentials (from perspective of the manufacturer/distributor)
Materials Used	• E.g. granular **source of truth** for ESG-reporting per product • E.g. manufacturer **internal transparence (**source of truth) for evaluation of amount of recycled material (imagine material is returned to manufacturer or recycling service provider after end-of-life --> DPP is the basis for R-strategy decisions ...) • E.g. basis for object centric **shipping/order fulfillment decisions** (e.g. certain customers expect a different material composition) • E.g. source of truth for manufacturer **internal markings**, **EH&S procedures** and **handling-instructions** ("handle with care, because product contains xyz") • E.g. anchor **reference for statements** about competition: "we have x% less of xyz than our competition ..." or marketing statements "Compared to our last years offering, we have improved by x%" ..." thanks to your valuable customer feedback we improved by ..." • E.g. source of truth for future **tax calculations** (e.g. plastic-usage tax) and automated billing-procedures • ...

You need to introduce the DPP for your products?

Property	Business ideas & potentials (from perspective of the manufacturer/distributor)
Certifications and Standards	• E.g. source of truth for **company internal transparency** with effects like "based on this collection we are now aware of product relevant changes much earlier than before" or "we have much more transparency about potential violations and can react in time" • E.g. re-use of this DPP-data also **for non-European trade** (e.g. include the required USA-certificates and papers) • E.g. **ad-Hoc check of products related certificates and standards** by just opening the DPP (i.e. another "source of truth" effect) • ...

You need to introduce the DPP for your products?

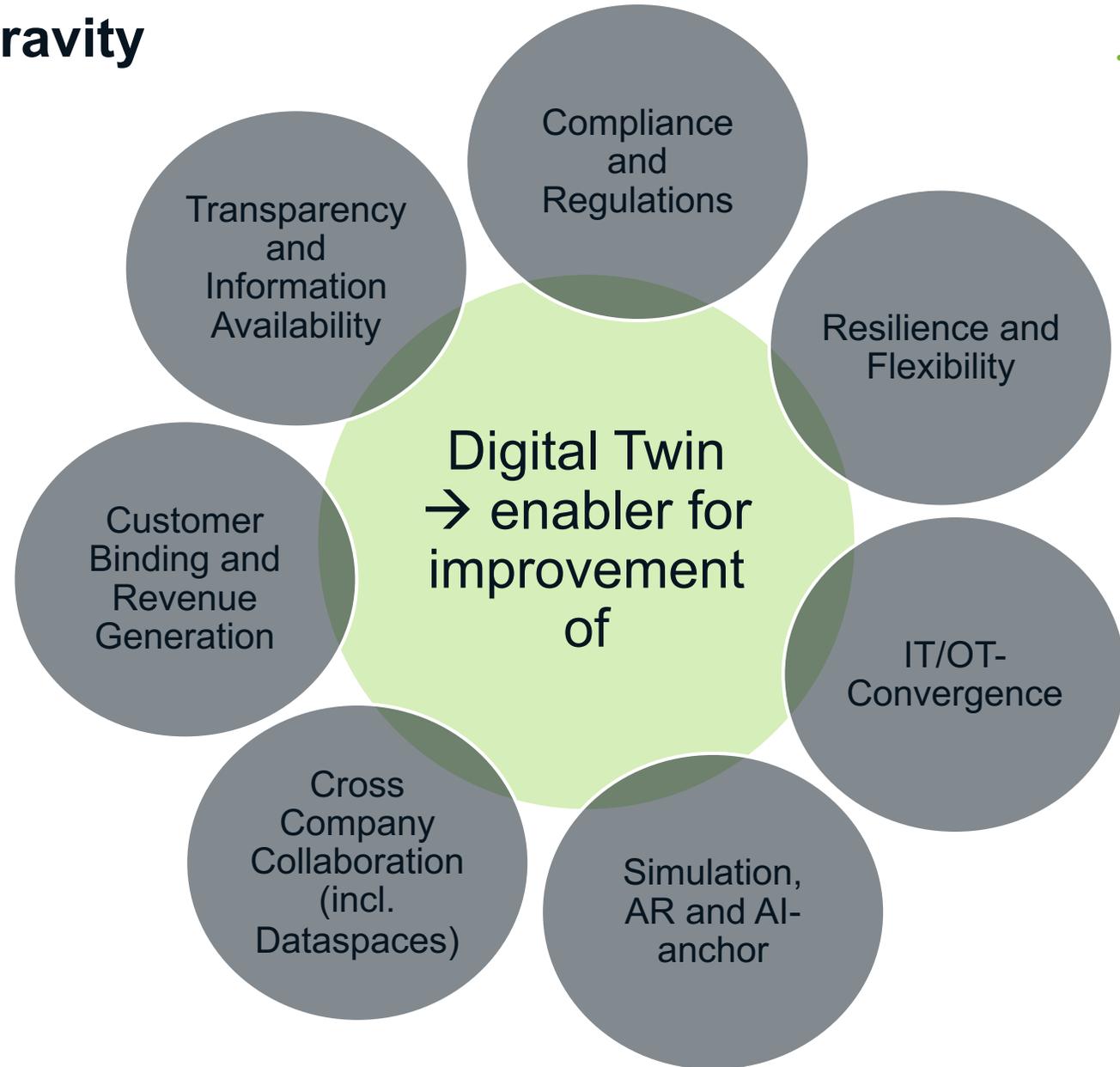| Property	Business ideas & potentials (from perspective of the manufacturer/distributor)
Recycling Information	• E.g. basis for an efficient introduction of a **profitable return/refurbish loop** for manufacturers products • E.g. establish a **value adding eco-system** of partners • E.g. identify totally new **synergies** e.g. merge your recycling supply chain with existing electronics, bottles, textiles ... • E.g. leverage this area for **positive recommendations** to customers (i.e. **gain trust**) • ...
Maintenance and Repair Information	• E.g. wide space for **customer recommendations** for lifetime extensions • E.g. another basis for **positive messaging** (trusted partner) • E.g. check for patterns from other industries like "we have a mobility guarantee" - ...

You need to introduce the DPP for your products?

Property	Business ideas & potentials (from perspective of the manufacturer/distributor)
Warranty Information	• E.g. source of truth for **warranty extension offerings** • E.g. source of truth for **service business and service partners** • E.g. **customer binding based on trust and partnership** (e.g. by positive recommendations or "we tracked that you always used the recommended lubricating oil, hence warranty is automatically extended by ..." • ...
Carbon footprint	• E.g. us DPP of inbound material to create an ad-Hoc mix for our own products (example - raw material in two batches - include a "good" and " a bad one" ... if I combine a "good batch of one component with a "bad batch" of another material, my overall end-product is still okay ...) • ...

Digital Twin as center of gravity

Value with **AND beyond** DPP

In addition to the value-add and synergies that the DPP introduction can create, the introduction of the **Digital Twin as anchor will** **add value in many dimensions**

Digital Twin → enabler for improvement of

- Compliance and Regulations
- Resilience and Flexibility
- IT/OT-Convergence
- Simulation, AR and AI-anchor
- Cross Company Collaboration (incl. Dataspaces)
- Customer Binding and Revenue Generation
- Transparency and Information Availability

The OI4 Process-House – DPP relevance almost everywhere

CROSS-ENTERPRISE L6

6.1 Operator/supplier collaboration

6.2 Supply chain

6.3 Member offerings

6.4 Sustainability

6.5 Digital product passport mgmt.

ENTERPRISE L5

5.1 Product T&T

5.2 Enterprise logistics

PLANT L4

4.1 Product onboarding

4.2 Intralogistics (discrete industries)

PROCESS L3

3.1 Process onboarding

3.2 Performance improvement
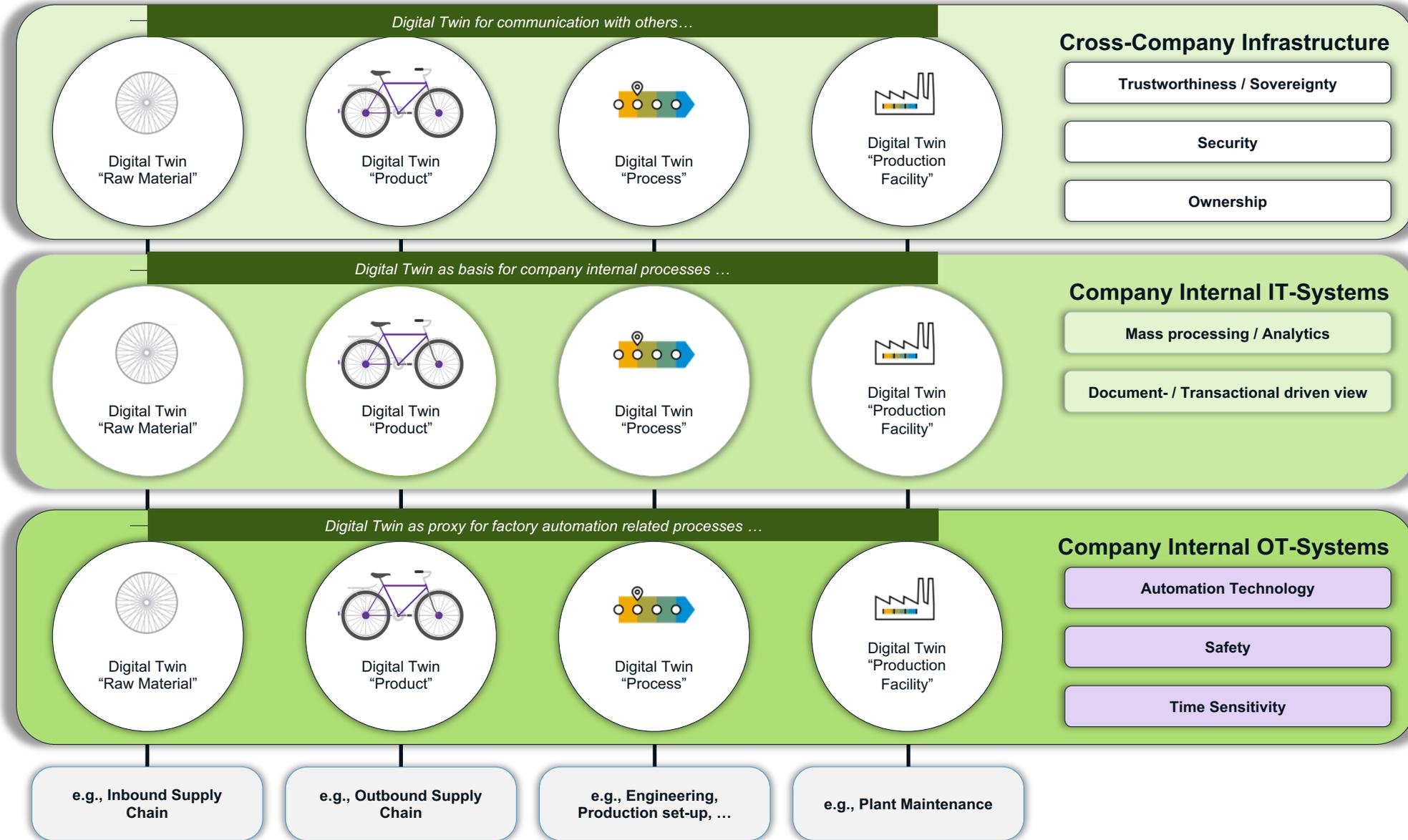
3.3 Process quality

APPLICATION L2

2.1 Condition monitoring

2.2 Predictive maintenance

2.3 Asset maintenance

ASSET L1

1.1 Master data management

1.2 Automatic onboarding

1.3 Replacement, SP and consumables

1.4 Software and config management

1.5 Asset relocation

X. Analytics & Simulation

Guardrails: OI4 view on Digital Twins across layers and usage

Digital Twin for communication with others…

Digital Twin "Raw Material"

Digital Twin "Product"

Digital Twin "Process"

Digital Twin "Production Facility"

Cross-Company Infrastructure

Trustworthiness / Sovereignty

Security

Ownership

Digital Twin as basis for company internal processes …

Digital Twin "Raw Material"

Digital Twin "Product"

Digital Twin "Process"

Digital Twin "Production Facility"

Company Internal IT-Systems

Mass processing / Analytics

Document- / Transactional driven view

Digital Twin as proxy for factory automation related processes …

Digital Twin "Raw Material"

Digital Twin "Product"

Digital Twin "Process"

Digital Twin "Production Facility"

Company Internal OT-Systems

Automation Technology

Safety

Time Sensitivity

e.g., Inbound Supply Chain

e.g., Outbound Supply Chain

e.g., Engineering, Production set-up, …

e.g., Plant Maintenance

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Let's think along a simplified product and process
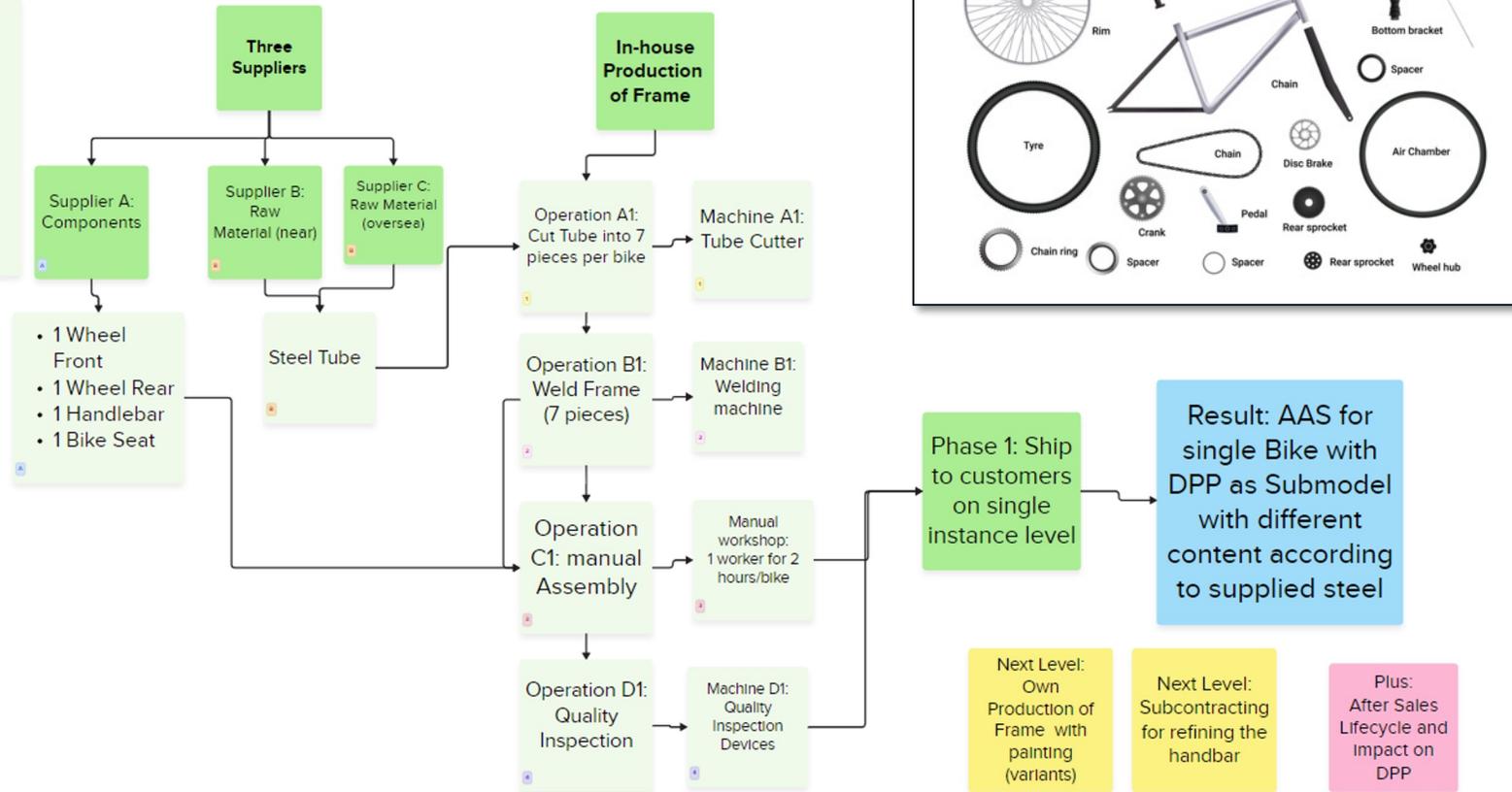
Ideal world – there will be an AAS (with DPP) for each entity …

AAS Assumptions
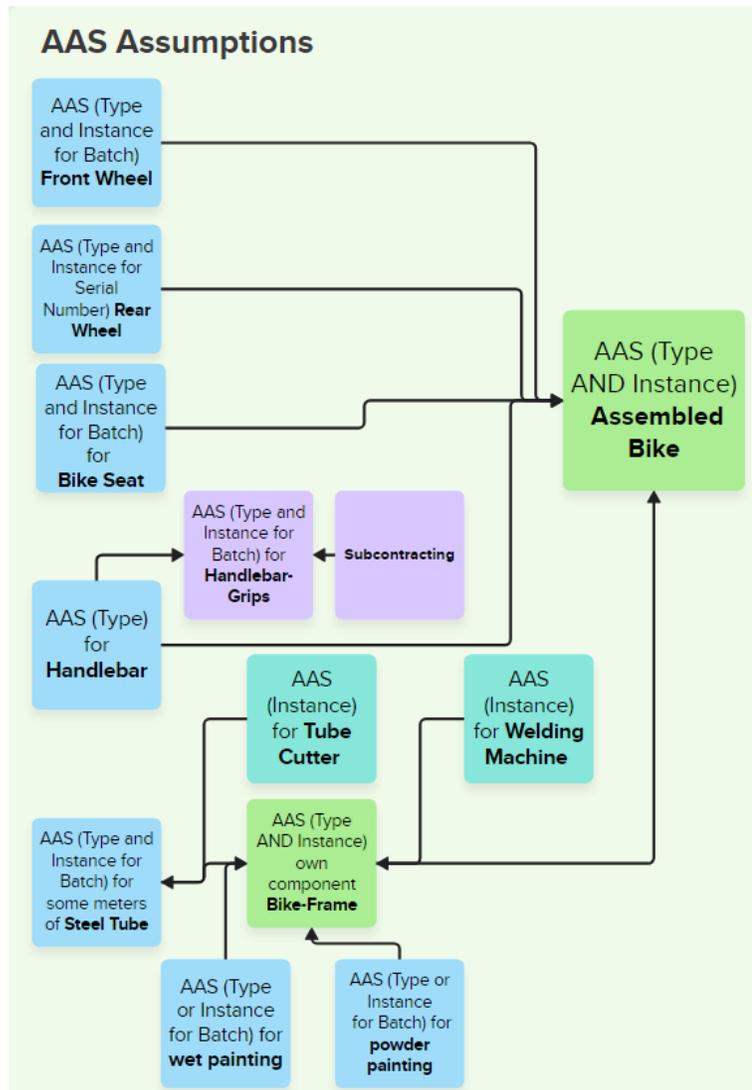
- **Gain clarity** about your inbound supply chain i.e.
  - Which data is already provided by the supplier?
  - What is missing?
  - Is the handover in an AAS-format and corresponding infrastructure realistic and by what means?
- Is the **inbound material**
  - **Serialized?** Are incoming serial numbers tracked reliably throughout the in-house E2E processes?
  - **Batch-managed?** Is the incoming data the same for a set/bundle of components?
    Are incoming batch numbers tracked reliably throughout the in-house E2E processes?
    Is an (accidental) mix of batches along the in-house production and assembly processes an issue regarding the consistency and validity of end-products DPP data?
  - **Neither-nor?** Means it does not (never?) make a difference for the DPP if the incoming material is shipped on different dates, by different means of transport, handled /stored/processed in-house via different options?
- Are my **identification/scanning processes** along the in-house E2E-processes good enough to achieve a seamless flow of information?
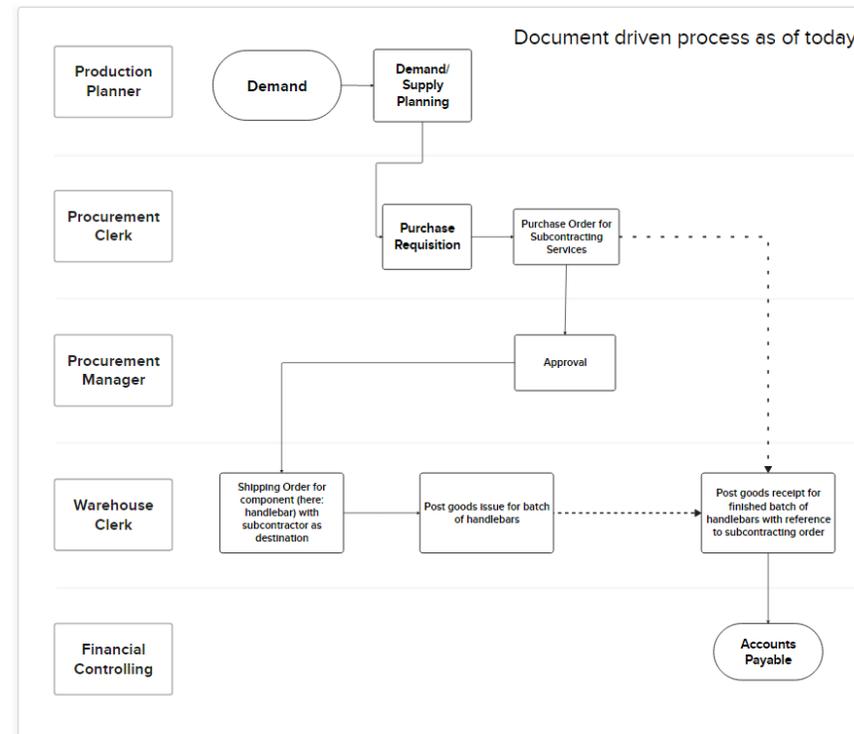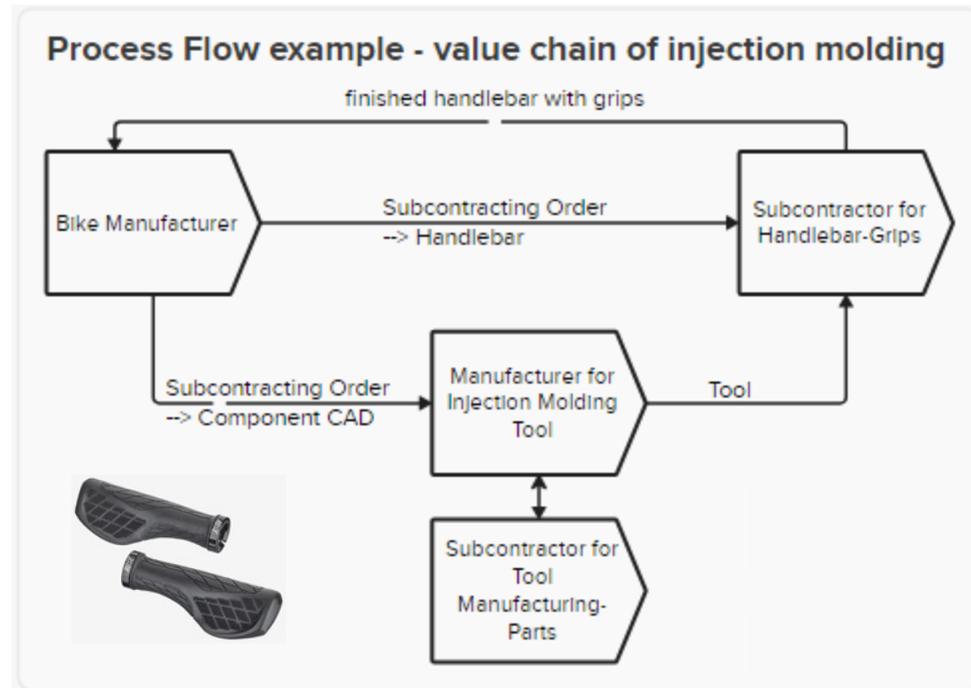- …

That sounds simple – but …

… there are many **process variants**.
Imagine you **collaborate** with other companies (subcontracting, machine- and/or tool-supplier …)
How to deal with the **DPP related data that is provided/contributed by the subcontractors**?
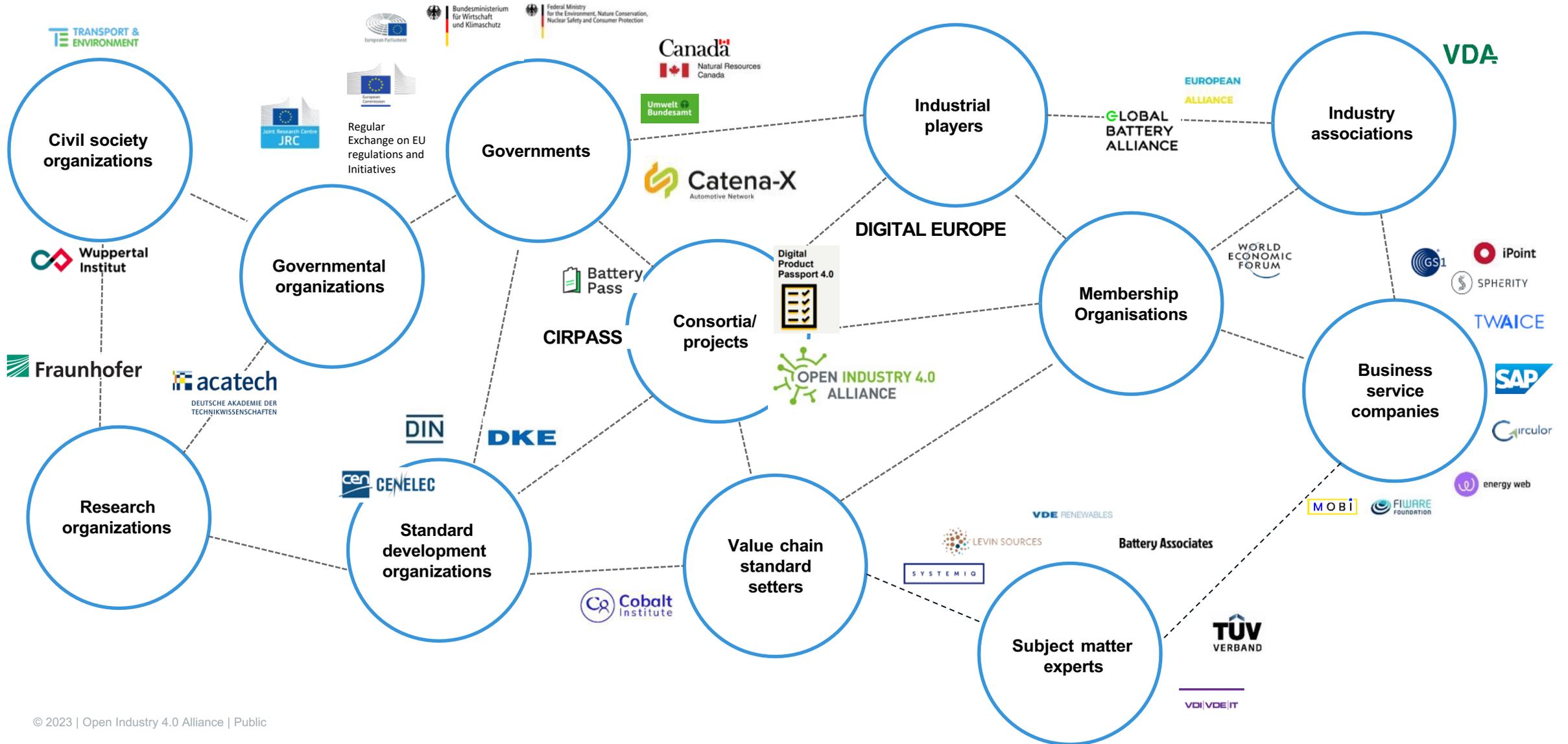
Discussion about such concepts is also a building block of our workgroup and
innovative solution templates are produced

Keep in mind:
Multiple Asset Administration Shells for same asset with sovereign ownership
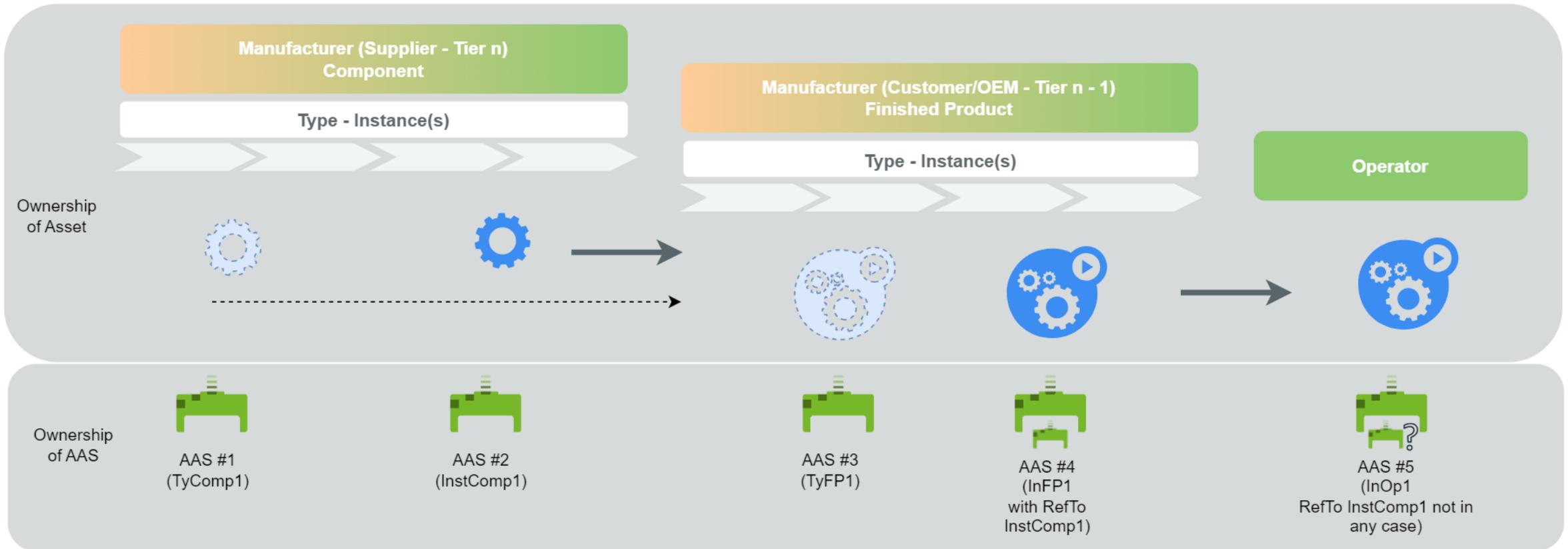
Digital Product Passport - Eco-System Play as of today

We are not done yet – feel free to join our workgroup!