



Towards AI powered manufacturing services, processes, and products in an edge-to-cloud-knowlEdge continuum for humans

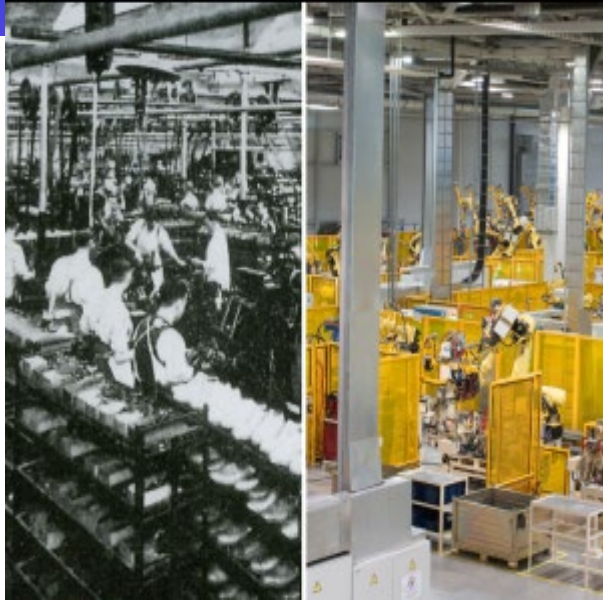
## knowlEdge Architecture

Technical overview of manufacturing companies in the era of AI

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# Current context AI adopters

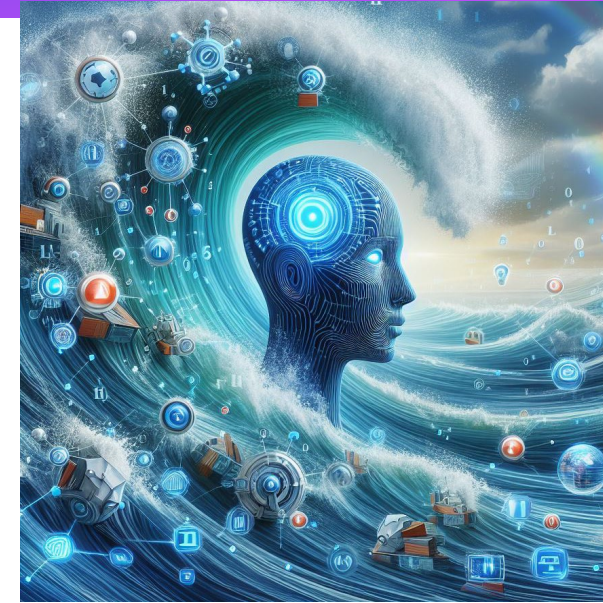


**Machines, Lines, Robots capture big amounts of data through sensors**

**how to make sense of it?**



**Different machine providers, different partners in chain, high pace of distributed, heterog computanional continuum**

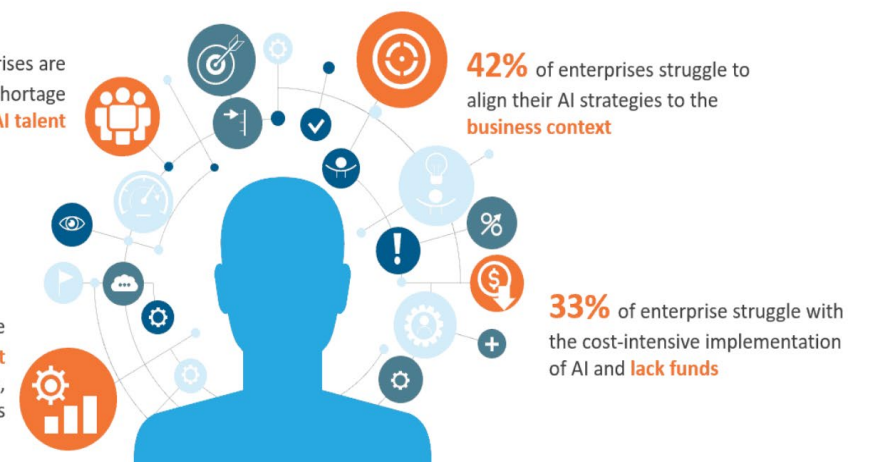


**54%** of enterprises are dealing with a huge shortage of skilled **AI talent**

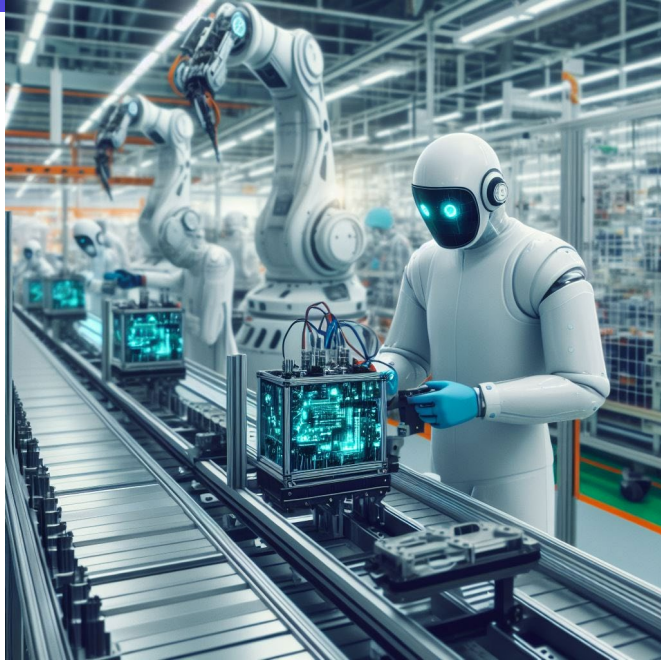
**42%** of enterprises struggle to align their AI strategies to the **business context**

**44%** of enterprises are challenged by **data management** issues in terms of data governance, acquisition, and bias

**33%** of enterprise struggle with the cost-intensive implementation of AI and **lack funds**



# Current context AI adopters



**Task automation and job takeover  
by AI**

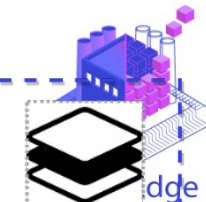
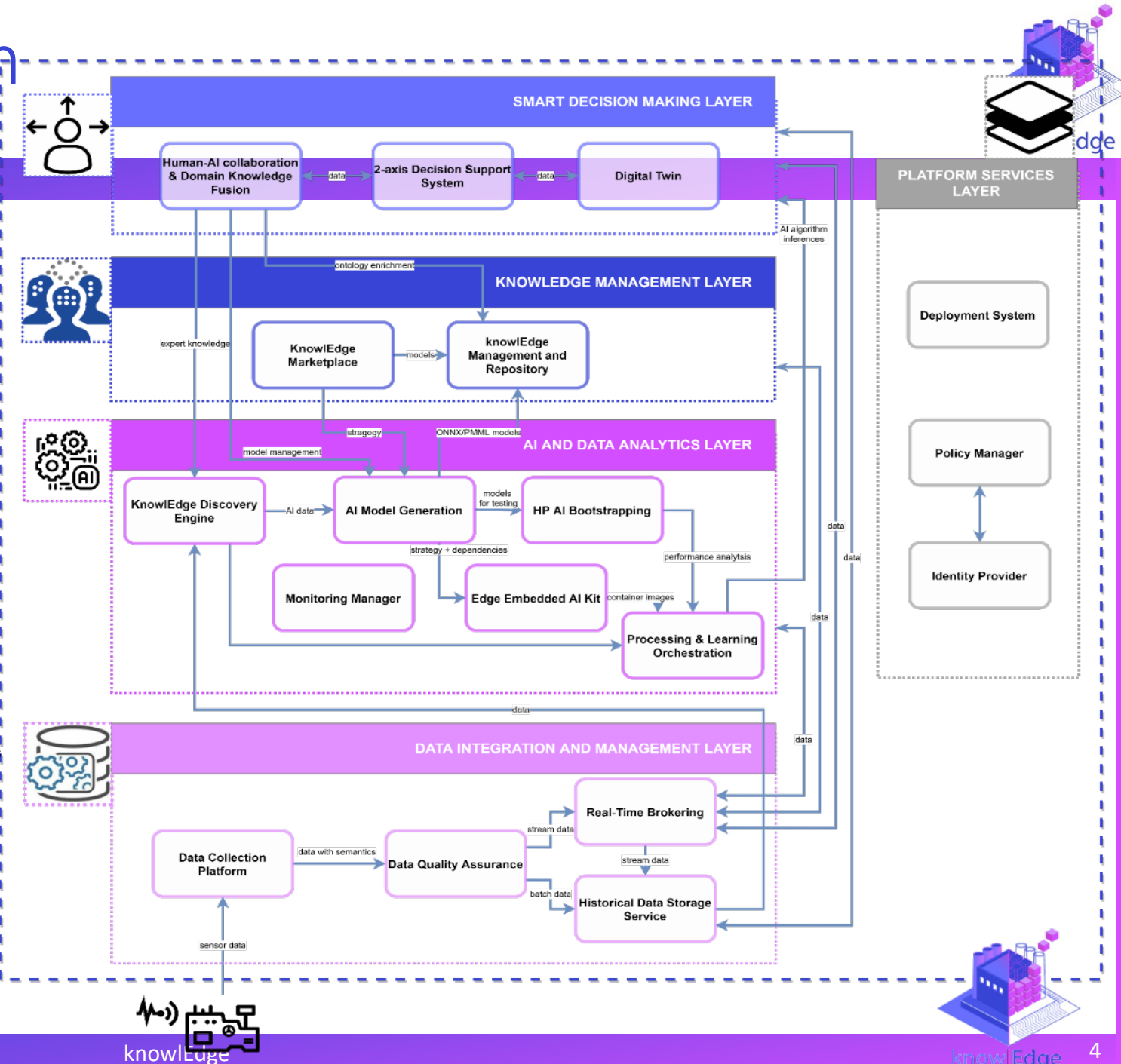
how to propose a more inclusive  
use of AI in the shopfloor?  
How to leverage human rights and  
worthiness?

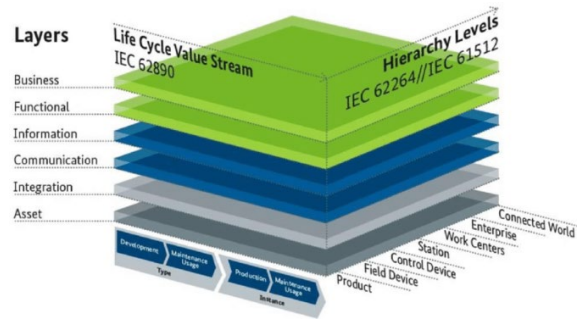


**Proprietary private solutions.  
Innovations only on big  
companies**

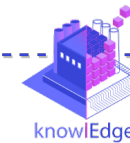
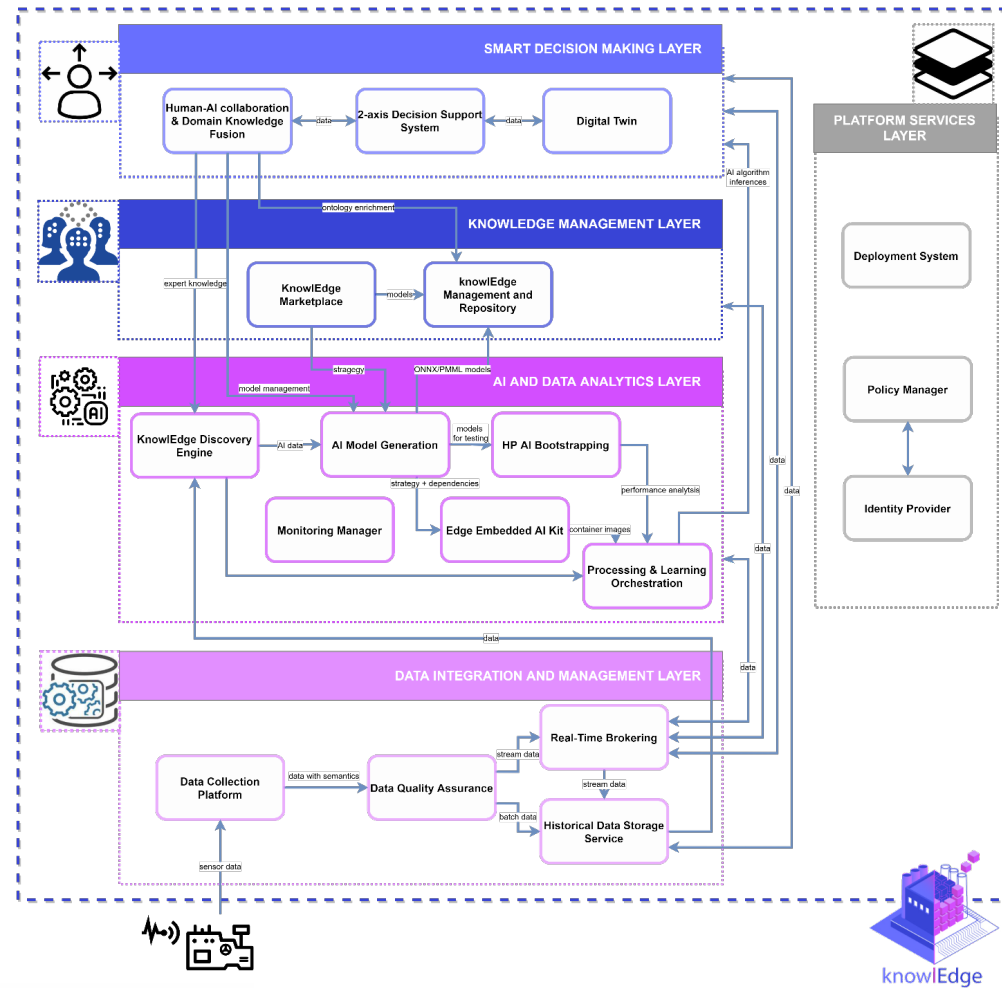
Empower EU SMEs with capable  
comprehensive AI-empowered  
solutions

# knowlEdge platform

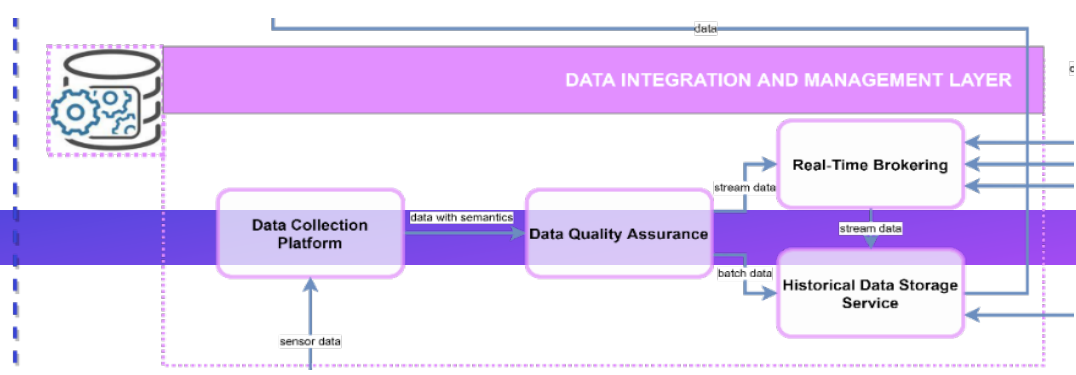




RAMI 4.0

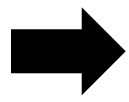


Distributed data mining and analytic services across the computing continuum (edge-to-cloud)



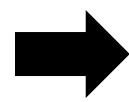
## Current data pains

Support to existing and coming manufacturing protocols



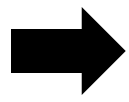
Data collection platform extensible with addons and knowlEdge data format

Interconnect heterogeneous / distributed devices with different computing capabilities



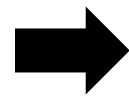
Edge to cloud deployable, synchronisable data infrastructure for registering, ingesting and analysing data

Data quality and processing is the main roadblock of valid decision making



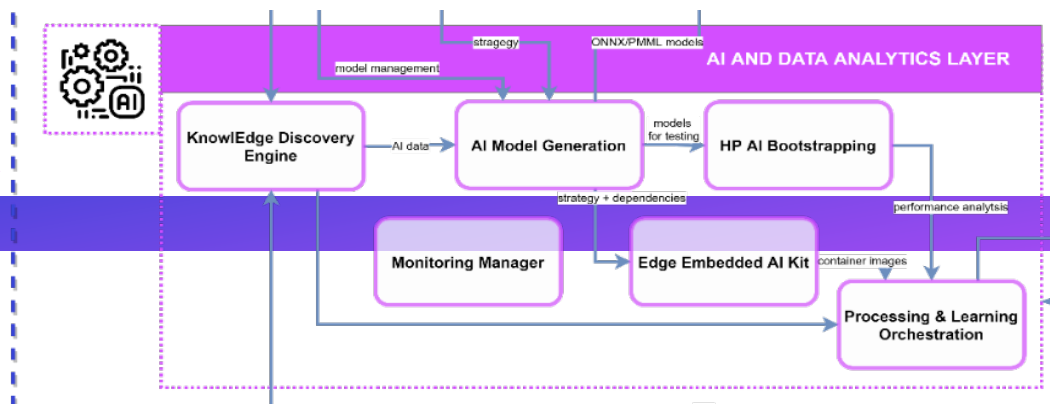
Data Quality Assurance Component

AI require huge amount of data that is impossible to acquire or too costly



Synthetic data generation based on Digital Twin specific simulators

AI centric software architecture to support agile manufacturing

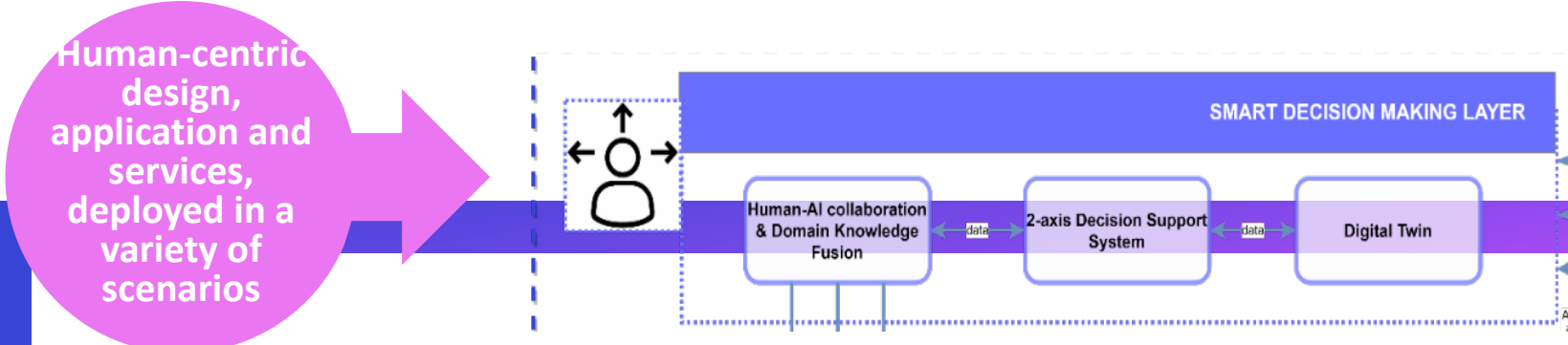


### Current AI pains

- Training algorithms is a complex problem that requires AI skills and expertise
- How to plan on computer resources for production
- Cognitive services for manufacturing
- Fast to market deployment of AI solutions into distributed and heterogeneous data pipelines

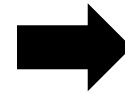
### knowlEdge gains

- Simplify the AI development, integration: AI model generator and knowlEdge Discovery Engine
- Cloud to edge infrastructure, HPC bootstrapping, AI recommender
- Image recognition algorithms for manufacturing
- AI edge embedded toolkit configurable pipelines and orchestrator component for architecture specific cases

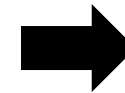


## Current Human-AI pains

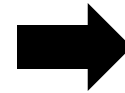
AI will take on humans jobs



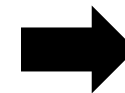
AI learns from data in long and data intensive processes



AI are black boxes and Human must follow AI instructions



Humans can explore decision implications without costly real experimentation



## knowlEdge gains

AI must leverage human capacities

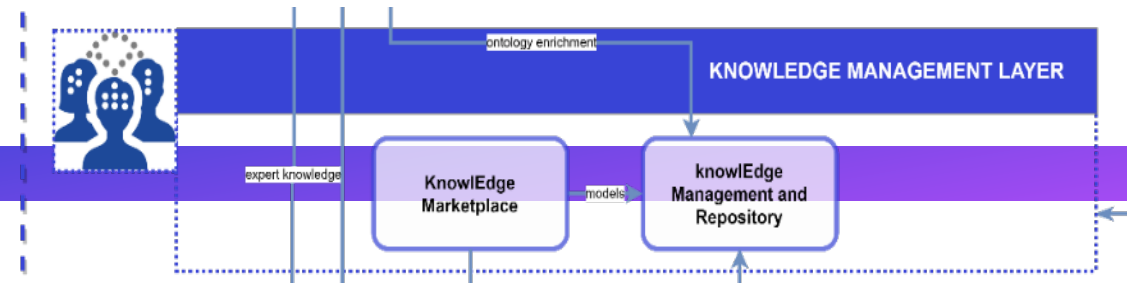
Human-AI collaboration toolkit capable to ingest human know-how into the AI training and retraining processes

DSS explainable AI and process and product quality preconfigured dashboards

What-if scenarios based on simulations of virtualise problem through the Digital Twin

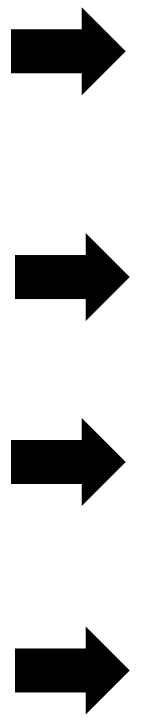


knowlEdge marketplace to enable trading and better utilisation of AI – simplifying uptake and diffusion



## Current Find and Share pains

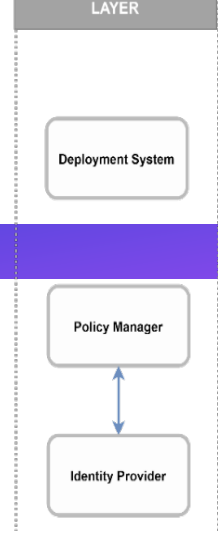
- Find good existing solutions applicable to a given problem
- Many existing algorithms and solutions hindering optimal selection making
- Securely monetize developments
- Talent shortage



## knowlEdge gains

- knowlEdge marketplace. Algorithms indexed by problem and dataset specific
- knowlEdge semantic repository, AI recommender
- Blockchain powered Marketplace
- knowledge transfer from existing solutions

Efficient and secure communication, data management and governance infrastructure

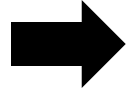
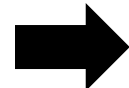
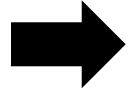


## Current Security pains

Deployment, update and patch of complex distributed infrastructure is a hard and costly process

Assure that information in the platform is out of the box secured

Manufacturers face an escalating threat from hackers targeting digital infrastructure.



## knowlEdge gains

knowlEdge deployment component is able to deploy and update the knowlEdge platform in hundreds of nodes

knowlEdge Policy Manager secures all messages exchanged between components

knowlEdge Identity Provider secure the access to the knowlEdge platform from undesired users