Catena-X

Opportunities and Recommendations

DETECON
CONSULTING

Inhalt

1.
Management Summary

The automotive industry is evolving and at the heart of its development is digitalization and data. Creating and providing digital services as well as collecting and using the available product and user data to its full potential becomes more important than ever before.

Catena-X aims at creating a data ecosystem that enables every player along the automotive value chain to provide transparency and new opportunities for cross-company collaboration along the whole chain. The platform was designed with the objective of providing a user-friendly environment, while maintaining trust, security, data-sovereignty, and the idea of being open for every interested party along the automotive value chain. Sharing data across the value chain not only implements use cases to help fulfilling compliance regulations as well as improve efficiency, quality and transparency across the whole chain, but also unlocks opportunities for new data-driven revenue streams. On the other hand, sharing data and providing transparency might also carry risks like giving away competitive advantages that must be assessed and be prevented effectively by the ecosystem.

To use the full potential of the platform, several use cases were defined and will be successively implemented, including real time information and traceability as well as opportunities to improve flexibility of collaboration between all stakeholders along the whole value chain – from material and components suppliers over OEMs to recycling companies. Assessing which of the use cases is the most relevant one for a specific contributor in the automotive value chain depends on many different factors, such as position within the value chain, provided

products and services, production & supply processes, digital maturity level, business model, relationships to suppliers and customers and many others more.

Detecon Consulting provides professional advisory services that help setting up the roadmap to unleash the individual value from joining Catena-X. As the advisory unit within T-Systems, who is member of the Catena-X consortium and association, we have deep insights into the Catena-X network and hence are capable of advising you in your individual situation and assess possible benefits, costs, and risks. With our advisory approach and using a data space solution from T-Systems that is similar to the Catena-X technology, you can gain your first practical experience with data spaces in your company's own environment in a first Proof of Concept to demonstrate the benefits from using data spaces to exchange data along the value chain even before the Catena-X network will go live. To identify what's in for you and how to proceed in terms of onboarding and planning the next steps, we suggest a three-steps approach, starting with a "Strategy & Concept" orientation with regards to Catena-X, followed by a "Data Space Proof of Concept" to identify the value in a small scale and get experiences with the required infrastructure and processes, and finally – once Catena-X will be live or close to going live – the definition of the detailed "Roadmap for Onboarding" to the Catena-X network, including business value and technical infrastructure aspects.

By relying on our proven methodologies and technology – Data Thinking Method and T-Systems' Data Intelligence Hub (worldwide the first available IDS data space) – we help you to get a head-start towards what Catena-X will provide.
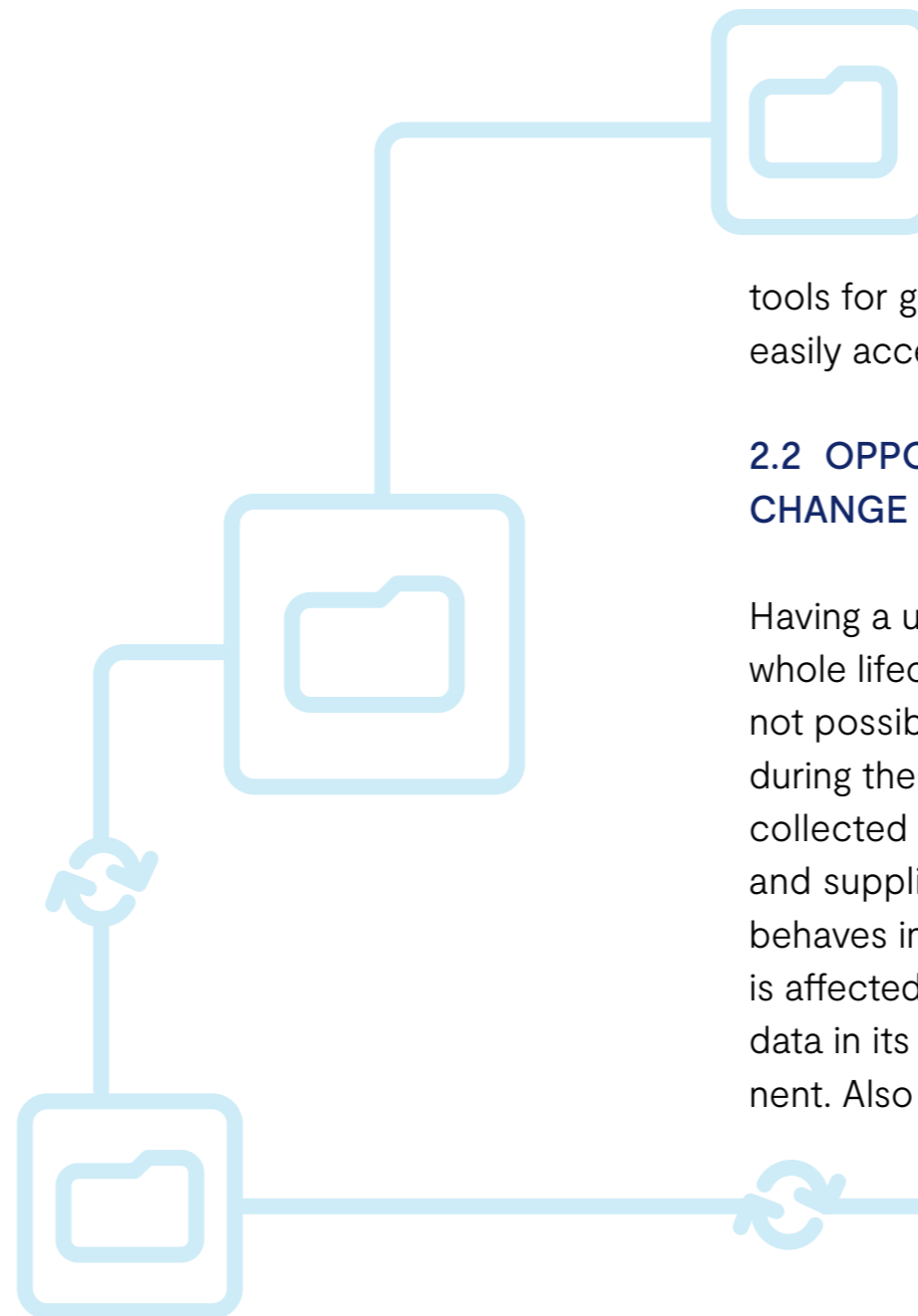
2.
Catena-X: Detecon Point of View

2.1 WHY IS THERE A NEED FOR A COLLABORATIVE DATA PLATFORM?

The value of data has become more and more obvious with the rise of big tech companies having data as the central asset in their business models. Big tech companies are not only aggregating data along their internal production processes but especially collect and use data from their customers. This helps to leverage their capability for cost cutting, advertising and to better understand the customer needs.

To achieve comparable effects across a complex supply chain a lot of companies in the automotive sector started to bolster their effort in collecting data at every touchpoint they have, both with suppliers on the one hand and customers on the other hand. But to truly generate value from data, it is necessary to collect it across the whole product lifecycle, which comes as a challenge in the automotive sector, due to the huge number of different suppliers and companies working on manufacturing and maintaining the product. Compared to other products, the lifecycle of a car is also rather long, leading to different phases in which data can be used and be collected.

To get a holistic picture of the supply chain, the involved parties need to share their data with each other. Of course, if a lot of different parties are involved, there is a multitude of technologies and legacy systems that have to be synchronized. To get the most out of this situation, data exchange and platform standards must be defined, also considering data sovereignty rules and tools for granting trust, to enable a data ecosystem, which allows easily accessible data sharing across all interested parties.

2.2 OPPORTUNITIES AND CHALLENGES FOR DATA EXCHANGE PLATFORMS

Having a unified data ecosystem allows to collect data along the whole lifecycle of the vehicles unlocking datasets that were not possible to access before. In addition to the data exchange during the manufacturing process of a car, also the data collected during the usage phase can be valuable to the OEMs and suppliers alike. For example: Knowing how the suspension behaves in different road conditions and how its performance is affected with increasing age allows the supplier to consider this data in its development process and further finetune the component. Also for recycling, the sharing of data throughout the whole

lifecycle until the physical end of life of a car, provides a valuable foundation for the increasing needs of Circular Economy. This again affects the demands on raw materials and storage needs, which can also be shared with the raw material supplier to optimize inventory management, logistics planning and forecasting. Making the resulting data accessible to 3rd parties along the whole value chain in the automotive industry, enables new opportunities for business or even new models and hence creates additional income streams if this data is monetized.

Obviously, sharing data across companies that are generally in competition mode amongst each other, also carries risks for the companies. It is absolutely mandatory that only this data is shared, that the companies want to exchange with each other and that data protection mechanisms still remain fully effective for the data that they do not want to share with others such as Intellectual Property, internal calculations etc. Unintended data sharing might give away an important competitive advantage and might be misused by other stakeholders in the value chain.

Another challenge for a data ecosystem is to reach a critical size and number of participants in order to fully unfold its potential. Some of the use cases of Catena-X can only enfold their full potential, if a large number of stakeholders along the supply chain participate in the network and provide their data — a chain is only as strong as its weakest element. In addition to technical challenges to establish the data flows between the involved applications, the Automotive industry faces a huge cultural change challenge, because the intended ecosystem requires a collaborative approach within a traditionally competitive environment. Digital Transformation is only 20% technology and 80% change!

EXCURSUS | FROM BIG DATA TO BETTER DATA: MANAGEMENT'S CALL TO ACTION FOR DATASPACES

By Prof. Dr. Chris Schlueter Langdon, Telekom Data Intelligence Hub, and Catena-X Product Manager

German chancellor Olaf Scholz has prioritized dataspaces as the "top megatrend" for business[1]. With the launch of the Catena-X data ecosystem in early 2023[2] it is becoming clear how a dataspace and its unique feature of data sharing with built-in data sovereignty protection fits into a successful digital transformation and data monetization agenda:

· 3 building blocks at enterprise level
· 3-steps at operational level

From an enterprise perspective, a dataspace facilitates the upgrade from Big Data to Better Data, which requires 3 enterprise-level building blocks or business enablers (see our White Paper, Part 1)[3]:

1. Treat data as a product applying product management best practice
2. Industrialize data products using factory-style automation
3. Build a data supply chain for these factories using resilient dataspaces

At an operational level with an emphasis on results for the next quarter the data monetization logic ought to be broken down on a use case basis into 3 steps (see our White Paper, Part 2)[4]:

1. Prepare to engage in data sharing
2. Construct datachains
3. Create corresponding super-app

For financial returns on a dataspace, like any other IT investment, an app or application is ultimately required – the automation of a business process using software ("softwarization")[5]. However, the availability of better and entirely new data for the very first time will allow improvement of existing apps or creation of super-apps (like WeChat) with leaps in user value that create entirely new and attractive or blue ocean marketspaces[6]. Examples include material traceability and intermodal mobility using digital twin data products.

FOOTNOTES
[1] https://www.bundesregierung.de/breg-de/service/bulletin/rede-von-bundeskanzler-olaf-scholz-2137650
[2] https://catena-x.net/en/
[3] https://www.t-systems.com/de/en/whitepaper-download/how-data-sovereignty-enables-the-next-future-of-automotive
[4] https://www.t-systems.com/de/en/industries/automotive/gated-content/winnning-with-data-sovereignty-part-2
[5] Schlueter Langdon, C. 2003. Does IT Matter? An HBR Debate. Harvard Business Review (June), http://research.cgu.edu/drucker-customer-lab/wp-content/uploads/sites/45/2023/02/DoesITMatter-AnHBRDebate_HBR_June_2003.pdf
[6] Kim, C., and R. Mauborgne. 2004. Blue Ocean Strategy. Harvard Business Review (October), https://hbr.org/2004/10/blue-ocean-strategy

2.3 HOW DOES CATENA-X LEVERAGE THOSE OPPORTUNITIES AND ADDRESS THOSE CHALLENGES?

When sharing and using foreign data, not only the resulting benefits but also the mentioned risks have to be considered. To mitigate risks, it has to be ensured that the data is not only secure, but also only accessible to authorized parties and only for the intended purposes.

With Catena-X there will be a data ecosystem in which every involved party along the automotive value chain is able to leverage the opportunities from cross-company data of products, services and components while maintaining full ownership of their data. Catena-X intends to provide a user-friendly environment for building, operating and collaborating along the automotive value chain. On this platform, data is the main strategic resource that can be used by the platform members to increase the value of data above and beyond the sum of its parts, leading to new data driven business models. Examples and use cases have been taken into account from the beginning and several use cases are currently implemented to showcase the advantages of a comprehensive data chain, that can be augmented and complemented by individual business applications.

Within those use cases and while increasing the value of data by making it accessible to the platform partners, the intellectual property has to be protected at all times. Trust and security mechanisms are in place and additionally, Catena-X is compliant with commonly used secured data space standards such as IDS & Gaia-X. The Platform enables its members to freely decide which data shall be accessible by whom, how, when and at what price so that the sovereignty of data is always ensured. Implementing the different use cases can provide several competitive advantages, including:

· Generating better transparency to earlier identify disturbances in the supply chain and hence enable earlier mitigation
· Enabling better cooperation between car manufacturers and R&D units of suppliers by exchanging valuable data from car usage throughout the whole lifecycle
· Flexibilization of manufacturing processes by e.g. Manufacturing as a Service business models
· Improving and simplifying compliance with laws and regulations in the area of sustainability / CO_2 reduction & reporting as well as Circular Economy

TEN USE CASES AS STARTING POINT

MaaS*	Online Control / Simulation	Modular production	Behavior Digital Twin
Demand / Capacity Management	CO_2 / ESG Monitoring	Live Quality Loops	Circular Economy
Traceability (e.g. Supply Chain Act)			
Business Partner Management (e.g. Golden Record Master Data)			

FIGURE 1: Catena-X Use Cases (Source: Catena-X- – Mehrwerte)
* = Manufacturing as a Service

2.4 COMPANY'S SUCCESS FACTORS AND CHALLENGES OF CATENA-X

The main success factor for a platform is its size. The more users are integrated, the more data is available which, combined and "mashed", provides even greater value. For a company, the integration to a platform means investing time and money to align the IT Infrastructure, adopting new standards, or modifying internal processes. To make this investment, the company needs to be confident that it is betting on the right platform. By having the largest companies in the automotive industry committed to Catena-X and driving its development by being a part of the Catena-X consortium, this trust is being built. Detecon as part of Deutsche Telekom and T-Systems is also a member of the Catena-X Consortium, which allows us to understand and shape the data ecosystem.

One of the biggest challenges for a data platform is to not only meet different user groups and their requirements, but also cover different aspects like standardization, legal requirements, or data security. Alongside the major OEMs and suppliers, the German automotive industry consists primarily of small- and medium-sized enterprises (SMEs) with a wide range of IT landscapes. For

them, affordability, compliance (e.g. traceability) as well as a structured and fast onboarding processes are crucial. To keep the costs and other barriers of entry low, Catena-X uses standards for data security and data sovereignty, specifically the European cloud framework GAIA-X. Furthermore, open-source software, which comes without high licensing costs are utilized.

As a result of the German supply chain act, many companies already face the challenge to increase the traceability along their processes and therefore they need to restructure their IT. Becoming part of Catena-X not only helps to achieve compliance but also creates a good starting point to further drive digitalization efforts within the company. The ability to participate in data spaces will become a "must-have" capability to be successful in the digital and data-driven age.

2.5 DEEP DIVE: USE CASE CIRCULAR ECONOMY

Because Catena-X has such a big scope, the members of the consortium agreed to start with an initial set of 10 use cases, which will be used as a proof of concept and a way to gather experience (an overview of the use cases can be found above). A particular interesting use case deals with Circular Economy. Its application enables all participating partners within the automotive industry to create a consistent data cycle across the whole life span of products, components and materials. During the endeavor of expanding and scaling this use case, the recycling of vehicle components and materials shall be significantly improved and eased by the data flow of this use case. In addition to the reuse of the raw materials through recycling, an extension of the life span through remanufacturing in so-called second-life cases should also be made possible. This is for instance especially important due to the increased usage of batteries in (semi) electric vehicles which could be reused, e.g. for solar power storage in private households. Enabling all partners to create a continuous data cycle and transparently use the materials across the value chain holds many benefits:

- Improving the resilience of value creation to political disputes, natural disasters and pandemics
- Setting the basis for the calculation of the CO_2 footprint needed to achieve associated compliance with the German Supply Chain-Act & reducing the CO_2 emissions
- Preparation of the upcoming laws & regulations of Circular Economy, demanding for transparency on the disposition of components & dangerous or polluting materials as well as regulations requiring increased shares of using recycled material
- Extending the product life cycle through remanufacturing
- Improving public perception due to increased transparency of used rare materials and reduction of emitted greenhouse gases

The traditional view on the automotive supply chain considers players up to the OEM. However, Catena-X also integrates downstream parties like dismantlers or recyclers and therefore, the traditional scope is extended to the whole lifecycle of vehicles and their components – to the automotive value chain.
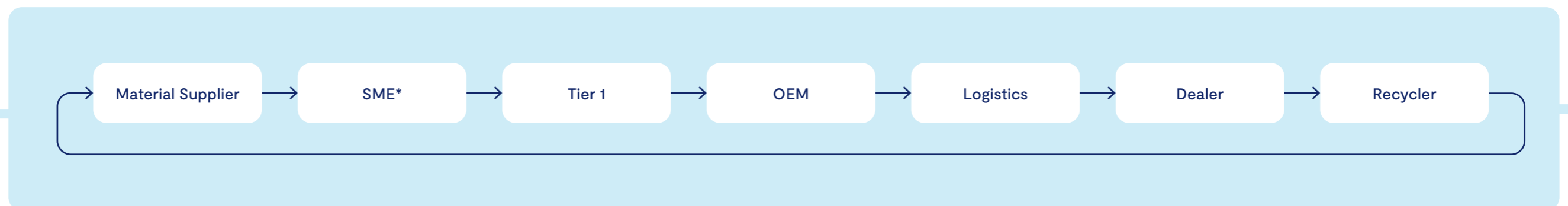

Material Supplier → SME* → Tier 1 → OEM → Logistics → Dealer → Recycler

FIGURE 2: Generic automotive value chain (Detecon)
* Small and medium-sized enterprises

When looking at the automotive value chain it becomes clear that circular economy can only be of meaningful use if all relevant players jointly engage in this endeavor. The clear goal is to track the materials and components used across the whole value chain until the disposal. This makes it possible to track in any state of the lifecycle of the cars or their components, even in second-life cases, which (rare-) materials have been used and their particular history. Based on this very specific information one has more transparency and could make more intelligent decisions about what to do with used cars and components – both in terms of economic decisions as well as ecological.

Within the use case of Circular Economy, Catena-X will provide a couple of sub use cases, to improve the recycling part of the automotive value chain. The following five features will be part (not exclusively) of the Catena-X Circular Economy scope:

· **Material & Product Pass:** End-to-end data space encompassing defined characteristics of materials and products which lead to a digital twin of the object uniquely identifying it by material IDs
· **Certification:** Certifies digital twins (based on material IDs) to improve regulated classification, reliability and restriction of certain functions
· **Scrap:** Concept for handling scrap arising during production to improve the use of secondary materials from the manufacturing process
· **Dismantler Dashboard:** Dashboard to support vehicle disassembly decisions with information on components, prices, raw materials, dismantling instructions and efforts and maintenance status
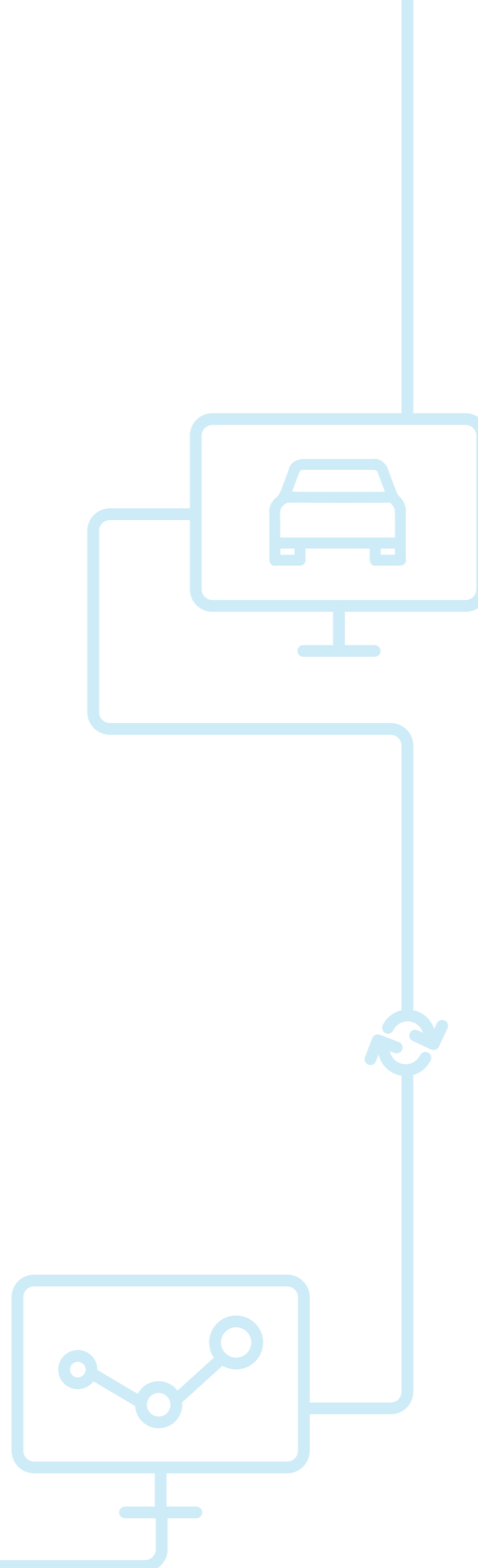
· **Marketplace:** Cross-industry trading platform for buying and selling secondary components and materials to open new opportunities for collaboration across the value chain and close the loop at the component and material level

Taking the example of a dismantler: With the data of Catena-X, e.g. through the material & product pass or certified digital twins, it would be up-front known which components or materials of the car are valuable to reuse, which ones can be dismantled and put back into circularity and which ones should be scrapped. Also, information about possible waste disposal costs for harmful components will support the dismantler to rate the residual value of a vehicle that is offered to him and the dismantling instructions allow him to estimate the effort of disassembling. All components, materials or scrap that are being resold through the marketplace, will again contain their product history, composition and maybe even ecological reference numbers – giving full transparency to the buyers.

Catena-X provides the ecosystem and digital twins to start tackling this use case by combining necessary parties within one platform. The information about the components and their composition will be combined from all contributors that were involved in procuring, manufacturing and maintaining the components.

Having this in mind, it becomes obvious that not only the big players as the OEMs and the large tier-1 suppliers need to be involved in the Catena-X network, but all players of the automotive value chain need to become part of this network.

Hence, the participation of SMEs will be crucial for the success of the network because their data and information need to be included to get the comprehensive picture. The success of onboarding also SMEs of the automotive value chain will decide about the speed and feasibility of the implementation. In this context it is essential to develop a data strategy that optimizes the use of the data obtained and clearly shows the added value not only for the consumers of the data in the use case applications, but also provides advantages for all data providers.

2.6 CATENA-X, WAY FORWARD AND RECOMMENDATION

Catena-X is a possible answer to address the current challenges and opportunities in the automotive market and across the whole value chain. Catena-X aims at creating a data ecosystem, that enables every player along the automotive value chain to derive the greatest possible benefit from cross company data at the product, service, process, and business levels. Catena-X provides the tools and security / data protection and also a data sharing culture which allows members to jointly create value and drive innovation by ensuring that intellectual property is protected, and data sovereignty is maintained.In order to take part and get the most out of Catena-X, we have identified three steps:

1. Understand: "Strategy & Concept"
First you should make sure that you have understood the objectives, purposes, benefits, mechanisms, processes and required technical infrastructure of Catena-X. This allows you to do a

high-level alignment with you strategy as part of the automotive value chain – as OEM, as supplier or as service provider. You will be enabled to identify your role within Catena-X and define the individual business purpose you are aiming for by joining the Catena-X network.

2. Optional: Data Space Proof of Concept
In case you want to gain some practical experience working with Data Spaces, even before Catena-X is live, the T-Systems' Data Intelligence Hub (DIH) provides easy to use building blocks, which can be used to create a proof of concept. The DIH includes services to quickly build-up and operate a data space within your own company, however using the same technology mechanisms and principles that Catena-X will use. Hence, you can gain a feeling of how to act as a member of a data space and how to integrate your existing system landscape to it – cloud-based applications as well as legacy applications.
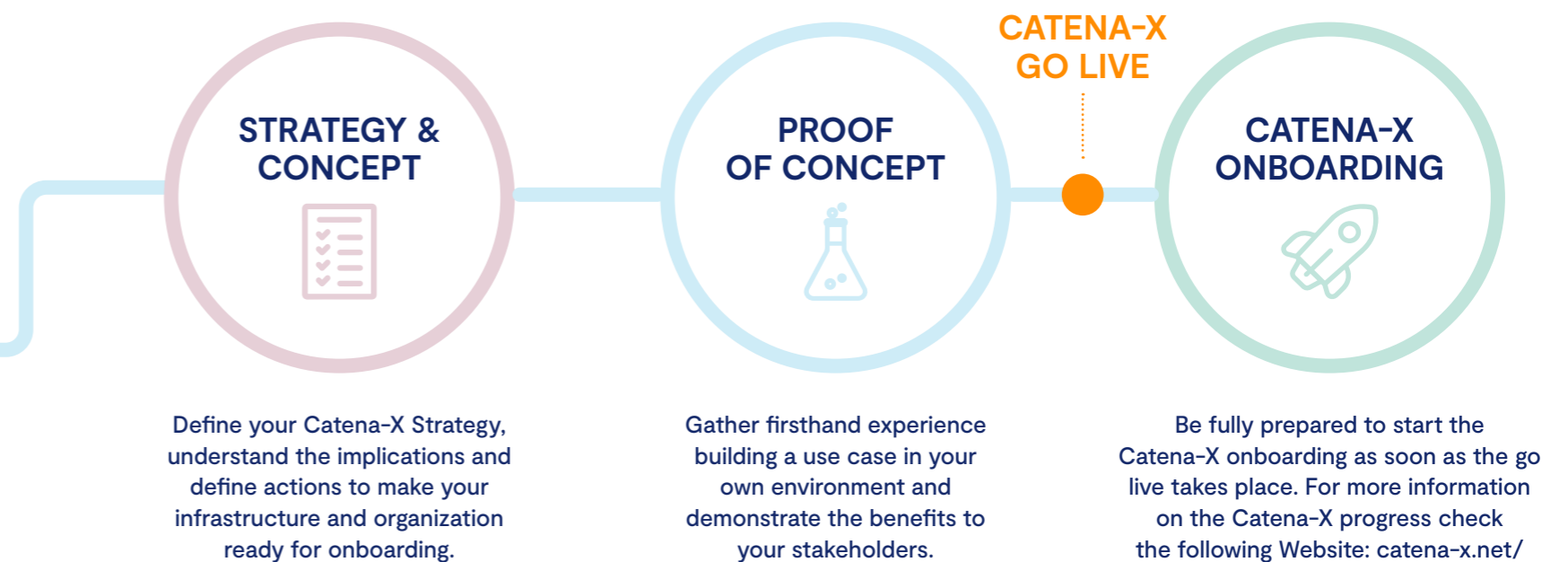
CATENA-X
GO LIVE

**STRATEGY &
CONCEPT**

**PROOF
OF CONCEPT**

**CATENA-X
ONBOARDING**

Define your Catena-X Strategy, understand the implications and define actions to make your infrastructure and organization ready for onboarding.

Gather firsthand experience building a use case in your own environment and demonstrate the benefits to your stakeholders.

Be fully prepared to start the Catena-X onboarding as soon as the go live takes place. For more information on the Catena-X progress check the following Website: catena-x.net/

FIGURE 3: Detecon's recommended 3-steps approach for joining the Catena-X network (Detecon)

3. Catena-X Onboarding

Once Catena-X will have gone live, the onboarding process will guide you through the necessary steps, including the definition of your business value, identification of the use cases and business applications you want to apply, identification of the data that you want to share within the network, the required technical infrastructure setup, the definition of interfaces and connectors as well as planning the implementation roadmap. Depending on your role within the platform (use case user / data consumer or only data provider), your company's size and complexity (organization, processes and system / data landscape), there will be shortcuts and tools for an easy and fast onboarding. The onboarding steps are currently developed by a community of onboarding partners within the Catena-X association where Detecon is involved. Further details will be published by the Catena-X association.

As an experienced digital consultancy company, Detecon International can show you the chances and opportunities of Catena-X, relying on proven methodologies and technologies. As the advisory branch of T-Systems, we are a vital part of the Catena-X consortium and association, we have first-hand experience with the planned features and mechanisms of the network and are active part of the stakeholders, who currently define Catena X and the way of how to onboard onto the network.
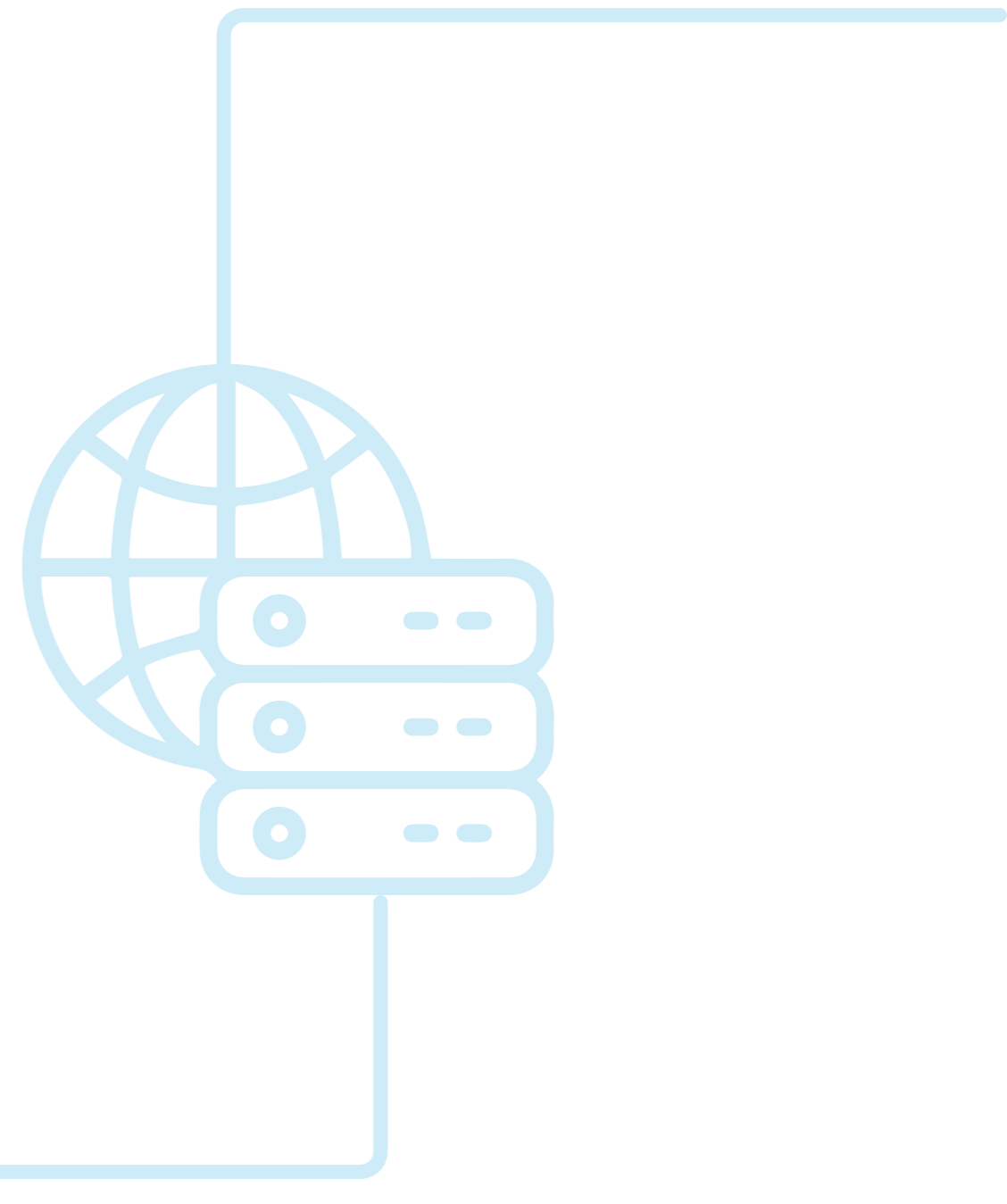
3.
About the Authors

DR. JÜRGEN PADBERG

Dr. Jürgen Padberg is Managing Partner at Detecon Consulting and Global Head of Automotive & Manufacturing Industries.

After studies of Business Administration and a doctoral thesis in Information Systems Management, he works since over 25 years as consultant in the Automotive and Manufacturing Industries and also has gained experiences as line manager in large enterprises.

The focal point of his consulting activities are innovative opportunities of Digitization for creating new products, services and even new business models. In addition, he exploits digital technologies for optimizing engineering, production, supply chain management and sales/aftersales processes. A special focus lies on the required Change of mindsets and organizations in order to cope with the challenges of the Digital Age.

DOMINIK HELF

In 2018, Dominik Helf started working for DETECON Consulting and is working as management consultant in the sector Automotive & Manufacturing Industries.

As an industrial Engineer and in the course of several projects, Dominik realized that technical solutions and economic objectives are often disconnected. However, new technologies are best leveraged when both aspects are brought together.

For this reason, one focus topic of Dominik is the Digital Twin – not only working on an architecture and the technical implementation of this concept, but also focusing on the economic benefits and new business models it could enable. Today Dominik continues to work on projects and knowledge topics at the interface between business case and technologic enablement.

SILVIO DEGENHARDT

Starting in 2020, Silvio Degenhardt joined DETECON's chapter "Business Technology" with the objective to provide consulting services and shape the future of digital endeavors.

With his background of computer science and information systems he was soon engaged in IT and data strategies of the energy sector and tackled challenges in the automotive industry – ensuring digital services are right at the level of the customers' needs and thereby, being reliable, fast and in accordance with effective GDPR regulations.

In 2021 he became part of DETECON's community exploring the possibilities and significance of Catena-X for all automotive players.

3.
About the Authors

FREDERIK SANDERS

Since 2018, Frederik Sanders is working at DETECON Consulting and is currently part of the unit "Digital Strategy & Innovation".

His career at Detecon began in the mobility industry. From early on and through various projects, he realized that business processes should always be aligned with the customer needs, which also led him to focus on customer-centric business process management in the automotive industry.

The scientific expertise from his studies, as well as his gained experience from agile projects, is driving his ability to design innovative processes for the mobility industry. Besides his project activities, he pushes different knowledge activities, always with a strong focus on the mobility industry and customer centricity. Right now Frederik is focusing on agile project management and combines it with the customer centric mindset. His aims to always put the customers and their requirements into the center of his and his client's activities.

ALEXANDER VAN WOUDENBERG

Alexander joined DETECON in 2019. In his current role as Manager, he is the responsible project leader for multiple project streams within Catena-X.

While growing his footprint within the automotive sector, Alexander tackled different project challenges especially within the realm of connected car backend software development and agile project management. During these project assignments, Alexander filled multiple project roles ranging from Scrum Master to Product Owner and Project Leader for multiple DevOps teams. Besides a strong digitization footprint, Alexander is a proven expert in the field of sustainability.

With his university degree in "resource efficiency management", he helps DETECON clients to define their sustainability agenda – to develop digital solutions which at the same time help to minimize their corporate environmental footprint. Within the Catena-X consortia, Alexander combines his expertise both, from digitization and sustainability, to shape the future of automotive data exchange in order to facilitate future sustainability use cases.

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