

COLIFE –

Data economy in collaborative asset lifecycle solutions

O1.1 Report on capabilities, opportunities, and challenges in the future industrial operating environment

O1.2 Sketch of Colife concept

(VTT, LUT)

Colife research group



VTT

- Pasi Valkokari, Project leader (Colife, VTT)
- Jari Halme, stakeholder interviews
- Jyri Hanski, SotA, stakeholder interviews
- Ella Hatara, stakeholder interviews, Colife visioning
- Anne Immonen , stakeholder interviews, Colife visioning
- Jukka Kääriäinen, stakeholder interviews, Colife visioning
- Antti Pulkkinen, PDM/PLM know-how
- Tuija Rantala, stakeholder interviews
- Riku Salokangas, maintenance/diagnostics know-how
- Erkki Siira, SotA, stakeholder interviews
- Teuvo Uusitalo, stakeholder interviews



**LUT
University**

- Kirsi Kokkonen, Project manager (LUT), stakeholder interviews, Colife visioning
- Ville Ojanen, Responsible leader (LUT)
- Nina Tura, stakeholder interviews
- Yan Xin, stakeholder interviews

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- Asset management state of the art

O1.1 Report on capabilities, opportunities, and challenges in the future industrial operating environment

Introduction to Colife

Colife vision - future operating environment

How can we speed up the data exploitation in Asset Management activities?

Colife vision for the future is (project plan):

“Business partners **collaborate equally in and over phases of the lifecycle of an industrial plant**. They promote common benefits including **environmental, social, and economic** factors. This is facilitated by **fair data sharing** and new operating practices.”

Main objective of the project is to construct ***Colife concept***, a playbook for fair data economy in industrial Asset Management ecosystems.

“The Colife concept guides on how to better utilise **data sharing in collaborative asset management**, i.e., in the coordinated activities of an organisation to realize value from assets.”



COLIFE – Data economy in collaborative asset lifecycle solutions

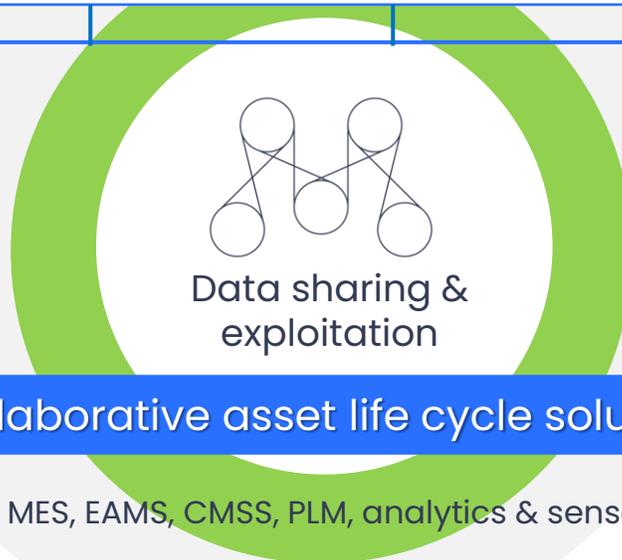
BF supported research project: Duration 5/2024 – 4/2026, size 1.22 M€



The project is a BF co-research project targeting at identifying and overcoming challenges of *implementation* of data economy in process industry throughout the asset lifecycle. The use cases give real-life framing for the work.

Use cases :

1. Use case Upgrade project of a production line
2. Use case Greenfield project of a new production mill
3. Use case Utilization and integrity of asset and operation data
4. Use case Data exchange in networked turnaround maintenance operations



Collaborative asset life cycle solutions

Target:
Create implementation capability to realize new business value for actors based on shared data and scalable digital industrial services, solutions & applications.

Tools: ERP, MES, EAMS, CMSS, PLM, analytics & sensors, IoT, AI..



Needs, requirements and high level Colife concept

Objective: finding requirements for Colife concept (and constitute grounds for playbook for fair data economy in industrial Asset Management ecosystems). Sketching and piloting the concept together with work packages 2, 3 and 4.

Research questions:

- What are the current needs, capabilities as well as motivation/de-motivation factors of companies to join the evolving business ecosystem of sustainable asset life cycle management?
- How to assess the readiness of different companies related to the capability to operate according to Colife concept?

T1.1 Current state analysis

Clarification of capabilities, motivation, bottlenecks and data exchange needs during sustainable asset management that the future operating environment will set for companies. Interviews. Giving the starting point for subsequent work packages.

T1.2 Sketching of Colife concept

Preparation of the Colife ecosystem concept based on the current state analysis.

T1.3 The readiness of companies for Colife concept

Creating a practical and agile checklist for companies to check the readiness of company for Colife concept. The checklist will be piloted with a case company and will be part of the Colife concept.

Asset management state of the art – in short

Asset management – key definitions

ISO 55000:2024 (2024) Asset management — Vocabulary, overview and principles.

asset = item, thing or entity that has potential or actual value to an organization

- Assets can be physical or non-physical
- A grouping of assets referred to as an asset system can also be considered as an asset

asset management = coordinated activity of an organization to realize value from assets

- Realization of value normally involves a balancing of costs, risks, opportunities and performance benefits
- The term “activity” has a broad meaning and can include, for example, the approach, planning and plans, and their implementation

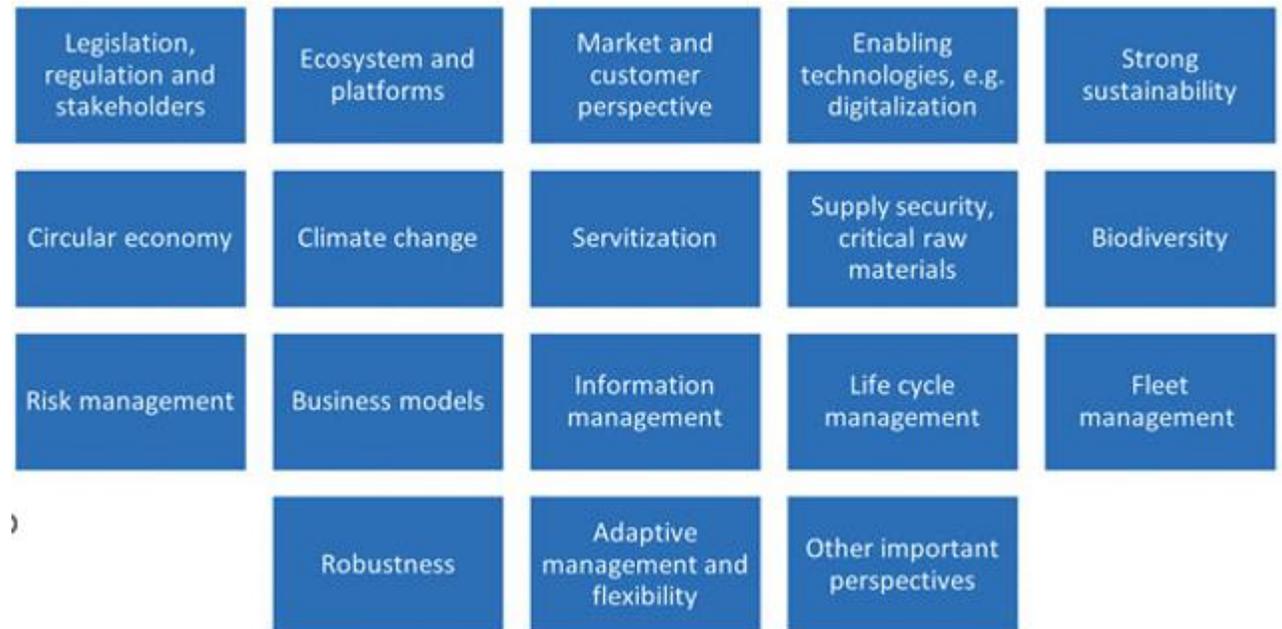
strategic asset management plan (SAMP) = documented information that contains and aligns asset management policy, objectives, strategies and approaches for developing and managing the *asset portfolio and the asset management system*

asset management plan (AMP) = documented information that specifies the activities, resources, costs and timescales required for *an individual asset, or a grouping of assets*, to achieve an organization’s asset management objectives

Asset management – trends impact SAMP

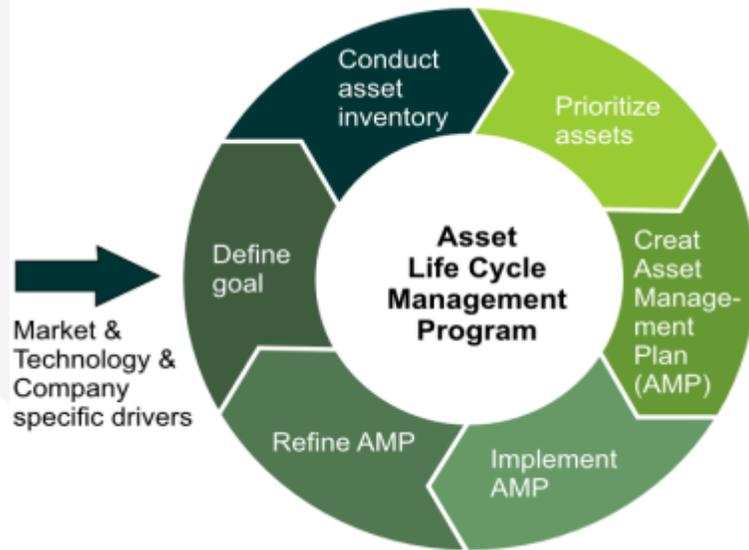
- Asset-intensive companies should focus on establishing an **asset management system and strategic plans** that inform investment, maintenance, operation, and sustainable end-of-life decisions. (ISO 55000, 2024)
- Content of the SAMP is affected by many trends and events that may disrupt the use of assets, alter investment volumes in the asset base, alter the timing and nature of production disruptions, and may even result in the shutdown of production units.

Important trends and perspectives affecting strategic asset management. Hanski 2019; Hanski 2023: <https://www.maintworld.com/EFNMS/Strategic-view-of-asset-management-managing-emerging-trends-and-perspectives>



Asset management – asset life cycle management

Kortelainen et al. (2023) <https://cris.vtt.fi/en/publications/knowledge-based-life-cycle-management-2>



- Managing asset or system life cycle is a continuous activity
- Asset life cycle management framework is useful tool for understanding how the technologies/collaborative models fit within the asset management system

AMP includes tasks such as item level life cycle management planning, maintenance planning, and stoppage, overhaul and shutdown planning, and decisions on outsourcing

Digital technologies for effective asset management – global state of the art

- Report by Global Forum on Maintenance and Asset Management (GFMAM) (2024) on digital transformation and asset management:
 - Sector perspectives: Road, Rail, Manufacturing, Energy, Defence, Healthcare, Academia, Start-Ups
 - “New” identified business models: equipment health monitoring as a services, OEE risk-sharing service, uptime as a service, warranty extension as a service, supply chain data as a service

GFMAM (2024) <https://gfmam.org/publications/digital-transformation-maintenance-and-asset-management>

AM Stages	Definition	Key Activities	Implications of DX
Asset Strategy	Determining a strategy for managing assets over their lifecycle to achieve organisational objectives	<ul style="list-style-type: none"> - Understand the Total Cost of Ownership. - Estimate Capital Project Investments. - Develop asset strategy based on hierarchy of business-critical components. - Develop robust Asset buying strategy (warranties). 	<ul style="list-style-type: none"> - Improved decision-making, - Increased asset reliability and maintainability, - Reduced lifecycle costs, - Enhanced safety and regulatory compliance
Identify Need	Identify the need for an asset and its requirements	<ul style="list-style-type: none"> - Eliminate nonvalue add buying. - Identify business critical asset component. - Understand the business levers to support asset performance. 	<ul style="list-style-type: none"> - Improved decision-making, - Better alignment with business objectives, - Reduced time to market, - Increased asset efficiency and effectiveness
Design and Plan	Design and plan the asset and its supporting systems and processes	<ul style="list-style-type: none"> - Understanding asset risk profile. - Develop robust Maintenance, Repair and Operate strategy. - Optimise process and equipment specifications with knowledge of the asset behaviour on ground. 	<ul style="list-style-type: none"> - Improved collaboration, - Reduced design and planning time, - Increased accuracy of design and planning, - Better risk management, - Reduced costs
Acquire	Acquire the asset and its supporting systems and processes	<ul style="list-style-type: none"> - Smarter source of asset and services decisions. - Effective vendor contract management. - Strategic procurement. - Vendor rationalisation. 	<ul style="list-style-type: none"> - Increased efficiency and effectiveness in procurement and contracting, - Improved supplier management, - Reduced risk, - Improved quality control
Operate and maintain	Operate and maintain the asset to meet expected value objectives	<ul style="list-style-type: none"> - Understand the asset condition. - Identify the optimum mix of maintenance tactics - Optimise labour and material resources requirement - Enhance system workflows to eliminate waste. - Ensure condition, cost and risk data for whole lifecycle decision-making. 	<ul style="list-style-type: none"> - Improved asset performance, - Increased asset availability, - Reduced maintenance costs, - Enhanced safety and regulatory compliance - Improved resources assignment - Better lifecycle control along operational stages
Dispose	Dispose of the asset at the end of its lifecycle	<ul style="list-style-type: none"> - Investment recovery strategy - Disposal strategy - Risk Management 	<ul style="list-style-type: none"> - Improved environmental sustainability, - Increased cost recovery, - Reduced liability

Digital technologies – implications for maintenance types

GFMAM (2024) <https://gfmam.org/publications/digital-transformation-maintenance-and-asset-management>

Maintenance Type	Activities description	Before digital transformation	After digital transformation	Example of digital technologies used
Predetermined preventive maintenance	Maintenance tasks performed on a regular basis to prevent equipment failures	Manual inspections and services using checklists and maintenance schedules	Automated inspections and services using digital monitoring systems. Maintenance schedules created using EAM systems. PM optimised using APM systems. Major interventions optimised using AIP systems.	<ul style="list-style-type: none"> - IoT sensors, - Big data analytics, - GIS, - Mobile devices, - Maintenance management software (EAM, APM) - AIP systems
Condition-based maintenance (CBM)	Preventive maintenance tasks performed based on the actual condition of the equipment (includes condition assessment)	Manual inspections and subjective assessments to determine when maintenance is needed	Digital sensors and monitoring systems to continuously monitor equipment and trigger data-driven condition-based maintenance in real-time.	<ul style="list-style-type: none"> - IoT sensors & Drones - Big data analytics, - Visualisation tools, - Machine learning (detection algorithms), - Artificial intelligence,

Maintenance Type	Activities description	Before digital transformation	After digital transformation	Example of digital technologies used
Predictive maintenance (CBM/PdM)	CBM tasks performed based on predicted equipment failures (includes activities enabling prediction)	Expert inspections and analysis to identify potential failures	Digital sensors, data analytics, and machine learning algorithms to classify & predict (RUL) equipment failures and schedule maintenance before failures occur.	<ul style="list-style-type: none"> - IoT sensors, - Big data analytics, - Artificial intelligence, - Machine learning (classification and prognosis algorithms), - Artificial intelligence,
Corrective maintenance	Maintenance tasks performed after equipment failure	Reactive maintenance including failure diagnosis and repair.	Reactive maintenance performed after equipment failure, but with the use of digital tools such as remote monitoring and diagnostic systems to quickly identify the root cause of the problem	<ul style="list-style-type: none"> - Augmented reality, - Remote monitoring and diagnostic systems, - CMMS, - Mobile devices, - Point cloud data, - Photogrammetry - 3D printing
Improvement Maintenance	Tasks aimed at improving the intrinsic reliability and/or maintainability and/or safety of an element, without changing its original function	Based normally on historical data, with decision-making relied on experience, and changes made reactively in response to identified issues.	The digitalisation of processes and protocols, including the use of advanced simulations and digital twins, ensures a more thorough consideration of intrinsic RAMS aspects.	<ul style="list-style-type: none"> - Advanced Simulations - Digital Twins - Augmented Reality - Visualisation tools - Point cloud data, - Photogrammetry - 3D printing

Challenges and more specific technology descriptions presented in GFMAM report and in the Appendix

Challenges for applying AI in Maintenance

Challenge	Description	Consequence
The Non-Ergodicity of Assets	If a machine component fails several times, the mean properties of these failures do not necessarily, converge to the mean properties of all the failures of that component in a fleet. Asset fleets are often non-ergodic.	This can seriously impact the possibilities to use information from other assets to update their own failure detection and predictions. This may lead to the multiplication of efforts when building algorithms.
The Curse of Dimensionality	Appears in Machine Learning models when algorithms must learn from an ample feature volume with abundant values within each one, reaching samples with each combination of values when training would be very complicated.	Thus, it can happen that classifier or regressor accuracy first improves including more dimensions but then could even decrease. The trade-off between dimensionality and precision of algorithms must be analysed.
The Dynamic measurement of Failure Risk	A great amount of information related to assets operation and condition emerge. Linking this information to a reasonable measure of failure risk becomes critical for the process of CBM decision making.	More data, information and knowledge of failure should be converted into the continuous improvement of dynamic failure risk for a real intelligent maintenance decision making. Experts must help to convert properly data into asset risk measures.
The Dynamic Scheduling of Maintenance	Asset's condition inspections are growing, frequently becoming on-line inspections, and the maintenance service is accomplished based on the status of the asset. The fact is that many maintenance interventions will be planned and scheduled dynamically.	The replacement of many predetermined maintenance tasks with CBM tasks represents a change in the scheduling on maintenance interventions. The orgs must prepare for this.

Open and standardised IoT architectures

- Use of open and standardized IoT architectures (such as OPC UA and MQTT) have become more popular and diminished the share of proprietary IIoT protocols.
- Benefits of using standards: Interoperability, tried and tested environment, larger employee skill pool, and easier maintenance
- OPC UA excels in industry automation, offers more support but tends to make things complex
- MQTT has strengths being lightweight in scarce resource environments (such as IoT)
- Both can be used concurrently to combine strengths and mitigate downsides
- Integrates also into Asset Administration Shell, which is a digital representation of an asset

	MQTT	OPC UA
Architecture	Publish/Subscribe model	Client/Server model with sophisticated data modeling
Complexity	Low complexity, minimal data overhead	High complexity, detailed structure for industrial applications
Security	Basic security with SSL/TLS encryption	Sophisticated security features user control, including user authentication
Performance	Excellent message transmission efficiency in low-bandwidth scenarios	Designed to facilitate consistent and dependable performance
Compliance with standards	Adheres to IoT-focused standards like LwM2M	Complies with industrial automation standards
Service quality	Quality of Service (QoS) levels to ensure message delivery	High-quality service levels for reliability and security
Use cases	Best for lightweight IoT applications	Best for complex industrial automation systems

Stakeholder interviews – results

Stakeholder interviews - method

- The interviews aimed to clarify capabilities, challenges and opportunities of Colife consortium partners related to shared data in a future industrial operating environment.
- The interviews were conducted by researchers from VTT and LUT between Oct/24 – Dec/24.
- All interviews were recorded and are treated as confidential. References to individual companies are not disclosed in the results.
- AI (Private Copilot) has been utilized in data analysis. All results generated by AI has been validated by VTT and LUT researchers.
- Raw data of the interview were analyzed by VTT and LUT researchers and further analyzed in two researcher workshops in Nov/24 and Dec/24.
- The results include the results of content analysis (thematic analysis) and the identification of elements to refine the Colife vision.

Industry/main products/services	Interviewees #	Interview date
Forest industry	5	8.10.2024
Telecommunications	2	11.10.2024
	2	23.10.2024
Digital solutions	2	23.10.2024
Material handling	1	23.10.2024
	1	6.11.2024
Engineering and consulting	5	24.10.2024
Inspections, engineering consulting	2	25.10.2024
Software	3	19.12.2024

Stakeholder coverage of Colife ecosystem

Role type	Role	Description (role in ecosystem)	Colife partners
Industrial customer	Capital intensive industrial company	Uses and manages production assets in their production sites.	
Production asset manufacturer	Production asset manufacturer	Produces (and usually also maintains, remanufacture, refurbish) production assets for industrial customer.	
	Production asset component provider	Produces (and usually also maintains, remanufacture, refurbish) production asset components for industrial customer.	
Lifecycle service provider	Maintenance service provider	Provides different types of maintenance services for industrial customer.	
Supportive service provider	Asset mgm solution provider	Provides solutions for ecosystem's asset management.	
	Inspections services	Providers inspection services for production mills.	
	Logistics provider	Provides delivery (or reverse) logistics for assets / spare parts etc.	
	Engineering & consulting	Provides engineering services.	
	ERP/MES solution provider	Provides ERP/MES solutions for industrial customer.	
	Data management & analytics	Provides data related services.	
	EOL & recycling partner	Materials recycling, component / spare part recycling.	
	System integration service provider	Company providing integration services for IT and industrial systems.	
Ecosystem and infrastructure provider	Ecosystem coordinator	Daily ecosystem activities. Communicates ecosystem and engages new partners.	
	Infrastructure service providers	Provides tools, cloud services and interfaces for ecosystem operation and management.	

Results of stakeholder interviews - challenges

Challenges of common data sharing concept

Technical restrictions

- Old asset network is limiting possibilities for new solutions and data sharing
- The clear integrations for different data are not yet established
- Good planning and implementation of data management in factory models does not guarantee the quality of data over life cycle if information is not transferred to the models during use phase
- Companies can have several systems for document management with no master system; different units and countries use different systems
- Measurement frequencies may not be optimal for creating optimal conclusions
- Restricted availability of data suitable for asset management
- Data privacy and protection laws (EU) must be considered
- In some cases, organizational standards or policies must be taken into account
- Verification of data source validity
- Time-related constraints – duration of maintenance shutdown

Unwillingness to share data

- Challenges in getting people and organizations involved and committed
- Everyone is trying to sell their own "closed" solutions based on the technologies and machines they provide – no willingness to openly share data
- Manufacturers rarely want to share their expertise with their competitors resulting in single point models
- Different organization cultures
- Data sharing atmosphere is not yet established over value chains
- Data related to economic factors is challenging to share
- Danger that third party data will end up in "wrong hands"
- If information sharing affects strongly the business model of the company, the information will not be shared
- OEMs protect their spare parts business
- Data is seen to intrude on the privacy of people, trade and other secrets
- Sharing data with competitors is seen as a risk; companies are afraid of losing the data or losing the control of their data if it is in the cloud

Value of the data is not seen

- Determination of data value
- Asset owners do not see ROI in data driven business as the data should be first organized and accurate
- Skepticism about data's value and demonstrating its concrete benefits
- People are unsure about what they are allowed to do with the data
- Companies overlook the importance of data
- IPR and value of data is a muddy topic
- The return on investment in data quality is not understood

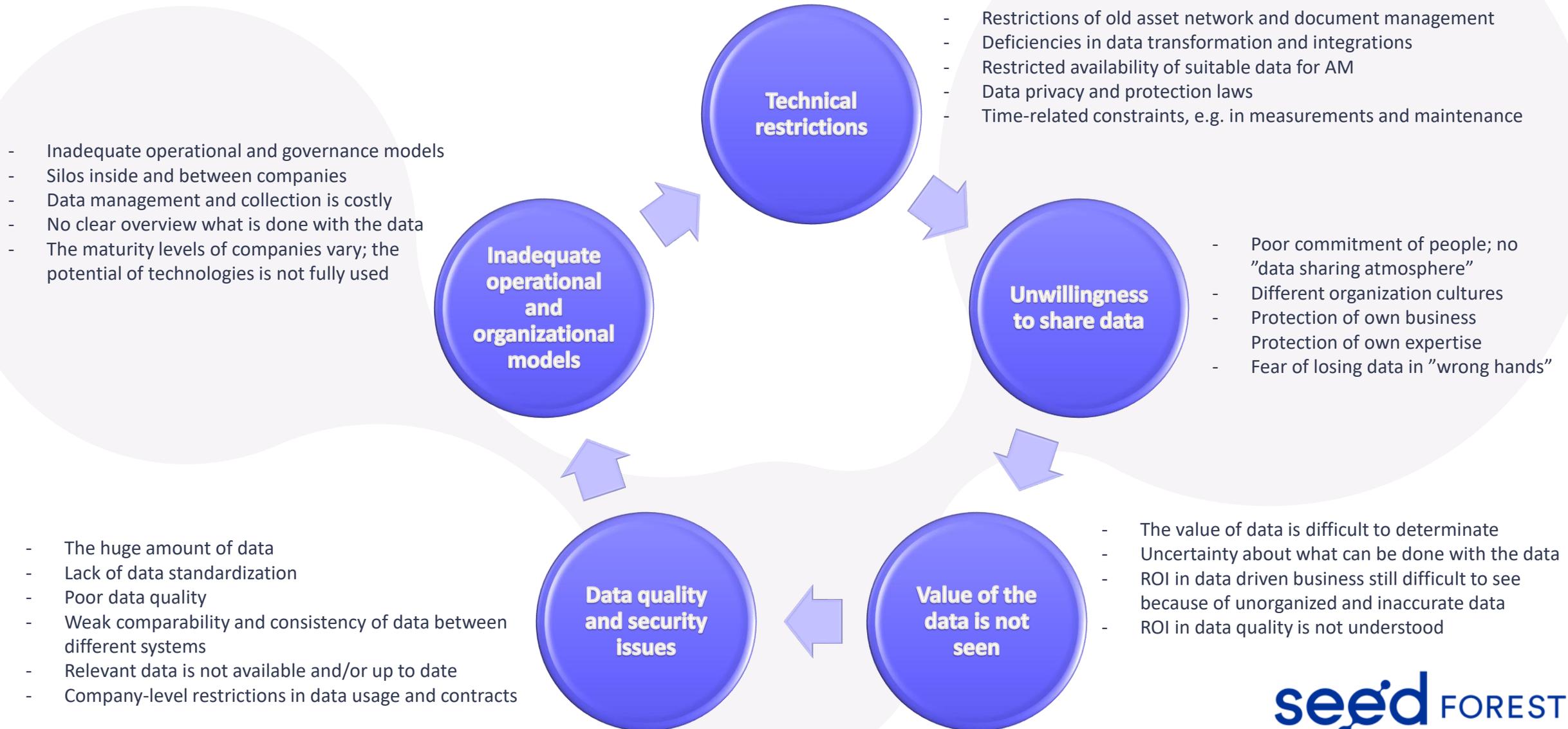
Data quality and security issues

- The huge amount of raw data
- Data security issues
- Lack of data standardization: data is disorganized, scattered and unreliable
- Comparability of data from different sources
 - Consistency of data across different systems
 - Availability and timeliness of relevant data
- Data is not up to date and maintained
- Defining the relevant data
- False comfort on data, which is not based on realities
- The heterogeneity of data from various vendor devices, with only a small percentage supporting standard protocols like OPC UA
- Company-level restrictions in data usage, obeying of contracts, confidentiality contracts
- Poor data quality is one of the biggest obstacles to AI development.
- Data privacy and IPR of sensitive data

Inadequate operational and organizational models

- Inadequate operation models lead to reduced quality of data
- Silos inside companies and between companies
- Improvement in data management is hard to sell even by verified savings
- Separate services and project organization in companies; services could benefit greatly from documentation that could be done already in project phase
- Data management and collection is costly. IoT sensors and data analytics platforms require investments.
- No clear overview of what is done with the data
- Questions on data ownership
- Inadequate tools in data analytics prevent to achieve insights from the shared data
- Data governance process should cover also data quality process
- Some companies adhere to old/more convenient standards; common standards are required for interoperability
- Inability to compare between own company and other companies
- The data must be gained a certain level for data-based services
- The maturity of the organization and the company is determinative: they may have the technologies, but don't know how to use them

Challenges of common data sharing concept



Results of stakeholder interviews - opportunities

Opportunities of common data sharing concept

Process improvement

- Data aggregation and harmonization from shop floor so that it can be used in asset lifecycle management applications
- Utilization of digital twins in maintenance optimization
- Optimization over life cycle of asset and reduced operating costs
- Assisting operators in their work (usage, maintenance, logistics data based services)
- Enhancing production processes to be more efficient in terms of time, speed, material usage, and quality
- Improving maintenance processes and making them more homogeneous and efficient

Improvements in asset design and maintenance

- Developing long lasting machines with higher availability
- Simulation models/predictive models
- Improving predictability of industrial asset integrity, thereby increasing the assets' remaining useful life and cost-effectiveness
- Better information about the asset integrity that is used to determine the necessary follow-up actions in both directions (up- and downstream)
- Implementing preventive measures in operations to extend the lifecycle of assets and improve safety
- Digital twin and product passport

Collaboration between partners

- Possibility to create platform for collecting data available
- Sharing of best practices, co-learning
- Asset collaboration platform enables many-to-many relationships, enhancing overall efficiency
- Open network allows operators to collaborate with multiple OEMs and service providers, creating a more integrated ecosystem.

Advancement in sustainability

- Circular economy solutions (e.g. reuse)
- Better understanding of the sustainability status of companies and larger ecosystems by modelling/data-based services
- Data and data management enables reaching of resource efficiency goals
- Optimization of energy use and ensuring supply security of energy systems
- Extending product lifecycles through circular economy practices such as reuse, remanufacturing, and recycling
- Improving safety and operational efficiency while adhering to sustainable development goals

New business opportunities

- Expertise in constant maintenance of assets
- Offering data as a service
- Contract-based lifecycle services
- New business opportunities from common/open data and state-of-the-art technologies to further develop current services/solutions
- After sales services
- OEMs: new services from installed asset base
- Selling information from assets/facilities and the end customers in other regions buy the information
- Utilization of side streams from production processes, such as those from pulp mills; repurposing these streams for internal use or selling them to third parties
- Life extension services for installed assets
- Service packages for reuse and recycling, particularly in decommissioning stages and recycling construction materials

Opportunities of common data sharing concept

- Asset data as a service
- Lifecycle and life extension services
- Further development of current solutions with open data and new technologies
- Utilization of process side streams
- Services for reuse and recycling

New business opportunities

Process improvement

- Data harmonization from the shop floor
- Operation cost savings
- Improvement in process efficiency; time, speed, material usage
- Preventive and more homogenous maintenance processes
- Assisting operators in their work

Improvements in asset design and maintenance

- Extended lifecycle of assets
- Better information on asset integrity to be used in follow-up actions
- Preventive measures
- Improved safety
- Digital twin and product passport

Advancement in sustainability

- Circular economy practices: reuse, remanufacturing, recycling
- Better understanding on sustainability status of companies
- Optimization of energy use and supply security
- Improved safety and efficiency while adhering sustainability goals

Collaboration between partners

- Platform for data sharing and asset collaboration
- Many-to-many relationships and more integrated ecosystem
- Enhanced overall efficiency
- Best practices, co-learning

O1.2 Sketch of Colife concept

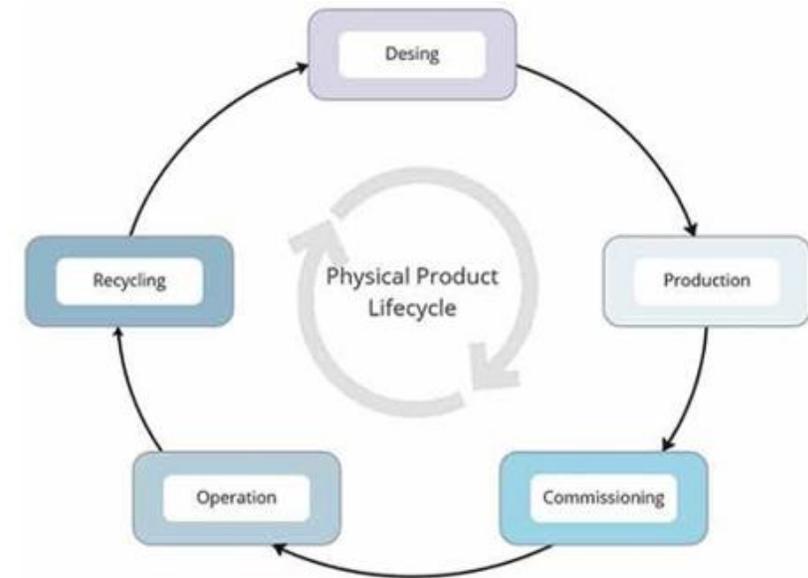
Colife vision - future operating environment

Colife vision for the future is:

“Business partners **collaborate equally in and over phases of the lifecycle of an industrial plant**. They promote common benefits including **environmental, social, and economic** factors. This is facilitated by **fair data sharing** and new operating practices.”

Main objective of the project is to construct Colife concept, a playbook for fair data economy in industrial Asset Management ecosystems.

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Stakeholders of Colife concept sketch

CHALLENGES

- Lack of standards for data
- Consistency of data across different systems
- Data sharing and data is scattered
- Data security
- Value of the data is not seen

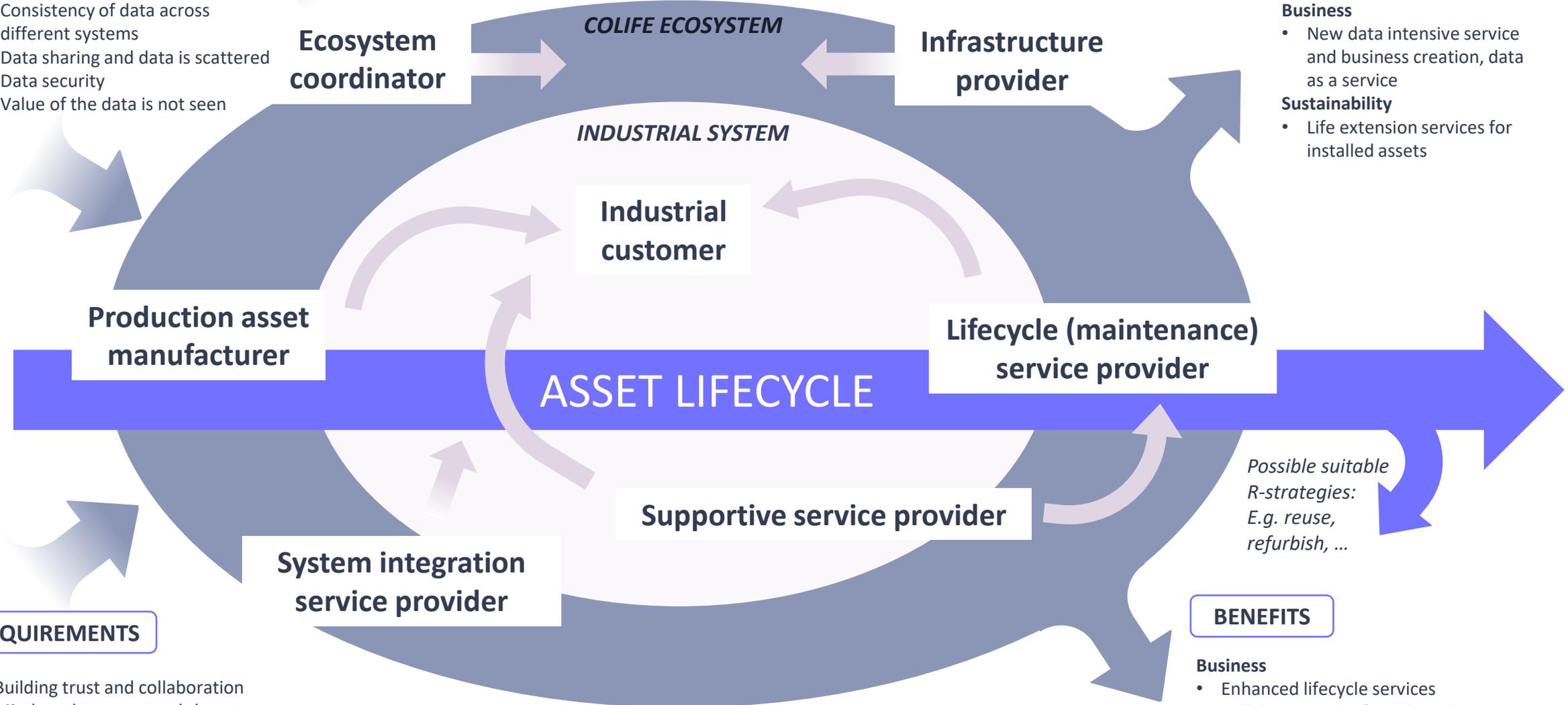
OPPORTUNITIES

Business

- New data intensive service and business creation, data as a service

Sustainability

- Life extension services for installed assets



REQUIREMENTS

- Building trust and collaboration
- Mindset change towards long-term vision and sustainable development
- Seamless end to end processes throughout the value chain
- Available, standardized, high-quality data

BENEFITS

Business

- Enhanced lifecycle services
- Collaborative platform-based services

Sustainability

- Optimisation of energy
- Extending product lifecycles
- Improving safety and operational efficiency

Identifying the elements of Colife concept based on interviews

Interview results



Issues	Concept elements	
Data availability	Availability and quality	Unified data ecosystem
Data quality (content)		
Legacy systems / integration	Interoperability	
Data heterogeneity		
Security issues	Security and trust	
Data ownership		
People and culture	Collaborative culture	
Value from data	Enhanced Data Value Realization	
Business issues	Innovation and New Business Models	

Elements of Colife concept sketch based on interviews

Unified Data Ecosystem (enabling the operation in multistakeholder environment)

- A future where businesses operate within a unified data ecosystem, characterized by:
 - **Availability and quality:** Availability and aggregation of good quality data with the help of standardized interfaces, data models and data governance activities.
 - **Interoperability:** Seamless data exchange facilitated by standardized protocols (e.g., OPC UA) and open APIs.
 - **Security and Trust:** Data security trust frameworks that encourage data sharing without compromising privacy. (e.g., handling governance issues like data ownership)
 - **Collaborative Culture:** A shift towards a collaborative culture and agreed operational rules where data sharing is seen as mutually beneficial rather than competitive. (Culture, mindset, willingness)

Enhanced Data Value Realization (leveraging data in asset management)

- Enhancing existing lifecycle services (e.g. maintenance, after sales, recycling) and creating new business opportunities (e.g., EoL & side stream services, data aggregation & harmonization, Edge solutions, advancement in sustainability)
- Enabling Colife ecosystem single partner services (lifecycle services)

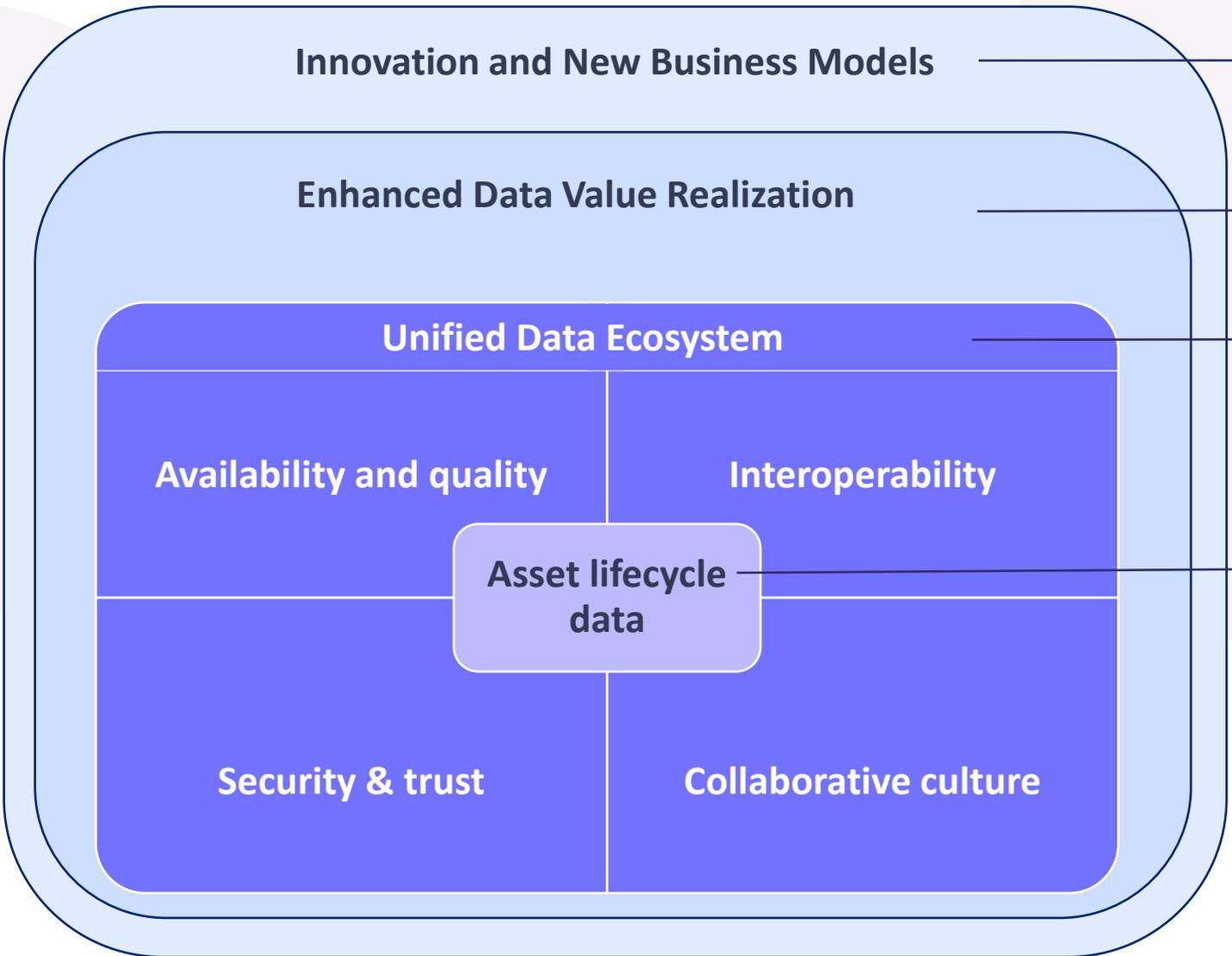
Innovation and New Business Models (innovating and monetization)

- Are the technological opportunities, options or practices known enough for Colife new data intensive service and business creation (AI, Edge, Digital Twin, Digital Product Passport, Global Reporting Initiative, ...)?
- What kind of new resources and expertise are needed for providing new data intensive innovations (e.g., utilization of AI, data analyzation skills, business model understanding, end-to-end user experience, increased understanding on ALM, systems thinking...)?
- What are the opportunities of Colife ecosystem joint services (e.g., collaborative platform-based services)?

Elements of Colife concept sketch

What is the data that is needed?

Is the data available, good quality, understandable and interoperable



Harnessing technology, fair data sharing and joint services to achieve sustainable fair asset management business (economic, ecological, social)

Leveraging lifecycle data into value creating sustainable asset management activities

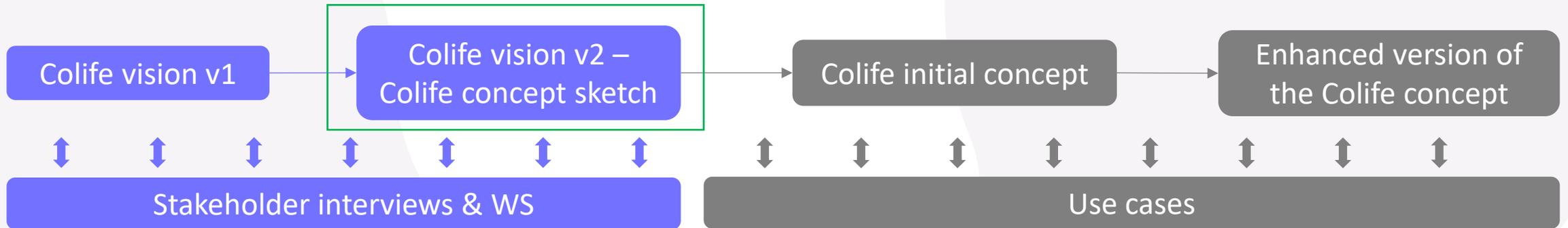
Shared, understandable and interoperable data for asset management

Diverse asset data accumulates throughout the asset's entire lifecycle

Next steps and things to consider

Main objective of the project is to construct Colife concept, a playbook for fair data economy in industrial Asset Management ecosystems.

“The Colife concept guides on how to better utilise **data sharing in collaborative asset management**, i.e., in the coordinated activities of an organisation to realize value from assets.”



- Colife concept sketch created based on stakeholder interviews and needs to be discussed to guide work towards next version of the concept.
- What kind of elements Colife concept (a playbook) should contain?
- How the Colife concept (a playbook) should guide to find better solutions for data sharing in collaborative asset management?