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Interoperability as a success factor: The Asset Administration Shell in the context of dataspaces

Electro- and Digital Industry Association

Content

1 Introduction: data as a strategic value driver

Industrial production is rapidly evolving into a data-driven system. Digitalization, automation and artificial intelligence are transforming how companies work, reduce costs and unlock new business models. At the center of this transformation is a resource that is not a physical one: **data**. Data is no longer just a byproduct of manufacturing but a strategic value driver. Companies that use data effectively can optimize production processes, save resources and increase product quality.
With the launch of **Industrie 4.0** in 2011, a new era began: the networking of people, machines and products. Ongoing **digitalization** has shown that value creation no longer stems solely from physical products but from the associated digital information. Data-driven business models are becoming increasingly important. Particularly in the electrical and digital industries with their complex products and supply chains, data is becoming a decisive competitive advantage.

Why data has value but often remains unused

Although data is considered the “new oil” of the economy, it remains unused or difficult to access in many companies. According to the **Digitalization Index 2024**, 71% of companies see a direct impact of digitalization on their competitiveness.[1] Yet many lack a unified data structure or struggle with isolated systems. Data only creates value when it is purposefully used and leveraged. Through data analysis and data sharing, companies can, for example, optimize production processes, develop digital services beyond the physical product and meet regulatory requirements such as material traceability or the Digital Product Passport (DPP).
However, the problem is that many companies store **data in silos** separately in machine controls, ERP systems or proprietary platforms. The result is incompatible systems and non-interoperable data formats. Moreover, **semantic information**, i.e., the meaning of data is often missing or inconsistently defined. This makes it nearly impossible to interpret or process data automatically or across company boundaries. As a result, companies cannot perform comprehensive data analyses or share data with partners without developing custom interfaces.
This is where the **Asset Administration Shell** (AAS, Verwaltungsschale) comes in. It enables standardized, structured organization and provision of data, both machine-readable and human-readable. This creates a basis for sharing data internally and externally. **Dataspaces**, in turn, offer a technological foundation for trustworthy and sovereign information exchange between companies. Together, AAS and data spaces form an essential basis for industrial digitalization and the development of new data-driven value-creation networks.

From internal data management to cross-company usage

Within a company, structured data management improves processes and transparency. However, true value emerges when data can be shared securely, controllably and in a standardized form across organizational boundaries.
Traditionally, data is stored in separate systems:

- Machine and sensor data remain in controllers or IoT platforms,
- Production data in MES or ERP systems,
- Product information in PLM or PIM systems,
- Compliance data in separate databases.

This fragmented approach leads to systems storing data in different formats and semantics. Companies cannot simply share their data with suppliers or customers, and custom interfaces must be built for every new partner or software provider. Before a systematic exchange of data becomes feasible, several steps are necessary: A leading system must exist for all relevant data. Then the data must be semantically well-defined and consistently structured. Only then can existing data sets and systems be meaningfully linked—ideally in an asset-centric manner along specific products, machines or processes. The AAS helps dissolve data silos and provides uniform structures for asset-related data. This paves the way for value-adding data usage in cross-company networks and for secure, sovereign exchange via data spaces.

[1] Langfassung Digitalisierungsindex 2024

2 Fundamentals: Asset Administration Shell and industrial dataspaces

The Asset Administration Shell as the digital twin of industrial assets

The Asset Administration Shell (AAS) is a core concept of Industrie 4.0 and acts as the digital representation of a physical asset. It enables standardized description of all relevant information and functions of a physical or virtual object across its entire lifecycle, from development to production to disposal. It forms the technological basis for implementing the **digital twin** in industrial practice. [2] An **asset in industrial contexts** may be any object with economic or functional value, such as a machine, sensor, tool, product or entire production system. The AAS provides all relevant information digitally, structured, machine-readable and interoperable.[3]

The AAS is modular, consisting of a shell-header and multiple submodels, each describing specific aspects of an asset such as technical data, operating parameters, energy consumption or maintenance information. Submodels follow established standards (e.g., IEC 61360, VDI 2770) to enable semantically clear data exchange between systems from different manufacturers. The **Industrial Digital Twin Association** (IDTA) has more than 100 standardized submodels in development or already published that enable various use cases for companies.[4,5] Submodels are defined in consortia of company representatives, associations and science, thereby constantly generating new submodels for specific use cases and then making them publicly available for use. A key feature of the AAS is that it is both machine-readable and human-readable. For machines, the submodels are structured and available in standardized data formats such as JSON, XML, or AASX. This means that the data they contain, such as information on configuration, interfaces, lifecycle status, or technical parameters, is structured, semantically unambiguous and standardized. This allows software applications to automatically access and interpret this information without human intervention. For humans, graphical editors like the AASX Package Explorer or tools like Eclipse Mnestix can visualize and edit the content. Technical and non-technical users can thus access the same data in a clear and understandable structure and therefore access the digital nameplate or the Digital Product Passport.

However, AAS is more than just a data format. It also includes standardized interfaces (APIs), defined communication mechanisms, and optionally even services and capabilities that can be triggered via AAS. This not only improves interoperability but also enables the active use and control of assets through their digital representation. AAS allows companies to efficiently manage their data internally and share it across company boundaries. This is a crucial prerequisite for integration into **industrial dataspaces**, enabling companies to exchange information securely and in a controlled manner.

Industrial dataspaces as a framework for sovereign data exchange

While there is no universally accepted definition of the term "data space," most existing definitions follow the same concepts. According to the **Data Space Support Center** (DSSC), a dataspace is an "interoperable framework based on common governance principles, standards, practices, and supporting services that enables trusted data transactions between participants." [6] In general, data spaces offer a standardized infrastructure that facilitates inter-organizational data exchange based on predefined rules. Three characteristics play a key role in this[7]:

1. Interoperability

- The ability of different systems to work together seamlessly and exchange data.
- Open standards such as the Administration Shell and OPC UA play a crucial role here, as they ensure that different systems can communicate with each other.

[2] IDTA – Der Standard für den Digitalen Zwilling - Startseite
[3] Technology - IDTA
[4] Use cases from the industry prove considerable time and cost savings thanks to the Asset Administration Shell - IDTA
[5] Teilmodelle - Industrial Digital Twin Association e. V.
[6] 1 Key Concept Definitions - Blueprint v1.5 - Data Spaces Support Centre
[7] Datenraeume-und-Manufacturing-X-Whitepaper.pdf

2. Decentralisation

- Instead of storing data centrally, it remains with the respective companies and is shared as needed via standardized interfaces.
- This reduces dependencies on central platforms and increases flexibility and control over one's own data.

3. Trust and data sovereignty

- Data sovereignty means that each company retains full control over who can access which data and under what conditions.
- Technologies like the Asset Administration Shell support this by facilitating targeted data sharing.
- Trust between participating companies is essential for the success of data spaces.

Projects funded by the German Federal Ministry for Economic Affairs and Energy (BMWE), such as those within the initiative of Manufacturing-X, are actively driving the development of these dataspaces to create a European alternative to proprietary cloud solutions. By combining an asset administration shell and dataspaces, companies can, for the first time, achieve **efficient, secure, and interoperable data exchange**. This is a fundamental prerequisite for the digitalization of industrial value chains. Thus, the AAS forms a basis for the successful implementation of industrial dataspaces.

3 Asset Administration Shell in conjunction with data spaces

In combination with industrial dataspaces, AAS opens up new dimensions of digital collaboration across company boundaries in a secure, controlled, and standardized manner. The interplay of these two concepts is a key building block for the digital transformation of industrial value creation. The result is cross-company, automated processes, complete data sovereignty, and the avoidance of proprietary interfaces.

Machine- and human-readable asset administration shell: Significance for users and use cases

A key feature of AAS is its machine readability. This offers significant advantages, particularly for industrial applications:

- **Process automation**: Machine-readable AAS contents enable automated commissioning, service processes, spare parts requests, and purchasing. For example, a digital system can verify the compatibility of a spare part or automatically trigger a maintenance request based on the condition data from the AAS.
- **Simplified integration**: When integrating a new asset, such as a machine, systems can automatically access AAS data, such as communication interfaces, supported protocols, and energy consumption and use this information for system configuration.
- **Electronic exchange across supply chains**: Information such as product specifications, operational data, and certificates can be provided in a standardized format and seamlessly integrated into ERP, MES, or CAx systems.

Despite these prospects, practical hurdles still exist that hinder the widespread adoption of AAS.

- **Low market penetration**: Although AAS is widely discussed in the Industrie 4.0 community, its actual use in industry, particularly among small and medium-sized enterprises (SMEs), remains limited. Many companies are unfamiliar with the standard or still view it as a "future technology." This often results in pilot projects being restricted to a few industry leaders.
- **Lack of expertise in SMEs**: Small and medium-sized enterprises frequently lack the IT personnel to implement AAS-based solutions. A typical example: A component supplier with 150 employees may have all the relevant asset data, but no experience in converting it into an AAS-compliant format. Without external support or user-friendly tools, getting started remains difficult.
- **Effort required for standard mapping and integration of legacy systems**: In practice, many older IT systems (ERP, MES, SCADA) exist in companies that are not directly AAS-compatible. These "legacy systems" must first be connected via interfaces or mappings, which is time-consuming and costly. For example, a production control system from the 1990s cannot interpret JSON or AASX files, which is why a "translator" must be programmed or used.
- **Lack of open-source tools or interoperable platforms:** While initial tools such as the AASX Package Explorer or middleware like Eclipse BaSyx exist, the ecosystem of freely available, practical open-source solutions is still limited. For some use cases, such as seamless integration into existing IoT platforms, standard-compliant, easily adaptable solutions are lacking. This makes it particularly difficult for SMEs to get started, as they either have to develop their own software or use expensive proprietary platforms.

Asset Administration shell as the key to scaling dataspaces

The full effectiveness of AAS unfolds in conjunction with industrial dataspaces (e.g., Catena-X, Manufacturing-X, or Gaia-X). In such dataspaces, data is not only shared but also exchanged with respect to sovereignty, security, and standardization. The AAS provides the semantically clear, structured data container and interfaces. The dataspace ensures that only authorized partners can access defined data and information. AAS, in combination with dataspaces, thus transforms the way companies will handle information in the future. Processes become modular, networkable, context-aware, and increasingly autonomous. What was previously based on complex system integrations is replaced by standardized AAS instances and semantically interoperable dataspaces. In the long term, this means:

- Self-configuring production systems ("Plug & Produce")
- Autonomous service systems that report their own maintenance needs
- Global supply networks in which data is shared in real time and with full sovereignty.

The Asset Administration Shell is therefore not only a technical tool, but a strategic lever for digital resilience and innovation, and also a key building block for interoperable data spaces.

Data exchange in transition: from silo thinking to interoperable dataspaces

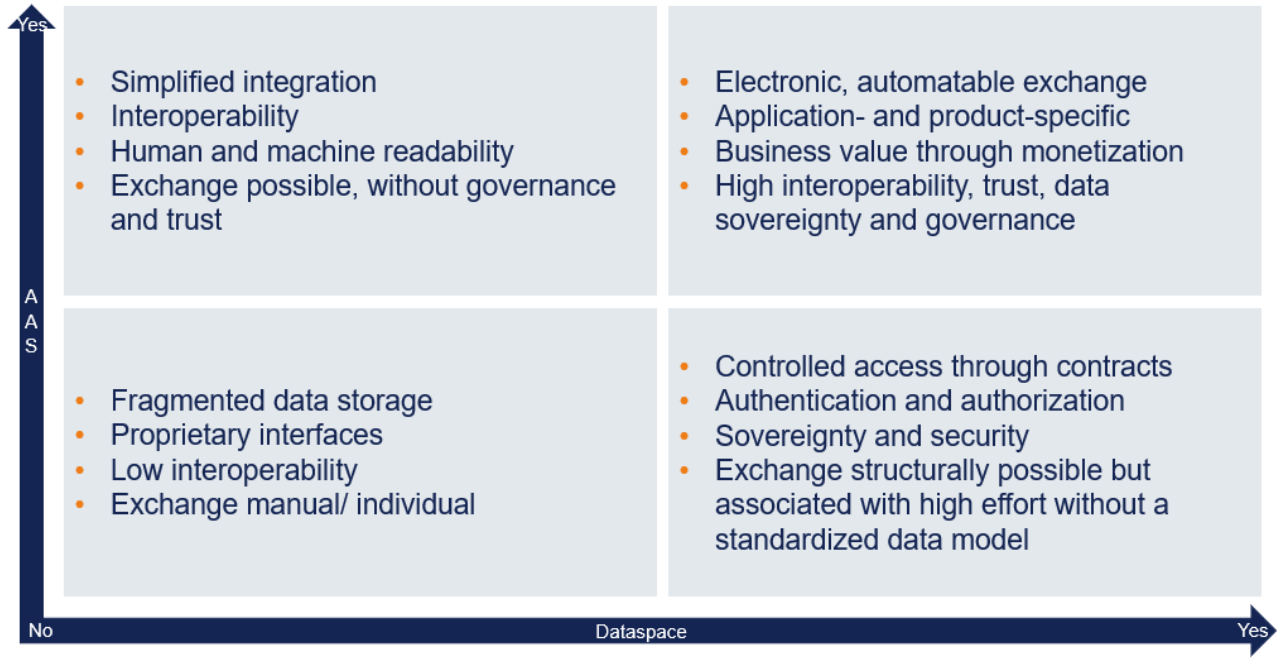

Figure 1 Interaction of AAS and dataspace - how overarching data exchange is changing

Data exchange without an AAS and Without a dataspace

If neither an asset administration shell nor dataspaces are used, data exchange is severely limited. Information resides in isolated systems, mostly in proprietary formats, and is often exchanged manually or via custom-developed interfaces. This process is error-prone, costly, and difficult to scale, as a new technical connection must be established for each new partner. While cross-company collaboration is theoretically possible, it is not economically viable due to the effort, costs, and resource consumption involved.

Data exchange with AAS but without a dataspace

If only asset administration shells are used, a standardized and machine-readable database is created for the first time. This allows for automated data exchange, for example, in the form of JSON or AASX files. Interoperability and integration into existing systems are significantly simplified. However, overarching mechanisms for secure identification, access rights, or contractual agreements are still lacking. Data exchange is therefore technically efficient but remains organizationally limited to bilateral relationships.

Data exchange without AAS but with a dataspace

If companies use only dataspaces, a secure and sovereign framework for data exchange is available. Access rights, user identities, and contractual conditions are clearly defined. However, without the asset administration shell, a unified, standardized data model is lacking. While the exchange is trustworthy, it requires additional translation and integration efforts because the data comes from heterogeneous sources and is not semantically harmonized.

Data exchange with AAS and dataspaces

Only the combination of an asset administration shell and industrial dataspaces enables the full added value. Data is not only provided in a standardized format but can also be securely shared in a controlled environment. Companies can provide their data in a uniform format and share it via standardized interfaces. This enables seamless integration into existing systems and promotes collaboration along the entire value chain. Ultimately, companies benefit from automated data flows, higher data quality, and the ability to develop new data-driven business models. This combination enables a new level of data sovereignty and efficiency in industrial collaboration. Companies retain control over their data, can determine who can see what and when, and can simultaneously benefit from a shared data ecosystem. Initiatives and projects such as Manufacturing-X and Dataspace for Everybody impressively demonstrate how the use of AAS can form the technological basis for a dataspace.

4 Use cases in companies: The possibilities of the Asset Administration Shell

Using the asset administration shell opens up a multitude of new possibilities for companies. The following examples demonstrate how the asset administration shell, as a foundation, fosters various innovations. This allows companies not only to optimize their processes, but also to increase their productivity or improve their product quality.

Automating compliance processes using the DPP4.0 as an example

With the Ecodesign for Sustainable Products Regulation (ESPR), which entered into force as part of the EU Green Deal, the European Commission aims to reduce the environmental impact of products throughout their entire life cycle and strengthen the circular economy. This is to be achieved, among other things, by making the necessary product information available to various stakeholders in digital form, the Digital Product Passport (DPP), provided by manufacturers. This is intended to facilitate sustainable development, purchasing decisions, repairs, recycling, and regulatory compliance. Delegated acts will define the content requirements for various product groups in the coming years. Every company that manufactures such products will then be obligated to provide the defined sustainability-related product information.

The Asset Administration Shell offers the possibility of assigning the regulatory-required product information to the respective product within the company and enabling external retrieval. The requirements of delegated acts regarding prescribed product information can be mapped via corresponding submodels. Furthermore, future adjustments or additional regulatory requirements can be implemented by adapting or adding further submodels.
In addition to the availability of digital information, the DPP also requires that access to this information is possible directly at the product level. Products can be uniquely identified globally via the Identification Link (IEC 61406, ID-Link), creating an access point to digital information. The combination of ID-Link and the Asset Administration Shell results in DPP4.0 – the Digital Product Passport for Industrie 4.0.

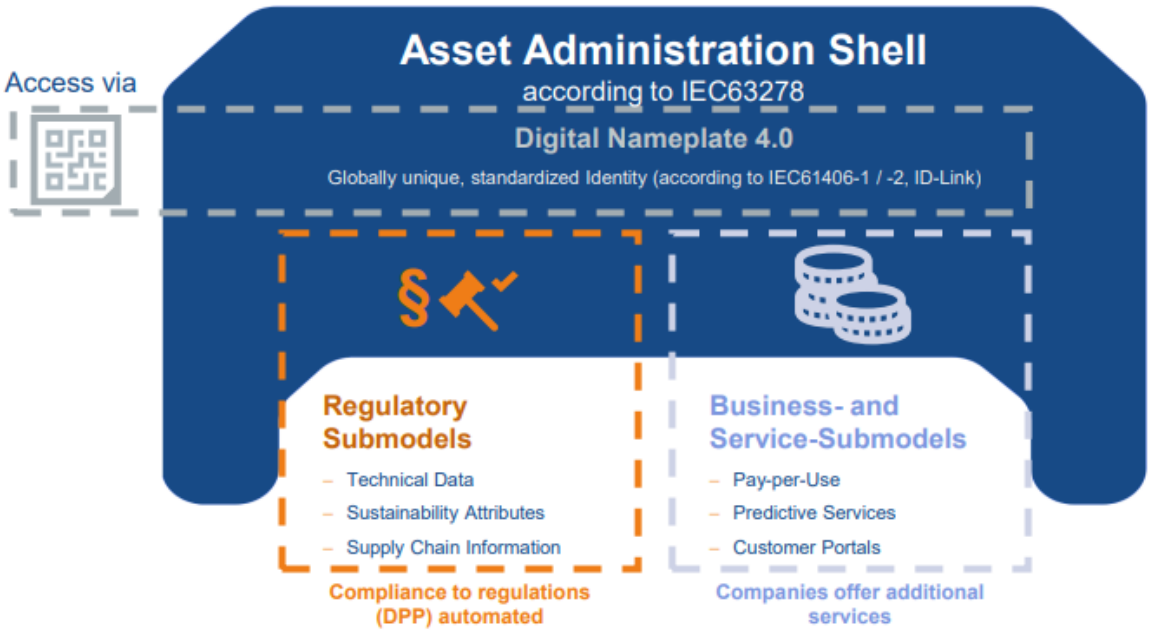

Figure 2 The Digital Product Passport 4.0

The AAS is far more than just a technical data shell to meet regulatory requirements. It provides a foundation upon which new digital business models can be realized. This allows companies to offer value-added services that generate new added value and customer benefits. The following examples illustrate in more detail how this is already applicable.

Efficiently connecting supply chains

Dataspaces, such as those being developed for various industries within the Manufacturing-X data ecosystem initiative, enable companies to share production and supply information transparently and securely with their partners.

Dataspaces help meet the growing demands for transparency and documentation of environmental impacts along the supply chain. These requirements are becoming increasingly urgent, particularly considering the European Ecodesign Regulation (ESPR) and the Digital Product Passport. Using the Asset Administration Shell (AAS), environmental data such as the Product Carbon Footprint (PCF), information on reportable substances of very high concern, recyclability, disassembly, and end-of-life of a product can be collected, consolidated, and securely exchanged between business partners in a standardized manner. This allows companies to efficiently fulfill regulatory obligations, demonstrate the CO_2 footprint of their products based on primary data, and implement well-founded measures for decarbonization or circular economy practices. The interoperable AAS models ensure that this sustainability data is consistent, verifiable and available across company boundaries, and can be used for both internal management and external reporting (e.g. DPP).

Beyond simply providing environmental and end-of-life data, after-sales services can also be directly integrated. Key enhancements include digital maintenance instructions, provided via the AAS and accessible at any time, as well as predictive maintenance models that use operational data and AI to calculate remaining useful life (RUL) and provide early warnings of maintenance needs. Additionally, the AAS can provide an overview of all spare parts, consumables, and compatible successor products, which are relevant for planning, maintenance, and ordering processes. Through the dataspace, companies can not only view this information transparently but also initiate and process orders directly via the "Purchase Order" submodel. This creates a holistic, interoperable digital ecosystem along the entire product lifecycle, promoting sustainability, cost optimization, and efficiency.

The "Traceability" use case from the automotive dataspace Catena-X exemplifies how digital twins based on the Asset Administration Shell enable end-to-end traceability in complex automotive supply chains. Companies make their data available via the dataspace as an AAS, with each company sharing data only with its immediate partners at its own supplier level (e.g., Tier 2 with Tier 1) and never directly across supply chains. This controlled, decentralized information exchange grants each company full data sovereignty. It decides granularly which information is shared while simultaneously protecting sensitive company details from unauthorized access. Through the AAS, relevant information on origin, condition, and processing steps can be securely, standardized, and traceably transferred across company boundaries without exceeding transparency to the next value creation stage. This makes it possible to trace the condition and origin of safety-critical components at any time, to identify and recall defective components in a targeted manner, and to demonstrate compliance with regulatory requirements or sustainability criteria.

Seamless data exchange using the example of Factory-X with the MX port "Leo" based on AAS

In the lighthouse project Factory-X, funded by the German Federal Ministry for Economic Affairs and Energy, AAS plays a central role in the interoperable sharing of data between participating industrial partners. The MX-Port "Leo" serves as the interface for exchanging data across manufacturers. A demonstrator illustrates the advantages of AAS-based data exchange and the MX-Port Leo. Developed within the Factory-X project under the leadership of the ZVEI, the demonstrator was first exhibited at the "Smart Production Solutions (SPS)" trade fair in Nuremberg in 2025 and will be presented again at the Hannover trade fair in April 2026.

The demonstrator showcases how companies in the manufacturing sector can collaborate effectively throughout the product lifecycle through standardized data usage – based on concrete use cases from Factory-X. These use cases are examples from the factory operator and equipment supplier industry to

1. Provide digital solutions for the collaborative, intelligent design of products and machines,
2. Provide software updates across manufacturers to keep all products and machines in a factory up to date,
3. Provide information (especially asset information) via standardized B2B interfaces, and
4. Provide information for processing in sustainability-related activities of a company, such as R-grading.

The AAS-based MX port “Leo” enables seamless integration and interoperability in the areas of Smart Products, Smart Engineering, Smart Production, Smart Operation, Smart Services and Smart End of Life.

Smart Products
Every product with a digital twin is potentially a smart product. Thanks to MX-Port "Leo," the right data can be accessed paperlessly at the right time and in the right place. The AAS technology used enables the simple, standardized, and automated retrieval of machine-readable data.

Smart Engineering
Systems for smart engineering can work across company boundaries using standardized data models (AAS) with current product data. The MX-Port “Leo” allows standardized product data to be retrieved from different manufacturers and integrated into proprietary systems.

Smart Production
The data from smart engineering is transmitted to production stakeholders via the MX-Port "Leo" and can also be used in assembly. Thus, from the pure digital twin arises the physical product.

Smart Operation
Data on device usage, production processes, and production control are available thanks to the MX-Port "Leo". They do not need to be searched for, evaluated for accuracy, or specifically provided to individual users.

Smart Services
Manufacturers can provide information on product changes (Product Change Notification, PCN) and software updates via a standardized AAS mechanism. The MX-Port "Leo" allows users to access this information across a wide range of manufacturers in a standardized way.

Smart End of Life

The AAS-based MX-Port “Leo” and the R-Grading Workflow application form the basis for a data-driven circular economy. Organizations can move from reactive, experience-based assessments of the condition of machines and components to proactive, data-driven strategies aimed at extending their lifespan.

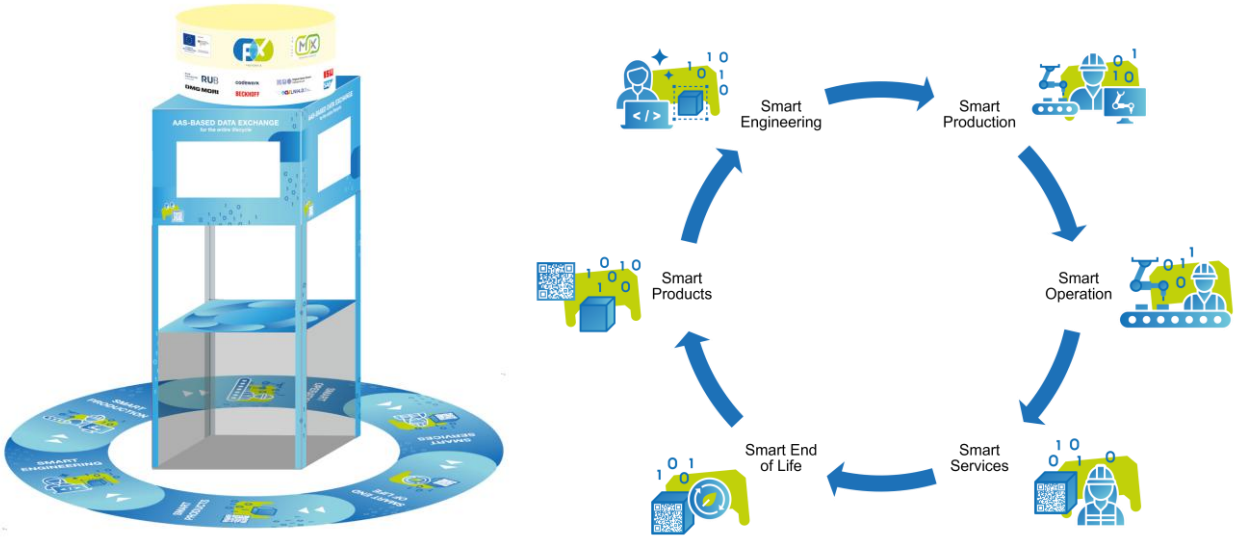

Figure 3 Design concept of the Factory-X demonstrator and content description of the 6 phases

Automation along the product lifecycle, thanks to Factory-X solutions like the AAS-based MX-Port "Leo," offers the opportunity to optimize production processes, compensate for the shortage of skilled workers, increase efficiency, and enable new business models. This allows companies not only to reduce costs but also to react flexibly to market changes and secure their long-term innovative capacity.

5 Implications for companies

The introduction of the Asset Administration Shell and integration into dataspaces are strategic decisions that involve investment, organizational change, and a clear roadmap. Companies must ask themselves: **When does the switch to a standardized data structure make sense, and how can it be implemented efficiently?**

Investments and value creation potential

The use of the Asset Administration Shell unlocks short-, medium-, and long-term value creation potential. Studies show that companies can achieve efficiency gains of between 10 to 20% in production through the targeted use of data. [8] According to an IDTA study, the use of AAS in cross-company engineering processes can achieve time and effort reductions of up to 67%. In product change management, this reduction can reach up to 79%. Simultaneously, costs are reduced through the automation of data flows, the avoidance of redundant interfaces, and more efficient resource utilization.

- **Short-term**: Implementation of structured and standardized data storage at the component level. Even at this stage, data silos can be broken down, and information can be combined in a machine- and human-readable format.
- **Medium-term:** Automated process integration, e.g., through plug-and-produce or predictive maintenance. Companies can commission systems faster, reduce maintenance costs, and minimize downtime.
- **Long-term:** Proactive, autonomous Asset Administration Shells that prepare decisions, independently trigger services, and cooperate with other digital twins. This will lead to new data-driven business models.

Investments in AAS thus pay off not only through cost reductions, but also through new revenue potential, increased innovation capacity, and better compliance with regulatory requirements. In addition, a standardized data format enables easy and low-threshold access to dataspaces and the possibility of collaborative cooperation through secure and sovereign data exchange.

Change management as a success factor

Implementing the Asset Administration Shell requires a long-term shift in mindset within companies, among their employees, and in their collaborations with partners. The IDTA describes this approach in its AAS Quick Start Guide as **"Think Big, Start Small, Scale Up".** [9] Companies, regardless of size, should start small, measure initial successes, and build upon them. This is a proven principle, even when extended to the use of dataspaces. A phased approach can be helpful in this regard:

1. **Define responsibilities**
   - Clear responsibilities are needed within the company to build consistent data structures.
2. **Identify and structure data**
   - Companies must first analyze what data is available, in what form, and how it can be optimized. The semantic description of the data should also be analyzed.
3. **Define a data strategy**
   - Companies must strategically define which assets they want to describe using AAS and what data is required for this. Furthermore, they must decide what will happen with the data in terms of use, exchange, and provision.
4. **Implement pilot projects**
   - The introduction of AAS should begin with concrete use cases that offer rapid and measurable added value.

[8] Manufacturing: Analytics unleashes productivity and profitability | McKinsey
[9] https://industrialdigitaltwin.org/wp-content/uploads/2024/11/IDTA_AAS-Quick-Start-Guide.pdf

5. Prepare the integration in dataspaces

- Once the internal structures are established, the step towards cross-company data exchange via dataspaces can be taken.

Manufacturing-X and the MX-Port

As part of the Factory-X initiative, within the framework of Manufacturing-X, the MX-Port concept was introduced as a modular, cross-industry framework for secure and scalable data exchange.[10] Initial exemplary configurations named "Leo," "Hercules," and "Orion" were developed to represent various use cases and requirements. The Asset Administration Shell plays a central role in those concepts, particularly for "Leo" and "Hercules." It serves as a standardized data model through which production requirements, technical specifications, and machine information are exchanged in a structured format via the MX-Port system. This enables specific use cases such as automated matching processes between production requests and partner capacities (demand and capacity management), optimizes cost and quality checks, and ultimately facilitates massive process automation and scalability across industries.

The AAS Dataspace for Everybody project within the framework of Manufacturing-X, offers a Software-as-a-Service solution based on Eclipse BaSyx that provides companies, especially SMEs, with easy access to AAS dataspaces.[11] Applications range from creating digital twins of production lines and determining CO_2 footprints to generating digital product passports. AAS Dataspace for Everybody aims to offer a low barrier to entry, intuitive operation, no proprietary systems, individual hosting options, and prototype and production operation including Service-Level-Agreements (SLAs). For example, in the event of a machine failure, an external service company can access machine-readable AAS data via the dataspace (remote maintenance), thus minimizing downtime while maintaining control over the data provided.

The AAS proves to be an essential component in the context of the Manufacturing-X initiative: In combination with the MX-Port concept (e.g., Leo, Hercules), it forms the technological basis for automated, interoperable data exchange in digital ecosystems. The AAS Dataspace for Everybody project complements this technical foundation with an accessible solution for companies of all sizes, especially SMEs. AAS thus enables not only innovation but also entirely new business models in secure, standardized dataspaces.

[10] MX-Port Concept
[11] AAS Dataspace for Everybody - Fraunhofer IESE

6 Conclusion: The Asset Administration Shell as enabler for dataspaces

The upcoming years will be characterized by growing regulatory requirements, geopolitical conditions, increasing global competition, and an acute shortage of skilled workers. The Digital Product Passport (DPP 4.0), the EU Data Act, and sustainability reports (ESG) demand standardized, traceable, and interoperable data usage. Companies that adopt the Asset Administration Shell early on are better prepared and thus secure clear competitive advantages.

The Asset Administration Shell is far more than a technical standard. It is the foundation for an efficient, consistent, and interoperable data infrastructure. Its strength is particularly evident in combination with dataspaces: While the Asset Administration Shell provides semantically unambiguous, machine- and human-readable data, dataspaces create the sovereign, secure, and rule-based framework for exchanging this data across company boundaries.

This makes AAS an enabler for dataspaces:

- It breaks down internal data silos and provides uniform, standardized structures.
- It enables interoperability between heterogeneous systems and companies.
- It makes dataspaces practically usable, as trustworthy exchange can only take place there based on clearly described and structured data.
- It leverages the possibility not only of sharing data, but also of using it for business purposes, for example through new services, data-driven business models, or the monetization of machine or product data.

This offers a tangible benefit, especially for SMEs: With AAS, they can process their data consistently without using expensive proprietary platforms and then exchange it with partners in controlled dataspaces. This makes them part of a European data ecosystem that strengthens technological sovereignty, competitive advantages, and innovation.

ZVEI and its involved partners see the Asset Administration Shell as the key to the digital transformation of the industry. Combined with dataspaces, it forms the technological foundation for a sovereign, interoperable, and scalable data ecosystem. Companies are invited to actively shape this path, for greater competitiveness, resilience, and sustainability in the industry of tomorrow.

Learn more about it via: Asset Administration Shell

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