Software and Digitalization

Challenges and Potential of the EU Data Act

Recommendations for the Mechanical and Plant Engineering Industry

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List of Abbreviations

GTC	General Terms and Conditions
B2B	Business to Business
B2C	Business to Customer
BE	Business Ecosystem
CCM	Collaborative Condition Monitoring
CM	Condition Monitoring
DGA	Data Governance Act
GDPR	General Data Protection Regulation
ETA	Estimated Time of Arrival
IaaS	Infrastructure as a Service
IDS	International Data Space
IDSA	International Data Spaces Association
IIoT	Industrial Internet of Things
IoT	Internet of Things
IP	Intellectual Property
AI	Artificial Intelligence
SME	Small and Medium-Sized Enterprises
MPC	Multi-Party Computation
MPE	Mechanical and Plant Engineering
OEM	Original Equipment Manufacturer

Preface

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The European Commission is in the process of establishing a data economy which is expected to generate additional gross domestic product of 270 billion euros by 2028. Especially for a country like Germany, which has no mineral resources worth mentioning, this appears lucrative at first glance. We are currently grappling with the question as to how we are going to achieve even close to the current gross national product in the future with an ever-declining workforce in a way that allows us to secure our own prosperity and that of future generations. The data economy could prove an important building block when it comes to answering this question.

Such a data economy will not only give rise to a new market, new players and new business models, but will also reach deep into the current understanding of machinery and plant manufacturers when it comes to how to handle data from their machines – forcing them to rethink. The legal instrument for creating the data economy – the EU Data Act – sets out new and binding requirements for the technical design of machines and plants, and gives their users the right to access machine data.

These changes are practically era-defining and offer both opportunities and risks. The aim of this study is therefore to demonstrate what is in store for mechanical engineering companies in the context of digitalization and the data economy, and at the same time to provide advice on how to prepare now for the mandatory requirements. This document starts with a summary of the impending legal regulations and details their relevance for the mechanical and plant engineering industry. Subsequent sections include expert interviews discussing how the mechanical and plant engineering industry can prepare for the data economy in a targeted way.

We would like to extend our thanks to the Institute for Industrial Management (FIR) for this insightful study, and would encourage you to embrace the opportunities presented by the data economy. The Software and Digitalization trade association will be happy to support you every step of the way.

Prof. Claus Oetter
Managing Director VDMA
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1 Management Summary

With the EU data strategy, the European Commission has set out a framework to regulate data transfer across Europe and to generate an economic boost of 270 billion euros through the efficient use of data, thus creating a single European market for data (see European Commission 2022a, p. 1). In this context it is also worth mentioning the Data Governance Act, which has already come into force. As a further pillar of the European strategy, the draft Data Act is now available – posing new challenges for the mechanical and plant engineering industry. The Data Act is intended to enable broad access to data and to regulate who can generate value from data and under what conditions. This raises the question for mechanical and plant engineering companies as to how their business models can be implemented in an open data economy and how their interests, such as mutual intellectual property (IP) protection, can be safeguarded in the process.

The aim of the study is to work out how the mechanical and plant engineering industry can prepare for the Data Act and its implications, and what requirements organizations must meet in order to do so. Future scenarios for the use of the Data Act and the associated challenges and potential will also be highlighted.

For this purpose, interviews were conducted with experts and these were expanded with case studies from companies with data-driven and digital business models. Using design thinking, new scenarios for the use of the Data Act for mechanical and plant engineering were developed together with experts from various industries.

The key findings of the study are described below:

Approaching the Data Act strategically and proactively

At the very least, the Data Act is relevant to the chief compliance officer, the chief digital officer, the data protection officer and the legal department. The study shows that the introduction of the General Data Protection Regulation (GDPR) is still a major task for many companies today. Although there is expected to be a 24-month transition period after its promulgation, companies are advised to initiate a project concerning the legally compliant handling of the Data Act at an early stage. It is crucial to proceed strategically and to proactively monitor the legal situation, to create transparency regarding readiness in relation to digitalization and business models, to derive a suitable strategy, and to introduce the necessary governance, resources and competencies during implementation.

Mastering complexity and dynamic requirements

In the current draft, key definitions, terms and incompatibilities with existing laws are noted, with further adjustments also expected.
The legal implications for companies, especially in the mechanical and plant engineering industry, are unclear in the area of data access by design or the existing database laws, for example. Conversely, there is a great deal of emphasis on maintaining competition. The extent to which IP protection is ensured is still very much up for debate. Companies must therefore be able to master these and other organizational and technological requirements to be able to properly implement the Data Act. Therefore, a combination of simple, classic, and agile project management methods is necessary.

Establishing new competencies and resources

Shaping a compliant contracting system for data exchange in an EU data economy is critical to business success. The contracts for data-driven and digital services often already amount to several dozen pages today. Therefore, legal organizations in companies need to develop new competencies and additional resources, similar to what they have already put in place with data protection officers for the GDPR. At the same time, there is also a need for tools and guidelines, such as templates for standardized contract design.

Preparing data-driven and digital business models

It is evident that the expected challenges also occur in digital and data-based business models and that companies have the ability to master and overcome these challenges. Therefore, the influences of the Data Act are not to be considered as something that is completely new, and they should be addressed immediately. Some of the companies in this study offer digital products and services without claiming data sovereignty. This will allow them to safeguard their business model when making data available becomes mandatory. This is a sensible approach in the long term, especially in view of society's increasing awareness of digital privacy.

Opening up new prospects with the Data Act

The Data Act opens up new prospects for the mechanical and plant engineering industry to promote innovation and ensure competitiveness. The study shows how the Data Act could be used to build sovereign business ecosystems and offer new services such as predictive maintenance without having to possess core digital expertise within the company. There is also the opportunity to use the Data Act, for example, to develop mechanical and plant engineering companies into consulting and service providers that are independent of manufacturers and active across different sectors. This will enable them to meet challenges such as the shortage of skilled workers, to diversify revenue sources and to build customer proximity.

2 Introduction and Aim of the Study

In this section, the relevance of the Data Act is outlined (see section 2.1) and the aim of the study is presented (see section 2.3). In particular, the key context of the Data Act and its relevance for the mechanical and plant engineering industry will be highlighted.

2.1 Introduction and Motivation

Experts estimate that by 2030 the volume of data streams will be 15 times higher than in 2020 (see Collini et al. 2021, p. 13). For this reason, the European Commission has set out a strategy to regulate data transfer across Europe and to generate an economic boost of 270 billion euros through the efficient use of data (see European Commission 2022a, p. 1). Recent surveys indicate that Germany has the highest level of dependency in terms of importing digital technologies (see Bitkom 2021). This is particularly clear when considering German industry, where surveys show that 57 percent of companies source software applications and modules and 42 percent source digital services such as cloud services from abroad (see Bitkom 2021). The overall aim is therefore to accelerate digitalization and create a European counterweight to the current digital dependency on other countries.

The European data strategy

The European data strategy aims to promote and facilitate the use of data in Europe to drive growth, innovation and competitiveness, making Europe a leading location for data use and innovation. The strategy involves measures in the areas of data infrastructure, data availability and use, data literacy and ethics, and data security and protection (see European Commission 2020, p. 2ff.). With regard to the legal implementation of the strategy, the EU has introduced the Data Governance Act (DGA) and additionally presented the European Data Act (EU Data Act or Data Act for short) as a draft law in 2022.

The measures of the European data strategy are:

- **Creating an open, fair and interoperable data infrastructure**
  The aim is to make data easy to find, share and use. The route to achieving this involves promoting the availability of public data, supporting data platforms and facilitating data sharing between companies and public agencies.

- **Promoting data literacy and ethics**
  The aim is for all citizens to be able to enjoy the benefits that data can provide. To achieve this, it must be ensured that data processing procedures are ethically correct and lawful. This aim is achieved by promoting education and training in data science, supporting data ethics research, and developing guidelines and standards for personal data processing.

- **Increasing data security and protection**
  The aim is to ensure that the data of citizens and companies is protected and that data processing is lawful and transparent.

2.2 Relevance for the Mechanical and Plant Engineering Industry

The EU data strategy is gaining relevance for companies through planned regulations, as well as those that have already been implemented, and may have a significant influence on existing business models. Many companies in the mechanical and plant engineering industry (MPE) are currently undergoing a transformation phase and are in the process of introducing digital business models or establishing initial data-based business models. The Data Act is intended to enable users to gain access to the data generated by smart devices, for example. Previously, it was mostly granted to original equipment manufacturers (OEMs) and third parties that had acquired this data. This is particularly relevant for IoT devices in the mechanical and plant engineering industry and poses the question of how business models can be implemented in an open data economy and how interests such as mutual IP protection can be safeguarded. The question of how sharing data can generate added value or even enable completely new application scenarios is now also being considered. In particular, the legal consequences of new rights and obligations can present organizations with previously unknown challenges. As such, the EU data strategy may have a decisive impact on the competitiveness of the MPE industry and bring new opportunities as well as risks.

2.3 Aim of the Study

The aim of this study is to answer the following key questions for the mechanical and plant engineering industry:

- How can MPE prepare for the Data Act and its implications, and what requirements must organizations meet in order to do so?
- How can the Data Act be used by MPE in future scenarios and what kind of potential and need for action does the Data Act bring with it?

To answer these questions, this study aims to provide a deeper understanding of the Data Act within the wider context of the EU data strategy. As a key pillar of a new EU data economy, the Data Act encroaches on important existing structures and processes, while also changing the way in which value is created. To enable companies, especially in the mechanical and plant engineering industry, to develop new prospects and opportunities as a result of the current changes, the study examines the central themes of the Data Act on the basis of interviews with experts. Case studies are used to analyze successful enablers for the use of data in companies. Using the design thinking approach, various concepts for exploiting the new potential of the Data Act were developed together with experts.

3 Definition of Terms

This section describes and defines the relevant terms in the context of the Data Act. These are used to create a consistent understanding of the subject under consideration and provide a contextual reference with regard to new trends. To this end, section 3.1 presents and explains the content of the Data Act. Section 3.2 then goes on to review the Data Governance Act as another part of the EU data strategy. To be able to place the EU data strategy within the overall context, the underlying motivation of digital sovereignty compared to data sovereignty is differentiated and explained in section 3.3. The section concludes with an introduction to the technical principles and benefits of data spaces in section 3.4.

3.1 Data Act

The Data Act is a proposal for a regulation to harmonize the rules on fair access to and use of data between different players in a European data economy (see European Commission 2022b, p. 1). At the time of writing, the open consultation for the version dated February 23, 2022 has come to a close. This legislative proposal passes to other EU bodies in the next instance, so should not be regarded as final.

The aim of the Data Act is to use the regulatory framework to create the technical and organizational basis to promote the emergence of an open data economy and to provide the necessary structures. Here, the economic exploitation of data is of central importance in order to tap into new added value as a single European market. To this end, the draft describes the relationship between the relevant players and the framework conditions for fair data exchange.

In the current draft law, there is a general need for clarification regarding the limits and examples of the concept of data, as well as the delineation of the relationships between users, data holders and data recipients. There is ongoing legal discourse surrounding this. At its heart, the following key areas are being discussed:

- The role of data and players
- New information requirements
- Data availability to third parties
- New contracting system in line with existing data protection policies
- Interoperability of data technologies

These are discussed below in the context of describing the Data Act and its areas of focus.

The role of data and players

The draft Data Act describes data as “any digital representation of acts, facts or information and any compilation of such acts, facts or information, including in the form of sound, visual or audio-visual recording” (European Commission 2022b, p. 47). In this context, the scope of the Data Act is focused on physical products and the services linked with them. This category includes machines and plants that communicate with one another and collect data for predictive maintenance services, for example. The regulation is directed toward users, data holders and data recipients. In the draft, the user is “a natural or legal person that owns, rents or leases a product or receives a service” (European Commission 2022b, p. 47). According to the draft law, the data holder has, “through control of the technical design of the product and related services, the ability to make available certain data” (European Commission 2022b, p. 47). The definition of the data recipient refers to persons other than the user of a product, to whom the data holder makes data available (see Demary 2022, p. 6f.).

New information requirements

The Data Act requires companies operating in the EU to provide certain information about their data processing activities. This includes information about the purpose of the data processing, the type of data processed, the duration of the data storage and the recipients of the data. Companies must also provide information about their practices and measures to protect data processing and enable users to exercise their rights based on the Data Act. The new information requirements are intended to help ensure that users are better informed about the use of their data and can more easily exercise their rights when it comes to data protection.

Data availability to third parties

The Data Act requires companies operating in the EU to make their data available in a form that can be used by other companies. This should contribute to reducing restrictions on competition and promoting innovation. Companies should tailor their products and services to provide the data they collect in a fair, transparent and nondiscriminatory manner, and they must take appropriate security measures to ensure the integrity and security of the data. Data availability to third parties is an important component of the EU Data Act, as it is intended to help ensure that companies have simplified access to the data they need so they can improve their processes or develop new business models based on this data. Data availability is also intended to give consumers a broader choice and higher quality of services by allowing companies to offer their services based on data provided by other companies (see European Commission 2022b, p. 23f.).

New contracting system in line with existing data protection policies

The Data Act requires companies operating in the EU to structure their data processing contracts and agreements in a manner that complies with the requirements of the Data Act. This includes compliance with the EU's General Data Protection Regulation (GDPR), which is not impacted by the Data Act, and also the additional obligations that arise for players that want to create value from data. To protect privacy and trade secrets, algorithms should be used directly at the point of data generation in addition to already established methods such as pseudonymization, so that insights can be gained without unnecessarily copying raw data (see European Commission 2022b, p. 23ff.).

Interoperability of data technologies

The Data Act requires companies operating in the EU to design their data technologies to share data and be interoperable. This should make it easier for companies to access, share and connect the data they need for their services and products. Interoperability is also intended to help provide consumers with more choices and better services by allowing companies to offer their services based on data provided by other companies (see European Commission 2022b, p. 28f.).

3.2 Data Governance Act

On June 23, 2022, part of the EU data strategy came into force through the Data Governance Act (DGA).

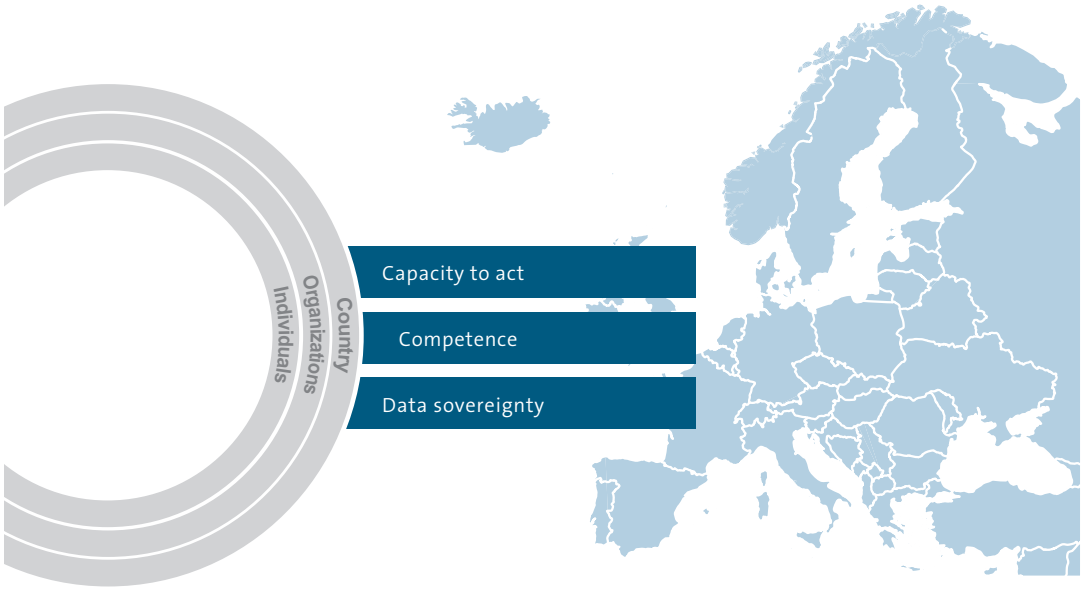
The Data Governance Act is an EU law that deals with the exchange and reuse of data. The law aims to make more data available by regulating the reuse of publicly stored, protected data. The Data Governance Act regulates both personal and non-personal data and applies in conjunction with the General Data Protection Regulation (GDPR). In addition to the GDPR, built-in safeguards will increase trust in data exchange and reuse and are intended to encourage voluntary data exchange. Companies and individuals have control over their data and can provide this data voluntarily, but without remuneration (see EU Parliament 2022, p. 1f.).

3.3 Digital Sovereignty and Data Sovereignty

EU sovereignty in the digital domain is one of the guiding principles for the EU data strategy. As such, digital sovereignty is closely intertwined in today's discourse with the topics of cyber security, digital resilience, the cloud and data protection, among others. Since the Data Act cannot be considered without also thinking about digital sovereignty and data sovereignty, these are explained in more detail below.

Digital sovereignty is fundamentally about being able to act as a player in the digital space, either independently or under the influence of external factors. Different definitions and approaches exist to explain this concept. In this context, digital sovereignty should be considered with regard to the key points shown in Figure 1, which are closely interwoven and are elaborated below:

Figure 1 Overarching Key Themes of Digital Sovereignty



Source: Institute for Industrial Management (FIR) at RWTH Aachen University

Ability to act

According to Kagermann et al., on a global level digital sovereignty describes the ability of an individual or a society to act in a self-determined and responsible manner within a networked world. It is about retaining control over one's own data and digital identities and deciding for oneself how this data is used (see Kagermann et al. 2021, p. 10ff.). However, sovereignty beyond the level of data is relevant here in a global context. The overall context is described with regard to the following eight levels:

- Raw materials and intermediate products
- Components
- Communications infrastructure
- Infrastructure as a service
- Platform as a service
- European data spaces
- Software technologies
- European system of laws and values

According to Kagermann et al., at the lowest levels of raw materials / intermediate products and components there are direct influences and dependencies due to the procurement of materials, such as lithium for the production of lithium batteries or in the procurement of microchips from Taiwan for the operation of modern infrastructure. This is extended on the level of the communications infrastructure, where there are direct and indirect dependencies; for example, with the use of hardware from untrusted third countries. At the levels of platform as a service (PaaS) and infrastructure as a service (IaaS), digital sovereignty is already being noticeably affected through the widespread use of cloud services from non-EU countries, for example. This high level of dependency also exists when it comes to the processing of large amounts of data, as data is seen as a new resource (see Kagermann et al. 2021, p. 10ff.).

Competence

The Federation of German Industries (BDI) expands on the more global view of Kagermann et al. to include the perspective of the affected groups, i.e., countries, organizations and individuals. In addition to the ability to act in a self-determined and independent manner in the digital world and to protect one's own interests, competence takes on a central role here. Competence includes control over one's own data and IT systems as well as the ability to develop and produce technological solutions oneself. As a building block of digital sovereignty, competence is indispensable, making it a decisive factor for competitiveness and security in the globally networked world (see BDI 2020, p. 6f.).

Data sovereignty

There is not yet an official, generally accepted definition of the term "data sovereignty." However, the general consensus in specialist literature today is that data sovereignty means having as much control, influence and knowledge as possible regarding how data is used. Data subjects should have the right to information and informational self-determination in the use of data, as well as access to the competencies required to implement this (see Jung et al. 2022, p. 207).

3.4 Data Spaces

Data spaces play a decisive role as the technical basis of the future data economy. Data spaces are virtual environments where data can be stored, organized and analyzed. They offer the possibility of integrating and analyzing large amounts of data from different sources to gain important insights and knowledge (see Curry et al. 2022, p. 5).

Data spaces can be divided into different types in terms of their purpose and the industry in question, such as databases for enterprise or scientific applications, cloud-based data spaces for collaboration and data management, and peer-to-peer networks for sharing data and resources (see Reiberg et al. 2022, p. 11).

The most prominent standardization initiatives are:

- International data spaces
- GAIA-X

International data spaces

The **International Data Space (IDS)** is a reference architecture for implanting secure data spaces, which are based on the concept of decentralization. The special feature of this is that data owners are granted full control over their own data at all times (see Otto et al. 2016, p. 12ff.). In achieving this, the IDS provides a reference architecture for decentralized data and information exchange with the properties of data sovereignty, secure data exchange (trust), decentralization, data governance principles, a network of platforms and services (interoperability), and transparency (see Reiberg et al. 2022, p. 13f.). It is being further developed by the **International Data Spaces Association e. V.** and used as an intermediary for industry (see Sautter et al. 2021, p. 3). Unlike other, centralized approaches to data integration, such as **"data consolidation hubs,"** data spaces do not have requirements for a common database schema; instead, integration takes place at the semantic level – for example, through shared vocabulary. This can enable data redundancy and the coexistence of data (see Otto 2022, p. 7f.).

GAIA-X

GAIA-X is an initiative that arose from the call for a data infrastructure in the German strategy for artificial intelligence. It builds on the IDS infrastructure and aims to achieve data sovereignty in a broader context than IDS. It refers not only to the exchange of data, but also to the storage and handling of data in the cloud (see Buck et al. 2021, p. 5f.). Federation services are at the heart of GAIA-X and include a federated catalog of distributed services, sovereign data exchange, identity and trust management, and compliance services (see Otto 2022, p. 9). GAIA-X and IDS are closely interlinked, enabling seamless integration of both architectures and processes.

A successful example of the GAIA-X initiative is the Catena-X project. The aim of Catena-X is to design an open data ecosystem for the European automotive industry and its suppliers. This is intended to enable secure and standardized data exchange along the entire value chain. Catena-X can be seen as one part of a larger data space focused on georeferenced data. It uses GAIA-X's federation services to ensure the integrity, sovereignty and security of the data managed in its data space. Catena-X's membership is made up of suppliers and users from across the automotive sector and represents a wide range of company sizes. Particular attention is being paid to integrating small and medium-sized enterprises (SMEs) into the data ecosystem (see Otto 2022, p. 7).

4 Design of the Study

This section describes the underlying approach to the research in this study and the methodologies and procedures in sections 4.1 and 4.3. Section 4.2 outlines how the methodology is used to design the interviews, while section 4.4 describes the process of the methodologically supported workshop.

4.1 Interview Methods

There are a number of different methods for recording information. These can be divided into qualitative and quantitative methods (see Weßel 2010, p. 4). The difference between these approaches lies in how information is collected. While the qualitative method focuses on subject-related understanding and the interpretative approach, the quantitative method examines the explanation of cause-effect relationships (see Renner and Jacob 2020, p. 11ff.). In practice, there are two main approaches, which differ in the preparation phase and the implementation phase:

- the semi-structured interview and
- the unstructured interview.

There are also structured interviews; however, these can be classified as quantitative research. The difference between structured and semi-structured or unstructured interviews is that in structured interviews all the questions are planned and written up in advance in the form of a questionnaire. All interviewees are asked the same questions, which means that responses can be compared on a quantitative level. Because the questionnaire is created for a specific topic, it is not possible to conduct a dynamic interview. In unstructured interviews, on the other hand, the questions are not planned in advance – the interview is free-form and flows dynamically (see Weßel 2010, p. 4). Comparing results is more difficult with this type of interview.

To allow for the most open and flexible conversation possible during the interviews, the semi-structured interview format has been used for this study. With this format, some of the questions are planned in advance and consolidated in an interview guide. However, much of the conversation is kept open in order to elaborate on the issues raised so that a framework can be created for new and further insights that the person conducting the interview had not previously considered.

4.2 Design of the Interviews

The semi-structured interviews (see section 4.4) were conducted with experts who were selected on the basis of their extensive knowledge of data utilization and distribution in the field of mechanical and plant engineering. The interviewees were questioned in detail on the subject of the Data Act in accordance with their own expertise.

The interviews were designed to be open-ended, but in order to process the results as effectively as possible guidelines were established in combination with selected definitions and a regulatory framework. Key questions relating to the future use and handling of the Data Act were identified and explained. These were subdivided as follows:

- General questions about the person/company
- Basic understanding of the topic
- Potential and measures
- Evaluation and outlook

The guidelines also provided a suitable starting point to more specifically address the practical implications of the Data Act in the other semi-structured interviews.

The research on dealing with the impending Data Act was conducted with two companies from different industries and of different sizes (see section 6). The focus was on industrial companies that will have to deal with and use the Data Act. Question guidelines specifically tailored to the specialists' expertise and divided into different sections were developed for the case study research. The first section of the interview dealt with general information about the company, its history and its background. The second section provided a generic basic understanding of the topic of the Data Act as well as the acceptance of it in the company. In the third section, the possible potential and measures, such as the development of different areas of application or service business models and their technical, organizational and legal requirements, were identified. In this context, the necessary measures and the associated IT skills as well as envisaged infrastructures were addressed.

This type of study design ensured that the aim could be achieved.

4.3 Design Thinking Method

The design thinking method was used to develop new ways of approaching the requirements of the Data Act. The design thinking methodology is a problem-solving approach that has gained popularity in recent years, especially in the field of product and service development. Originally developed at the **Stanford School** (formerly the **Hasso Plattner Institute of Design)** in the early 2000s, it has since been applied in a variety of fields including education, healthcare and social services (see Plattner et al. 2009, p. 101ff.).

Key principles of design thinking include a focus on the user and their needs, an iterative process of ideation, prototyping and testing, and an emphasis on collaboration and collective design. These principles are designed to help organizations and individuals identify and solve complex problems more effectively. Different tools can be used to support the successive phases. The design thinking methodology can be applied in different ways, depending on the specific context and the problem at hand. Common applications include developing new products and services, improving existing products, and identifying and implementing innovative solutions to social and environmental challenges (see Plattner et al. 2009, p. 103ff.).

4.4 Design of the Design Thinking Workshop

In order to develop new approaches for the mechanical and plant engineering industry with regard to dealing with the Data Act (see section 7), various experts from mechanical and plant engineering, data processing, associations and the logistics industry were invited to a joint workshop. Participants were divided into two groups and given the following assignment:

"Design a new application scenario for forward-looking MPE enablement in the context of the Data Act and describe recommendations for the MPE industry."

Participants were then guided through the phases of the design thinking process. The first step was to develop a common understanding of the initial question. The participants then developed a persona, i.e., a profile, in order to define a common stakeholder group. With the aid of interview methods, customer profiles were derived and further developed in the value proposition canvas. On this basis, the participants then developed solution prototypes after prioritizing the ideas. The separate and guided methodology allowed for independent and novel solution development in the groups.

5 Expert Interviews

In the first part of the study, four experts from different sectors were interviewed in three interviews in order to obtain different perspectives on the topic of the Data Act within the MPE industry. For this purpose, experts were selected who already have experience of handling data, including its utilization and distribution. Accordingly, the interviewees had a comprehensive picture of the upcoming challenges and opportunities presented by the new law. The experts are technology providers and specialists who deal with the overarching topic – including, for example, the legal issues relating to handling and the renewal of contractual rules. In this study, the experts' assessments cover technical, organizational and legal areas.

5.1 Marco Müller-ter Jung – Deloitte Legal

Marco Müller-ter Jung, LL.M. (Information Law) is a specialist attorney in IT law at Deloitte Legal Germany. With many years of professional experience as a lawyer, he works as a partner at the Cologne office in the areas of digital economy, IT and intellectual property. Deloitte is one of the largest consulting and auditing firms in the world. Its legal office Deloitte Legal Germany offers legal advice in all sectors, such as corporate, M&A, IT/IP, labor law, antitrust and public procurement law, real estate law, banking and capital markets law, and legal management consulting.

In the interview with Marco Müller-ter Jung, the legal implications of the EU data strategy and the resulting legislative projects, such as the Data Act, were discussed. Aspects relating to the data economy, data access and responsible data handling were evaluated. The key takeaways from the interview are listed and then explained in detail below:

Figure 2 Overview of Expert Interviews

Deloitte. Legal	Marco Müller-ter Jung, LL.M. **Deloitte Legal Rechtsanwaltsgesellschaft mbH**	Legal aspects from the field
ZRD Zentrum für Recht und Digitalisierung Saarbrücken	Dipl.-Jur. Simone Salemi, LL.M. Ass. Iur. Nils Torben Wiedemann **Zentrum für Recht und Digitalisierung Saarland [Law and Digitalization Center Saarland]**	Legal aspects from research
ADVANEO	Jürgen Bretfeld **ADVANEO GmbH**	Technological aspects

Source: Institute for Industrial Management (FIR) at RWTH Aachen University

- The Data Act should be considered together with the Data Governance Act, which together provide a framework for access to and use of data.
- The Data Act does not create a proprietary right to data. When it comes to the use of the Data Act, the roles of the relevant parties and the corresponding rights and obligations must be defined in contracts.
- The relationship to existing laws and the protection of personal data must also be examined in the context of the Data Act.
- The protection of business secrets and anti-trust and competition law will not be affected.
- In particular, mechanical and plant engineering companies should prepare themselves for the **"data access by design"** provided for in the Data Act.
- The legal landscape for handling data will change in the future, especially as authorities may be established to monitor lawful handling.
- Legal departments are becoming key enablers in organizations when it comes to implementing the Data Act.

The status quo of the EU data strategy

The Data Act, which follows from the European data strategy, was presented by the European Commission on February 23, 2022 as a draft for the regulation and promotion of the European data economy. The aim is to safeguard the innovative capacity and competitiveness of EU companies across all sectors, effectively empower people with regard to their data, and better equip companies and public bodies with an adequate and predictable mechanism for addressing key political and societal challenges, including public emergencies.

This is because, due to the growing importance of data in all areas of society (the share of the data economy in the EU was 2.4 percent of GDP (301 billion euros) in 2018, and is forecast to increase to 5.8 percent of GDP (829 billion euros) by 2025), a true single market for data is to be created in which both personal and non-personal data is secure and in which companies have simplified access to a large amount of high-quality industrial data, including for commercial exploitation. It is assumed that the processing and analysis of data still predominantly takes place in data centers, although from 2025 the ratio will be inverted and the majority of the data will come from intelligently networked objects (manufacturing robots, cars, household appliances, etc.).

As a measure to build a European data economy and in addition to the draft Data Act, the Data Governance Act (DGA) was also passed on May 16, 2022. While the DGA creates procedures and structures to facilitate data sharing among companies, individuals and public agencies, the Data Act is intended to regulate who can extract value from certain data and under what conditions. In particular, it provides a regulatory package for expanding and strengthening access to and use of data. It is therefore necessary to take a close look at the legal implications of the Data Act for the B2B sector and for the utilization of data through the use of digital technologies. However, we cannot rule out the possibility that there will still be changes to the Data Act.

"The Data Act is a complex regulatory framework; therefore, we cannot rule out the possibility that another significant change will be made. After a transition period for implementation, it must be applied in full."

Past examples, such as the implementation of the General Data Protection Regulation (GDPR), show that European regulation is relevant to all industries. Many players from the mechanical and plant engineering industry are still busy with major projects concerning implementation of the GDPR. The regulatory aims of the European data strategy should therefore be monitored intensively, even before the official adoption of the law, as new organizational structures will be required in the future. These changes may span different business areas and industry sectors, and for this reason Deloitte is already taking a detailed look at them from a holistic perspective and developing appropriate action plans.

Challenges and potential of the Data Act

From a legal standpoint, there are various challenges that arise with respect to the Data Act.

Among other things, the Data Act regulates the provision of data that is generated through the use of a product or connected service. It also contains stipulations on the provision of such data by data holders to data recipients. This includes specifications for the exchange of data in B2C and B2B relationships and defines the rights and obligations of the users as well as the data holder and third parties. In this context, one significant factor is the obligation to design and manufacture products such that the data generated during their use is, by default, simple, secure and – where relevant and appropriate – directly accessible for the user in the sense of "data access by design."

This creates new obligations for product development and the use and processing of data for companies and organizations, including in the mechanical and plant engineering industry when it comes to smart components and plants, for example.

In order to use data properly and provide the relevant access, responsibilities should be defined and contracts should be concluded between the parties involved. This is because the primary legal institution of the Data Act is the (license) contract. Data access is based on contractual relationships between data holders and users, data holders and data recipients, and possibly between data recipients and users. This requires the allocation of data rights as part of the contract design, particularly in view of the fact that the data is essentially stored in the technical-factual sphere of control of the data holder.

"Stakeholder roles, contract designs and use cases are unclear and need to be legally developed for implementation of the Data Act."

A major challenge in practice may be the quantity, structuring and closer categorization of the available data (what is "the data"?) in order to allocate it to the players involved within the scope of contractual agreements. The mixed situation with 3D printing can be mentioned as an example here; for example, when a print service provider carries out a print job for a client using a specific plant. The plant manufacturer, the print service provider and the client may all have an increased interest in the vast quantity of process and analysis data generated by the plant before and during the manufacturing process, whether for the purpose of improving and maintaining the plant, optimizing the manufacturing process or evaluating the achievement of certain quality benchmarks with regard to the manufactured product. It is necessary to balance out which data "belongs" to which player. For use cases relating to the "Industrial Internet of Things," for example, intensive examination is required for legally effective implementation.

Another challenge is that the goal of facilitating access to data is not easy to achieve; this is especially the case with regard to personal data, due to the broad scope of the GDPR. The GDPR has not been amended by the Data Act, which means that where the Data Act also applies to personal data, the regulations of both the Data Act and the GDPR must be observed. The impact of the GDPR may well slow things down when it comes to the data economy. In addition, it is anticipated that – based on the existing draft of the Data Act – use-generated data will need to be distinguished from secondary analysis results, as the latter are arguably not intended to be covered by the data access law. In practice, it can be difficult to make a precise distinction between primary and secondary data; for example, when using artificial intelligence.

Another challenge for companies is the interpretation of trade secret protection. While the Data Act stipulates that this will remain untouched and prohibits the use of data to develop competing products, companies may still refuse to disclose certain information to protect their trade secrets. It remains to be seen to what extent the Data Act will resolve conflicts between the protection of secrets, intellectual property rights or antitrust law and the desired granting of access to data. In principle, the Data Act also has no effect on the application of antitrust and competition law or the rules on the protection of intellectual property. Finally, attention must be paid to the quality and interoperability of data and the design of the role of intermediaries that provide data exchange platforms. Ultimately, there are many issues that need to be addressed when it comes to the implementation of the Data Act.

Implications of the Data Act for the mechanical and plant engineering industry

Even before it has come into force, the introduction of the Data Act is already providing plenty of scope for discussion, with particular challenges arising for the mechanical and plant engineering industry. There are no specific regulations for this industrial sector, but rather more general, abstract rules.

“Although there is a transition period for the introduction of the Data Act, companies should address the legally compliant implementation of the Data Act early on.”

A transition period of 24 months is planned for the Data Act, during which time companies will need to get to grips with the new regulations and make adjustments. It is therefore important that all parties concerned carefully consider how the future exchange of data can be structured, taking into account all relevant legal regulations, and what obligations and opportunities for their own business development may arise from this. Companies should already be setting up corresponding internal projects in order to develop governance structures and be able to act in good time.

“It is important to address organizational processes and new role models early on in order to fulfill duties and seize opportunities.”

In connection with the Data Act, intermediary systems, data spaces and data pools offer new potential as data exchange platforms for the mechanical and plant engineering industry. These platforms could be used, for example, for data access to improve maintenance cycles, in the area of sustainability or for process optimization. This would enable companies to make their process data available in order to achieve sustainable process optimization. However, suitable business models must be developed for this purpose, which can be used in a legally secure manner on the basis of the new legislation.

Even if trade secrets remain protected, OEMs will have to rethink their future product designs and business models. With regard to the possible exchange of certain data, it will be necessary to examine how facilitated, standardized data access, for example, can be designed in concrete terms and when purely read-only access is sufficient. With regard to the drafting of contracts, the Data Act may mean that general terms and conditions (GTCs) in the mechanical and plant engineering industry will also have to be revised with regard to the non-waivable fairness requirements for clauses unilaterally imposed on SMEs.

"Responsibilities should be defined and a pooling of existing expertise should be considered."

The implementation of the Data Act requires companies to create structures – for example, in terms of roles and responsibilities, (internal) policies and processes, the creation or adaptation of contract templates and the introduction and development of new tools. For this purpose, it may be advisable to set up a corresponding implementation project, in which decisions are made regarding the responsibility within the company for implementing the Data Act and scoping, and suitable measures are defined. In this context, the early designation of the party responsible for implementing the Data Act may be a key success factor. As a rule, the **chief compliance officer** (compliance department), the data protection officer (data protection department), the **chief digital officer** (CDO department) and the legal department are likely to be involved, with responsibilities to be assigned accordingly, which may even lead to the creation of a new data economy department.

The legal department also gains a role as an enabler, as the act entails, among other things, new contractual negotiation processes and contract designs. Consequently, close cooperation between the legal department and the relevant parties within the company can be conducive to lawful dealings.

Once the act comes into effect, the introduction of corresponding control mechanisms for compliance with the Data Act is to be expected. In this context, for example, authorities may take action against violations of Data Act obligations (e.g., failure to provide data) with sanctions such as fines. However, it is not yet clear whether this will be carried out by existing authorities or whether new institutions will be established to specifically monitor compliance with the legal requirements. Another control mechanism could be private enforcement, where claims for access to data are brought before ordinary courts. This would require a list of claims (civil claims) to be formulated under the Data Act or a mandatory procedure to be provided for fast and efficient dispute resolution.

Figure 3 Overview of Affected Business Units

Source: Institute for Industrial Management (FIR) at RWTH Aachen University

5.2 Simone Salemi and Nils Wiedemann – Center for Law and Digitalization Saarland

Dipl.-Jur. Simone Salemi, LL.M. and Ass. Iur. Nils Torben Wiedemann are research associates at the Center for Law and Digitalization in Saarbrücken under the leadership of Managing Director Dr. Stephanie Vogelgesang and Chairman of the Board Prof. Christoph Sorge. In their interdisciplinary (legal and information technology) research activities, they focus on the protection of personal data and the right to privacy in companies and organizations. An important aspect of their work relates to the proper legal handling of digital services and digital data flows. In doing so, they create a legal understanding of the use of data, data protection and IT security.

In the interview with Ms. Salemi and Mr. Wiedemann, the perspective of data protection law was examined with regard to the legal implications arising from the new information obligations and interoperability requirements of the Data Act. The key takeaways of the interview are summarized below and then explained in detail:

- There are incompatibilities with existing laws and regulations.
- The current definition of data and products is unclear and impractical for the industry.
- Process standards are needed to anonymize personal data.
- Compared to the GDPR, the group of data subjects has changed from natural persons to legal persons and thus also includes companies.
- The current version changes previously applicable database rights and requires central data storage in certain cases.
- New competencies and resources are needed in legal organizations and product design.
- Companies must develop action strategies with technical and organizational measures at an early stage.

Their work examines technical protective measures and regulations on the part of the European Union. It is expected that the Data Act will provide a new frame of reference, particularly on issues related to data access. One example is the generation of data by wearables in the workplace, which is being investigated in the "WearPrivate"[1] project, among other similar initiatives. As part of this, the legal, ethical and technical issues regarding the use of wearables in the workplace are being researched. Wearables collect and store large amounts of data about the user and the environment. According to the General Data Protection Regulation (GDPR), the privacy of users must be protected and data may only be used for legitimate purposes. The Data Act will be important in this regard, as it is expected to entail major changes and new demands from legal, information technology and ethical standpoints.

[1] BMBF research project WearPrivate (https://www.wearprivate.de/)

"The Data Act is important because of the access claim to data generated by IoT devices." – Simone Salemi

The PAIRS[2] project for the development of an AI platform for crisis management and prediction represents an interesting use case for the Data Act from a legal and information technology perspective, especially since the Data Act could make data more easily accessible and usable for training AI systems in the context of developing complex AI systems for public institutions, such as research institutes and universities.

Legal and information technology analysis of the effects, opportunities and potential of the Data Act

In the interview it became clear that the possible potential of the legislation can already be identified in the existing version. Up to now, access to data and its transparency have not been an absolute given. But the Data Act may for the first time create a legal claims framework to assert new claims regarding the transparency and availability of data generated by IoT devices. The GDPR also lacks a definition or regulation for the handling of non-personal data, which previously created a need for action. The Data Act is intended to apply to data to be defined and thus represents a supplement to Article 20 of the GDPR, which had previously offered no practical relevance. It is therefore hoped that the Data Act will create a legal framework for handling both IoT-generated data and personal data.

However, at the current stage (first proposal to the European Parliament), a properly formulated standard for handling anonymized data is lacking. At this point, we can only speculate about the impact of the Data Act's disclosure of data for providers or the impact of the utilization of data for users. For example, as with the GDPR, there is a lack of standards for anonymization. Process standards of this kind and regulations should be specified in order to protect personal data, users and providers in a standardized manner. There is also a significant difference compared to the GDPR with regard to the term "users." While the GDPR only covers data subjects, i.e., natural persons, the Data Act defines users as legal persons, i.e., both companies and end customers.

The question remains unresolved as to how much data providers must disclose and what benefit users may derive from it. Although the Data Act provides written guidance, it does not currently provide a clear perspective on implementation among the affected group. This is also due to the fact that no clear definitions have been formulated. One example of this is the exceptional rule in the definition of data covered, which only relates to data that has been generated automatically and does not require human input. On this point and several others, there is a need for clarity regarding wording and definitions.

"Integrating the Data Act into the rest of the regulatory framework poses a major problem, for example, in terms of coexisting with the other EU regulations on data protection and data law." – Simone Salemi

BMWK research project PAIRS (https://www.pairs-projekt.de/en/)

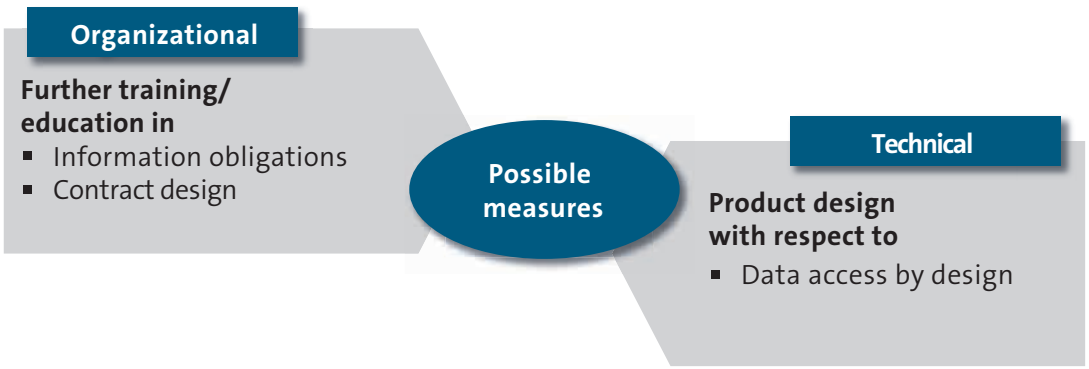
Integrating the Data Act into the rest of the regulatory framework, especially in connection with the other European regulations such as the Data Governance Act and the GDPR, presents a challenge. Essentially, the Data Act is intended to be a horizontal bill in relation to existing laws and to enable new access rights based on sector-specific regulations. However, it becomes clear during the conversation that there may currently be incompatibilities between existing regulations and the Data Act. Similarly, it is currently unclear how conflicts will be resolved when they arise from interactions between incompatible regulations.

When it comes to the open exchange of data, data protection rights and intellectual property (IP) rights in particular pose a special challenge from a legal perspective. According to Ms. Salemi and Mr. Wiedemann, the protection of trade secrets is not sufficiently guaranteed in the current draft. Article 6(2e) of the Data Act specifies the extent to which a product may be developed based on the data made available. However, the definition of "product" must first be clarified so that the provision can be clearly fulfilled. Article 35 of the Data Act is also viewed critically (see European Commission 2022b, Article 35). This restricts database rights to the extent that the existing database policies are heavily modified. In this context, protection is lowered if a database stores data that has been generated by an IoT device. The intellectual property rights of these databases are limited by Art. 35 DA even if they only contain a very small proportion of data generated by IoT devices.

The Data Act with regard to mechanical and plant engineering – consequences and significance

One problem that was raised time and again in the interview was the vague definitions in the Data Act. It appears that the lack of clarity regarding the definitions in the Data Act is also seen as one of the main problems by industry players. In addition, no clear responsibilities, such as data holder or data user, are defined for data exchange and access. In particular, the requirements of the third article (data access by design) pose considerable difficulties for the mechanical and plant engineering industry, as no practical standards are explained in this article.

Figure 4 Illustration of Possible Organizational and Technical Measures



Source: Institute for Industrial Management (FIR) at RWTH Aachen University

The interviewees predicted that, particularly in the initial phase following the introduction of the Data Act, the mechanical and plant engineering industry will have to deal with additional administrative work, especially with regard to drawing up contracts. There is a need for new and clearly defined contracts and standards between players.

"New obligations and new demands are on the horizon. So it makes sense to tackle these now." – Nils Wiedemann

In order to successfully meet the new requirements of the Data Act and to accompany the implementation, the interviewees recommend that companies actively develop action strategies at an early stage. The strategy should include both organizational and technical measures.
At an organizational level, various new Data Act-related competencies will be necessary in order to ensure that a company's legal organization is prepared for the information obligations and the provision of data to third parties or governmental organizations. An important step could be, for example, the further training of data protection officers for the new obligations. Another option would be to create new positions that will be filled by candidates with the previously required expertise as well as expertise in how to handle new contractual agreements and standard contracts. On the technical side, in terms of product design, companies need to address measures to implement the data access by design required in the third article of the Data Act.

5.3 Jürgen Bretfeld – ADVANEO

Jürgen Bretfeld is the Chief Executive Officer of ADVANEO GmbH, which is based in Düsseldorf. ADVANEO GmbH was founded in 2002 as a spin-off of RWTH Aachen University. The company deals with the topics of business intelligence, software development and digitalization. Since 2016, the company has been particularly active in the field of implementing secure infrastructure for data-driven business solutions. As part of the **International Data Spaces Association** (IDSA), ADVANEO is concerned with the discoverability of data across corporate boundaries. Its monetization and exchange, and the creation of added value through data sharing are all focal points in the activities of ADVANEO GmbH. Core elements of this are solutions for data management, for secure and privacy-preserving data exchange in value chains, and the development of data marketplaces and data spaces.

The interview with Mr. Jürgen Bretfeld addressed questions regarding the practical implementation of use cases, their infrastructural and operational requirements, and lessons learned from initial pilot projects. The key findings, which are explained below, are summarized here:

- The exchange of data between companies fails in the majority of cases due to a lack of trust.
- The Industrie 4.0 maturity of the shop floor in companies is often too low to have the necessary data foundation.

- Data spaces are critical enablers when it comes to implementing data availability and connectivity for SMEs.

- Data marketplaces are an essential component of data spaces and enable data monetization alongside other building blocks such as collaboration tools.

Holistic control and protection measures, such as usage control or privacy-preserving multi-party computing, are needed to make sensitive data available for external or shared use.

The Data Act, along with the Data Governance Act, is the core element in the legislation with regard to mapping the technical requirements for interoperability and use of data spaces, especially in B2B and in the IIoT area relevant to MPE. This is primarily intended to limit the influence of external players from the USA and China, for example, in order to prevent developments similar to those in the B2C sector. As a solution provider, ADVANEO has therefore long been part of the IDSA, which has paved the way for the architecture of data spaces in line with the Data Act. The "International Data Space (IDS)" standard thus provides the template for the formulation of technical interoperability as described in the Data Act. Since the basic standard already exists and is usable, working use cases already exist today in sovereign data spaces and thus serve as pilot projects. Despite the presence of existing applications, the potential of the Data Act for companies is often not tangible and companies do not know what sovereign and interoperable data handling may mean for them.

Challenges and potential of the Data Act

"The Data Act and technical interoperability enable manufacturers and suppliers to cooperate via collaborative condition monitoring and create value by sharing data."

In the interview, it became clear that existing pilot applications provide a preview of the new opportunities that the Data Act will open up for companies. Especially in the complex environment of IIoT, completely new application scenarios are emerging, which enable a paradigm shift in the cooperation between component manufacturers, plant manufacturers and operators. Companies today already have experience with data-based use cases in the area of machinery and plants; for example, when it comes to AI-based applications such as predictive maintenance, which are made possible by condition monitoring. According to Jürgen Bretfeld, however, the true potential lies in the horizontal and vertical networking of physical assets beyond factory boundaries. Collaborative condition monitoring offers particular potential.

Collaborative condition monitoring

Conventional condition monitoring is a method of monitoring and diagnosing the condition of plants, equipment and machinery in real time. It uses a combination of sensor data, machine learning algorithms and user feedback to detect and solve problems early. Collaborative condition monitoring (CCM) enables better performance, higher availability and longer service lives of the plants through the cooperation of plant, component and sensor manufacturers. The focus here is primarily on networking and data exchange between the various producers of components and plants across factory boundaries, i.e., multilaterally rather than bilaterally. Based on the analysis of the originally fragmented and singular operating data, life cycles and failure probabilities in the overall system can be predicted (see BMWi 2020, p. 7).

"Most companies today fundamentally lack a data foundation and basic integration of an Industrie 4.0-capable shop floor."

In the interview, however, it was also pointed out that even if great potential could be exploited, companies would falter on the way to achieving this because of the basics. In many projects at ADVANEO, it has become apparent that the implementation of data-driven use cases fails due to a lack of reasonable Industrie 4.0-capable basic integration of the shop floor. As a result, the necessary data foundation is missing. According to Jürgen Bretfeld, however, this is the necessary prerequisite for dealing with digital sovereignty and new business models in mechanical and plant engineering in the first place. This insufficient level of maturity is evidenced by studies showing that, when it comes to the maturity of their Industrie 4.0 activities, 80 percent of companies still need to deal with the basic connectivity of their assets, people and systems before they can talk about general transparency and predictive capability (see Schuh et al. 2020, p. 10).

Jürgen Bretfeld sees the fundamental lack of trust among players as one of the other main obstacles for companies. Sharing data is often seen as a threat to a company's own business basis. The Data Act creates potential new entitlements with regard to accessing data. An automotive OEM using a third-party plant could make claims to the data from the plant sensors just like the plant manufacturer itself. For fear of possible conclusions about their own production, the plant manufacturer would thus not be able to offer new services based on the data from the plant sold.

The Data Act with regard to mechanical and plant engineering – consequences and significance

For Jürgen Bretfeld, the following key success factors are needed to make the Data Act manageable for companies and lead to new added value:

- Transparency
- Collaboration
- Control

"There needs to be some sort of metadata-level directory for consumers in order to have transparency in the first place."

One building block for ADVANEO is transparency, i.e., the creation of a central marketplace on existing IDS architecture to bring data providers and users together. The underlying IDS standard does not dictate which technologies must be used or make other company-specific procedures obsolete. The standard can be described as a semantic integration of data via metadata and allows data sovereignty to remain with the data provider itself. This integration of metadata facilitates a marketplace that does not use raw data. In order for players to decide how to monetize data, there also needs to be a catalog in which metadata is made visible in a structured way. This should be built based on open data principles. In order for new business models to be realized, it is necessary to strategically determine how onboarding, i.e., the access path for new data providers on such a platform, is to be incorporated in the process.

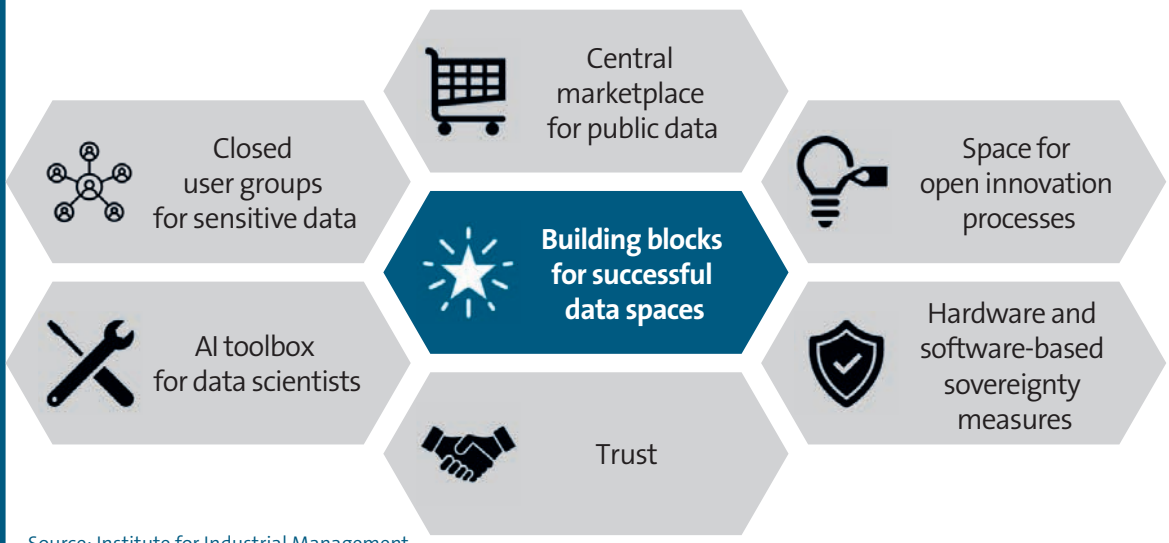
"Data spaces will be a central pillar for smart networking among SMEs."

In addition to transparency, collaboration is another success factor. Both legal and technical cooperation are central to this success. Representative of the new legal concepts for collaboration, there are new basic tools for designing contracts between the new players in data spaces. This means that it must be possible for a data provider to manage different access rights. In this way, plant manufacturers can legally safeguard third-party access to their data with little effort. In technical terms, the focus of the collaboration for ADVANEO is on the data spaces. The first self-designed and operated data spaces have shown that there are some basic features that characterize a successful data space. For Jürgen Bretfeld, a data space therefore does not just describe a pure infrastructure solution for connectivity and the exchange of data for the resulting new use cases. Rather, it should be understood as a kind of meta-platform that can connect different platform solutions and provide tools that work interoperably, but that can also exploit cross-selling effects, for example. Examples of successful features from pilot ADVANEO data spaces[3] are shown in Figure 5.

"Technical hurdles to implementing the Data Act are of secondary importance today. There is a lack of trust between players when it comes to data exchange."

Just as important as transparency and collaboration – as becomes evident in the interview – is control. This is a critical enabler for the success of the Data Act for companies as well as for ensuring IP protection. Today, according to Mr. Bretfeld, it is apparent that companies' willingness to participate in an overarching data economy does not usually falter because of technical hurdles, but because of a lack of trust between the players. One of the key factors in building trust is the technical implementation of usage control from the IDS standard. This summarizes measures or systems that make it possible to control and restrict the use of resources or services by certain

Figure 5 Successful Features From Pilot Data Spaces



Source: Institute for Industrial Management (FIR) at RWTH Aachen University

BMWK research project "PAIRS" (https://www.pairs-projekt.de/en/)

players. In this context, Mr. Bretfeld points out that sufficient asset protection is crucial in the multi-party space. Privacy-preserving multi-party computation (MPC) will play a key role here. This approach involves methods for performing calculations with sensitive data without disclosing the underlying raw data to third parties. In a data economy, third parties may include a data center, an analytics service provider or other service operators. The methods used can include federated learning, homomorphic encryption or ADVANEO's proprietary trusted data hub technology.

"One connector alone does not make a data space. In addition to usage control, measures such as privacy-preserving multi-party computation are needed for use cases to be widely adopted."

A combination of the building blocks of transparency and collaboration is also required, as well as an extension of pure "usage control" based on the IDS architecture in the data space, in order to ensure holistic protection. According to Mr. Bretfeld, it is equally important that things do not remain at the level of singular prototypical use cases, but that innovators also roll them out on a broad scale so that the Data Act and all its possibilities are within companies' reach.

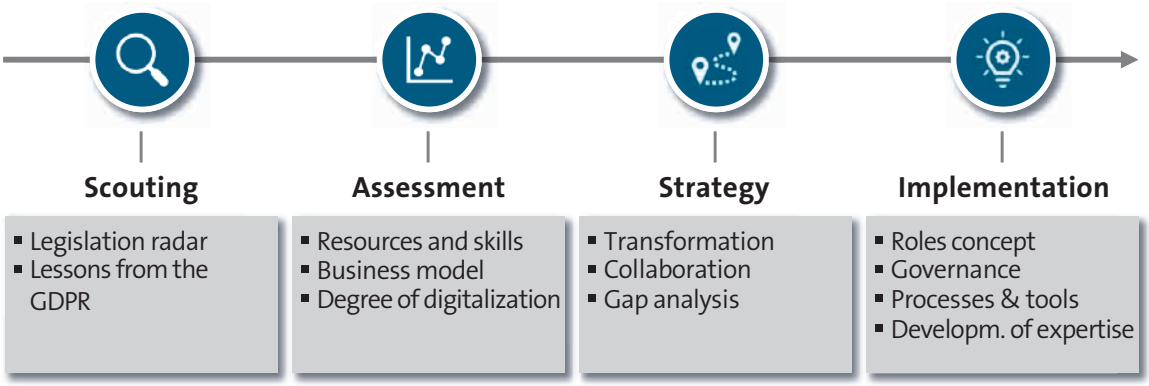
5.4 Interim Results of the Expert Interviews

Various recommendations for action, open questions and generally relevant propositions can be derived from the expert interviews. These are compiled in a strategic process model for dealing with the Data Act as well as in the portfolio for choosing the appropriate management methods in relation to the Data Act.

Strategic process model

A strategic process model can be derived from the findings of the interviews. This is divided into the phases of scouting, assessment, strategy and implementation, as described in Figure 6. In the individual phases, key success factors and project components can be derived, which are explained in more detail below. It should always be kept in mind that this is a simplified schematic process and that project-based implementation is a continuously ongoing process.

Figure 6 Strategic Process Model for Companies



Source: Institute for Industrial Management (FIR) at RWTH Aachen University

Scouting

Companies should get to grips with the Data Act at an early stage. From the interviews, it is clear that it is not enough to deal with the Data Act when the final version is announced. A transition period of 24 months after entry into force is to be expected, but the implementation of the GDPR shows that this is often not sufficient, as many companies are still working on its implementation today. The key here is for companies to implement best practices from the GDPR and to implement and conduct continuous regulatory scouting.

Assessment

To help companies better deal with the new and changing requirements of the Data Act, it is crucial that they conduct a status quo assessment at this stage. This includes identifying existing resources and competencies in the legal organizations and creating transparency, as well as assessing the existing business model with regard to new risks and potential. This will reveal areas for action on the business side. It is equally necessary for companies within the MPE industry in particular to survey the current level of digitalization in the company. Frameworks such as the **Industrie 4.0 Maturity Index** can be used for this purpose. As such, a technical assessment regarding basic digital integration is also carried out.

Strategy

The assessment forms the basis for developing a strategy that is suitable for the company.
The fields of action can indicate which business model components need to be further developed or create transparency, while also indicating whether they are affected by the Data Act.
Equally relevant is the determination of whether formerly conventional business models will be further developed or supplemented to become digital business models. The strategic decision on future approaches should also provide clarity regarding the degree to which future collaboration is desired in the data economy and provide the basis for conducting a gap analysis based on the assessment and current status as determined during scouting.

Implementation

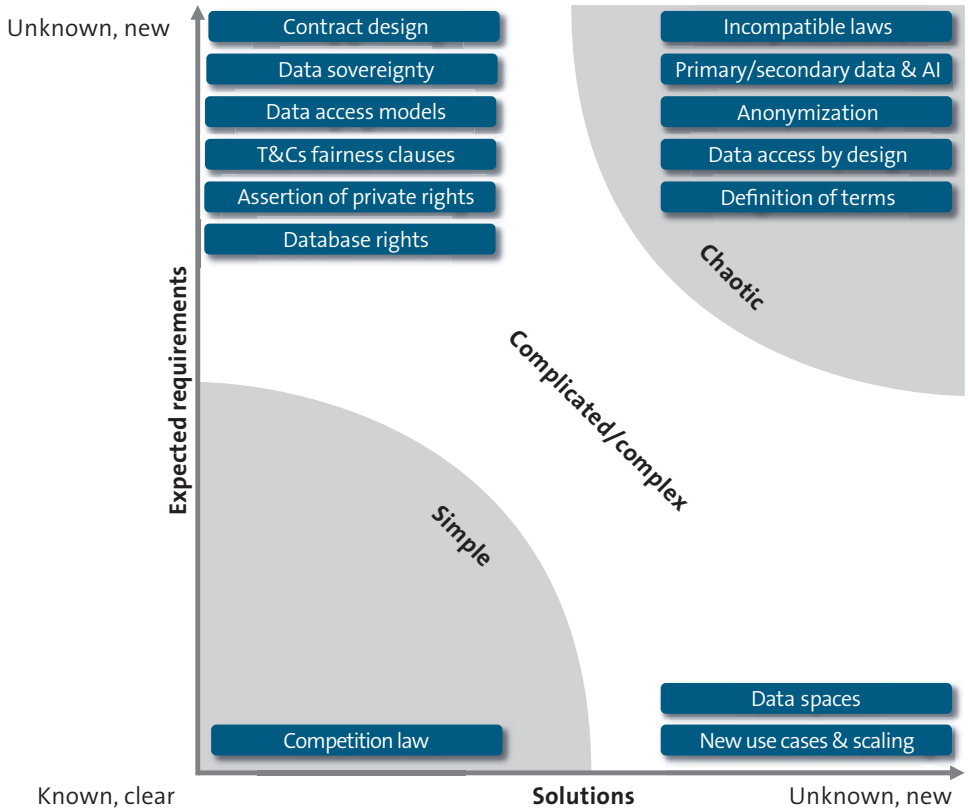
For the implementation, key building blocks for successful execution can be identified for project-based approaches in companies. For such a project, the **chief compliance officer,** the data protection officer, the **chief digital officer** and the legal department should be involved as a minimum. It is crucial that responsibilities for the subsequent process are assigned. Likewise, governance structures should be established and roles and duties defined. From the organizational perspective, internal processes and guidelines should be reviewed and adapted, and new tools implemented. For example, new templates for efficient contract design will be necessary and should be introduced. Furthermore, existing competencies and resources in legal organizations must be identified and, if necessary, developed according to requirements. Expertise on contracting will be necessary in particular. For example, further training opportunities should be created to empower existing data protection officers.

Management methods in dealing with the Data Act

In order to deal with the Data Act in the project along with the dynamic requirements, suitable project management methods can be derived for the individual topics by arranging them in the Stacey Matrix (see Figure 7). In the Stacey Matrix, topics are ranked in terms of the uncertainty of the emerging requirements and the existing degree of certainty regarding necessary solution approaches in the company. This enables project managers to derive suitable methods on the basis of the expected situation. The following situations should be considered:

- Simple
- Complicated/complex
- Chaotic

Figure 7 Portfolio on Management Methods in Dealing with the Data Act



Source: Institute for Industrial Management (FIR) at RWTH Aachen University

Simple
The expected requirements and the instrument for implementation are known.

Recommendations
No special methods are required. Routines can be used and can be implemented in a classic reactive manner.

Issues to be considered
It can be assumed that competition law will remain unaffected. Consequently, existing processes and structures in the legal organization can be applied to manage the foreseeable adjustments. IP protection should continue to be monitored.

Complicated/complex
The expected requirements are either dynamic or still partly unclear. The lawmaking process is still ongoing and there are no direct comparisons. However, the underlying approaches needed for implementation are established and well known. It may be that the requirements for the company are clearly defined and foreseeable, but the necessary approaches for implementation are new and not yet known.

Recommendations
A combination of conventional project management methods, such as the waterfall method, and agile methods, such as scrum, is recommended. In the case of assessable requirements, the procedure should be characterized by intensive analyses and the consultation of experts from specific domains. In the case of unknown requirements, it is to be expected that certain interactions cannot be avoided and iterative re-testing using agile methods will be necessary.

Issues to be considered
Future contract design depending on data sovereignty is still subject to great uncertainty due to the legislative process. The necessary stakeholder groups and participants are unknown. It is equally unclear how the actual data access is to be designed organizationally and technically in order to work in compliance with the law. The necessary contractual design tools and technical access tools are established. For the MPE industry, this may mean that GTCs will also have to be revised with regard to the non-waivable fairness requirements for clauses unilaterally imposed on SMEs. Private enforcement could also result in claims for access to data being brought before ordinary courts. Legal organizations will need to prepare for this with established methods. Furthermore, the database law known in the previous version is being changed, which may result in central data storage being required or the protection being threatened by the disclosure of certain data. This will require modification of the existing guidelines.

The architecture of the data economy is based on the standards for data spaces (IDS, GAIA-X), but for many companies it is not clear how to implement it within the company with regard to the existing infrastructure in order to meet interoperability requirements. Similarly, there is still no blueprint for how companies whose level of digitalization is unknown can identify and apply scalable use cases and design them independently. In most cases, there are not yet processes and guidelines in place to implement this.

Chaotic
The expected requirements are dynamic, new, or unknown. It is equally unclear whether existing solutions will be known at the time of implementation or whether they can be applied at all. They are new or unknown in organizations.

Recommendations
These situations require a combination of methods for rapid, highly iterative solution prototyping and intensive derivation of solution hypotheses to create a shared understanding. Design thinking can be used to develop initial solutions based on a fixed set of information and, if applicable, to transform the problem into a complicated/complex one in a preliminary project. In terms of management, a high risk of failure is to be expected, but there is also great potential for innovation.

Issues to be considered

At the time of the draft law, it is not yet fully clear what incompatibilities with existing laws are to be expected. Certain incompatibilities can be identified at the draft stage. However, on this basis, it is unclear which approaches can be used in companies to solve the problem. Equally problematic is the handling of use-generated data from secondary analysis results, as this is arguably not intended to be covered by the data access law. In practice, and especially for applications such as artificial intelligence, the lack of differentiation between primary and secondary data can lead to challenges. The challenge here is that the topic of artificial intelligence and comparable technologies is still new to many in MPE and the corresponding competencies and processes are unknown or new. It is also unclear in the draft how anonymization of the data is to be implemented technically and organizationally, and there is a lack of appropriate specifications or tools. Furthermore, since the degree of anonymization is not specified, it is equally unclear for companies which solution approaches can be used. This is generally reflected in the problem that many definitions of terms are still subject to great uncertainty. As a result, specific requirements in the area of data access by design are unclear. This means that the MPE industry in particular faces the challenge of how to design products, despite the product development process in many MPE companies being highly standardized.

6 Pioneer Reports

In the second part of the study, three experts from two companies in different industries were interviewed to gather the views of real-world companies on the potential and challenges of their digital business models in the context of the Data Act. The selected companies already operate digital business models and have experience in monetizing data-based business models. The selected companies are directly related to MPE and serve downstream processes or are in upstream or downstream stages of the value chain. The assessment is intended to describe the role of digital business models in the context of the Data Act and provide an insight into how companies with existing digital products and business models are classifying the impact of the Data Act.

In this section, case studies are conducted with the following companies:

- Schaeffler Monitoring Services GmbH
- Cargobull Telematics GmbH

6.1 Philipp Jussen – Schaeffler Monitoring Services

The Schaeffler Group is a supplier to the automotive and mechanical engineering industries. The product portfolio includes clutch systems, transmission parts, camshaft phasers, bearings and linear technology components. At around 200 sites in over 50 countries, approximately 83,000 employees generate sales of around 13.9 billion euros.

Philipp Jussen is Managing Director of Schaeffler Monitoring Services GmbH, which is responsible for the Schaeffler Group's condition monitoring and digital services portfolio. The product range includes the OPTIME Condition Monitoring (CM) solution, which allows operators to monitor the condition of their machines and plants. Schaeffler OPTIME CM is a modular system and consists of wireless, battery-powered vibration sensors, a gateway and a digital service that automatically evaluates this data and provides analyses. The conversation covered the challenges and potential of digital business models of manufacturing

Figure 8 Profile for Schaeffler Monitoring Services Case Study

SCHAEFFLER

Company: Schaeffler Monitoring Services GmbH
Interview: Dr. Philipp Jussen, Managing Director
Digital solution: Schaeffler OPTIME

Image source: schaeffler.de

Source: Schaeffler

companies, as well as the potential impact of the Data Act on data-based services. The key findings were:

- The early focus on digital business models serves as preparation for the effects of the Data Act.
- No impairment of the business model is expected in the future.
- The Data Act offers new potential, but additional administrative work is expected.
- The impact of the Data Act on the industry will only become clear in practice.

Not all digital business models are at risk from the Data Act

The benefit of **Schaeffler OPTIME CM** lies in the higher transparency of machine conditions and the resulting increased ability to act and react quickly in the event of failures. The system can detect changes in the machine's status and anomalies based on sensor data, which is transmitted to Schaeffler's cloud storage solution. Users are then notified of the changes and anomalies in an app. In addition, information about possible causes of damage is communicated, which makes it easier to remedy the cause. Special features of the solution are the easy-to-install sensors and the existing knowledge at Schaeffler which is used to create the analyses.

Often, the Data Act is criticized because granting third parties access to data allows them to bypass the original OEM that makes the data available, thereby jeopardizing the provider's business model. Schaeffler secures the digital business model by ensuring that data sovereignty and monetization through data sharing are not part of the business model. Customers already have the option of accessing sensor data free of charge and deciding how to use it. Some companies are already using this feature. This does not create any disadvantage for Schaeffler: The greatest added value comes from the analysis algorithms, which Schaeffler has enhanced on the basis of years of experience and the pooling of knowledge. Schaeffler uses the collected data from various companies to increase the overall performance of the algorithms. No conclusions can be drawn about individual companies or data points in this context, as the models are trained on the basis of the data and can then be run without viewing this sensitive data. The sensors are only available together with the proprietary analysis functions and are thus monetized through the combination of the hardware and software components.

As a result, the Data Act and the associated directives do not fundamentally challenge the OPTIME CM business model; at most, they will lead to an adjustment in parts. The digital service serves as an example that companies can also offer unique value propositions in the data economy through advanced knowledge.

The Data Act offers potential, but will entail additional administrative effort

While the Data Act does not fundamentally change Schaeffler's digital business model, it is clear that with the introduction of the legislation, administrative burdens will fall on companies that want to participate in the data economy. Digital services, especially in the B2B sector, are already accompanied by comprehensive contracts.

Among other things, these regulate the mutual obligations of the customer and provider, the handling of data and information, and liability claims.

"It is not uncommon for final contracts to exceed 40 pages and take months to draft."

In the discussion, the interviewee predicted that companies will be faced with additional administrative work, especially in the initial phase after the introduction of the Data Act, and particularly with regard to drawing up contracts. This poses a potential problem for SMEs, which may not

have the necessary legal resources. This would be a frustrating barrier to participation in the data economy, which is the very aim of the Data Act. The regulations are also intended to enable small companies to participate in the single European data market.

The impact of the Data Act on the industry will become clear in practice

Finally, for all the above considerations, it should be made clear that even experts do not yet know exactly how the Data Act will be implemented operationally at a national level. A good approach to preparation is therefore to look at the current state of knowledge today and examine possible effects on digital products and services within the company – including those that are still in development. The ongoing development of the legislation should be monitored. Direct adjustments in the product and service development process should be limited to the key themes of the Data Act.

6.2 Stefan Grawe and Anna Stuhlmeier – Cargobull Telematics GmbH

Schmitz Cargobull AG, a family-owned business, was founded in 1892 and has become a leader in the manufacture of high-quality truck semi-trailers, bodies and trailers for temperature-controlled freight, general cargo and bulk materials. Around 6,900 people are employed throughout the company. With over 130 years of experience in the industry, Schmitz Cargobull has developed a broad product portfolio and is a pioneer in the field of digital solutions for a huge range of transport tasks. To handle its digital business areas, Schmitz Cargobull founded Cargobull Telematics GmbH in 2004 and started equipping trailers with its own telematics system TrailerConnect® as standard in 2018. Schmitz Cargobull has a production network that spans Europe and offers its products and services throughout the entire continent.

Figure 9 Profile for Cargobull Telematics Case Study

Company: Cargobull Telematics GmbH
Interview: Stefan Grawe and Anna Stuhlmeier
Digital solution: TrailerConnect telematics, TrailerConnect platform

Image source: Schmitz Cargobull

(Image: Schmitz Cargobull)

Stefan Grawe is Interim Manager and Head of Project Management at Cargobull Telematics GmbH and Anna Stuhlmeier is Head of Marketing Communication, Press and PR at Schmitz Cargobull AG. They deal with digital solutions as well as digital business models that enable remote monitoring of commercial vehicles and trailers. The development of a digital platform rounds off the company's telematics services. The interview discussed the topic of digital business models at manufacturing companies and the impact of the upcoming Data Act on data-based services. The following key findings were identified:

- Organizational changes are expected as a result of the Data Act.
- The digital business model will remain unharmed at its core.
- In addition to the potential, administrative challenges will arise from the Data Act.
- The Data Act is expected to have an impact on the industry in practice.

The Data Act will influence digital business models

Cargobull Telematics' portfolio ranges from vehicles with IoT devices (hardware with software), in which data is generated and thus made available, to purely data-driven business models (software). The data service offers a variety of features such as GPS tracking, vehicle movement monitoring, load status and temperature monitoring, and communication capabilities between drivers and the dispatcher. The system uses GPS technology and vehicle sensors to collect and transmit data in real time. The data is then stored in a central database and can be visualized and analyzed by companies or individuals via a user interface. In addition to fleet monitoring, Cargobull Telematics' data service also provides real-time information about the supply chain, including delivery times and locations, so that companies can respond quickly to changes and optimize their logistics processes. The digitalized monitoring solution therefore helps to improve the efficiency, performance and safety of the vehicles, which leads to more resilient and efficient business processes for customers downstream.

The interview discussed the general challenge that the benefit of the business model could be compromised. In these cases, the fear is that customers that have access to the data will already be able to take advantage of all the added value of the digital solution or will be able to bypass the original provider by transferring the data to a third party. However, Schmitz Cargobull's digital solutions get around this problem by enabling customers to process and use the data themselves. Customers also have the option of integrating data from the system with third-party systems to make estimated time of arrival (ETA) estimates.

Schmitz Cargobull provides data to the customer via a technical platform. The added value of the data services comes from the aggregation and management of data generated by integrated devices along the logistics chain. The TrailerConnect platform (data management center) has a connection to all common customer-relevant interfaces. In addition, the devices (hardware) used are monetized. In this case, the revenue is based on a customer-specific contract, which defines the needs in terms of openness of data provision.

It became clear during the discussion that, consequently, the Data Act and the associated directives will influence Cargobull Telematics' business models to some extent. Adjustments will be needed from a contract law perspective to handle data accessibility even more sensitively. The company's digital offerings show that it is already playing a role in advancing the data economy today, and that its services are future-proof.

In addition to the potential, administrative challenges will arise from the Data Act

Schmitz Cargobull operates in the business-to-business (B2B) sector and some changes are assumed due to the introduction of the new legislation with regard to digital business models.

"The Data Act will mean that all data needs to be handled even more sensitively than it is today." – Stefan Grawe

The data laws are a key area of focus for the company and it anticipates administrative challenges as the Data Act comes into effect. One challenge is handling the data in a compliant manner, as the Data Act requires that it is handled sensitively and an exact regulation cannot yet be estimated. This poses specific challenges for digital business models, especially when considering a lack of resources among SMEs. These also include new competencies in the area of contract design, which describe the handling of data in detail and define the transactions of information and money.

The Data Act is expected to have an impact on the industry in practice

Even for the experts, the practical implementation of the Data Act is very uncertain. Therefore, current and subsequent legislation should be monitored. In order to prepare for the operational level, it is advisable to get to grips with the current status of the draft law at an early stage and to prepare one's own company for the possible effects on digital products and services. In this context, the adaptation of products or services should be a central theme in order to act in a legally compliant and profitable manner.

6.3 Interim Result of the Pioneer Reports

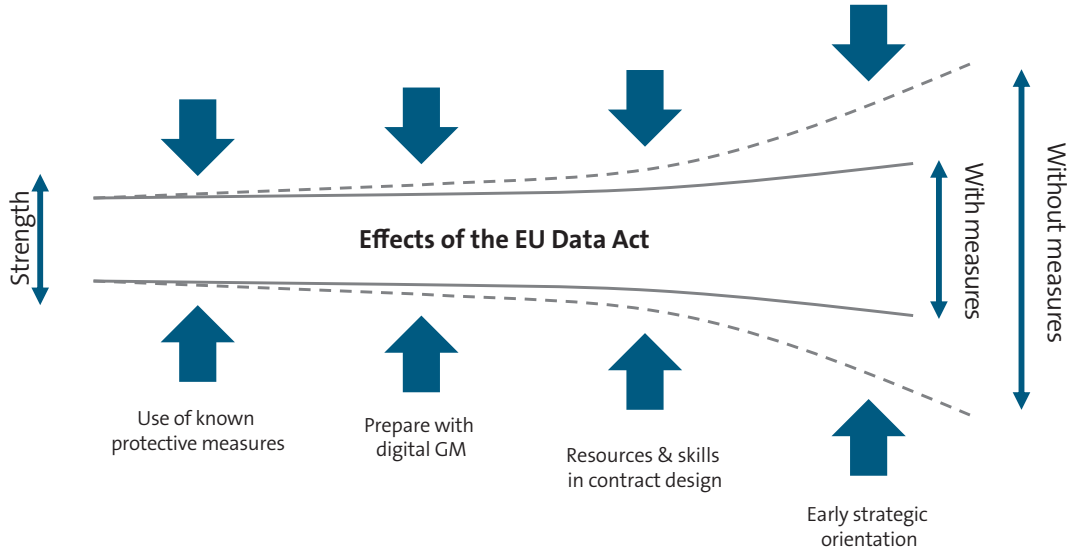
The interviews with experts from companies that have already developed or are already operating data-driven and digital business models provide crucial insights into how they assess the impact of the Data Act. This shows the level of acceptance among customers, while also demonstrating what obstacles can be expected and how, in the course of the dynamic development of the draft law, these companies will continue to be able to act.

The core results, which can be seen in Figure 10, are explained as an interim result below.

Even without the Data Act, today's data protection measures are accepted by customers

Data-based and digital business models are already functioning today. In many cases, the feared data protection issues do not turn out to be a stumbling block. The interviews show that products and services can also be designed so that customers accept them. In this context, the use and exploitation of data are not core elements of the service proposition. In these examples, customers either retain sovereignty over the data, or the improvement of their own products by training algorithms is accepted by customers because they know that no conclusions can be drawn about raw data. This shows that data protection is not necessarily an obstacle to the implementation of data-driven and digital business models.

Figure 10 Schematic Illustrations of Measures Throughout the Relevant Scenario



Source: Institute for Industrial Management (FIR) at RWTH Aachen University

Digital business models serve as preparation for upcoming challenges

The companies interviewed assume that they will not have to make any serious adjustments to their existing business. This is because the necessary structures of a data-driven and digital business model have already been established independently of the Data Act and they are prepared for future challenges. It should be noted, however, that on the administrative side, estimates of the effort required as a result of the Data Act vary. This may be due to the size of the individual companies, as the availability of resources can differ significantly with size, especially in these areas.

It will all come down to the right contract design

In the interviews, it became clear that the success of data-based and digital business models is characterized by the intensive drafting of contracts, e.g., with regard to the mutual obligations of customer and provider, the handling of data and information, and liability claims. It is important that companies build up the necessary competencies and resources to design these contracts, as these competencies will remain relevant when the Data Act is introduced.

"Know your knowns" – and soon

It is clear from the interviews that even companies that already have experience with data-driven and digital business models have difficulty assessing the impact on the MPE industry and also need to develop appropriate strategies to deal with the requirements. At an early stage, companies should orient themselves on the core motives of the Data Act that can be anticipated with a high degree of confidence, and align their strategy accordingly. Changes and adjustments to individual details of the Data Act cannot be ruled out and should not delay early alignment.

7 New Scenarios and Outlook

This section describes scenarios for using the Data Act from the joint design thinking workshop with various experts. As customers and users of the scenarios, the MPE industry was specified as a starting point. As a result, various concepts were developed to identify new areas of potential and risks as well as fields of action and to provide fresh impetus in the dynamic lawmaking phase. The following scenarios are described below:

- Business model innovation as an OEM of mobile machines
- Business ecosystem for predictive maintenance

7.1 Business Model Innovation as an OEM of Mobile Machines

The scenario of using business model innovation to evolve into a service provider describes a typical MPE company that can use the Data Act to free up new resources in relation to the skills shortage to expand its existing business model from just selling mobile machines to becoming a training and consulting business. In doing so, the company uses access to data in the network to become a manufacturer-independent full-service provider for mobile machines.

For the detailed description of the business model innovation, the first step is to define an archetypal persona of a company for which the service model was designed. This should be as representative as possible of relevant facets in the MPE industry. Subsequently, the dimensions of the "magic triangle" for business modeling according to Gassmann et al. are used to describe the developed business model (see Gassmann et al. 2017, p. 7).

Initial situation

This is a company from the MPE industry. The company manufactures mobile (special) machinery, such as rollers or forklifts, and has a highly standardized product portfolio. The company employs approximately 5,000 people and is in the early stages of introducing digital business models via new telematics solutions. The company aims to become a solution provider and has a strong network of service partners. However, the growing shortage of skilled workers is putting a strain on the company's resources. Furthermore, the company is struggling with falling sales.

The following dimensions are used to describe the business model according to Gassmann et al. (see Gassmann et al. 2017, p. 7):

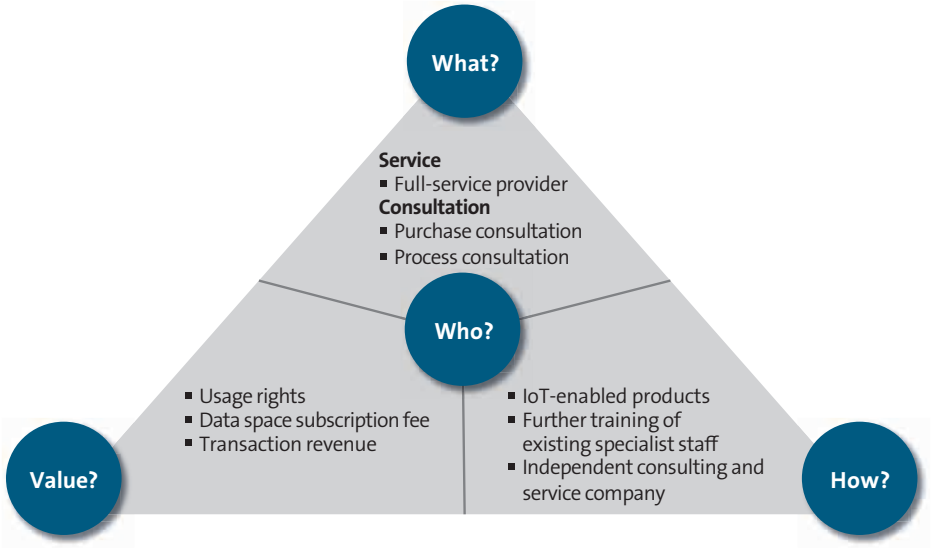
- Value proposition
- Customer
- Value chain
- Revenue mechanism

Value proposition

The company is adding two new services to its existing business:

- **Consulting**
  Manufacturer-independent purchase consulting, system-independent process consulting
- **Service**
  Manufacturer-independent service provider

Figure 11 Illustration of Business Model Innovation as OEM of Mobile Machines (Gassmann et al. 2017, p. 7)



Source: Institute for Industrial Management (FIR) at RWTH Aachen University

With regard to consulting, manufacturer-independent purchasing advice is to be offered to customers, and process consulting is also to be developed. The process consulting portfolio is to cover all processes in which mobile machines are used, irrespective of the products sold. The focus is always on the customer's problem in order to offer high process quality. The range of services is supplemented by the preparation of insights gained from data in the form of a publication for the respective customer and the integration of the original telematics system.

Customer

The business model addresses the company's existing B2B clientèle and expands it to include customers from other OEMs and industries that use the training and process consulting services. This allows the company to diversify its customer base across industries and remain closer to the customer's problem to gather new insights for product design.

Value chain

The company establishes a new company, into which the consulting and service business is spun off. The necessary skilled workers will be taken over from the existing business, which is now freeing up resources due to declining sales figures. These skilled workers can draw on many years of experience and are well equipped for the new tasks through change management.

The Data Act provides the necessary infrastructures for the original company to share machine data with its customers in a suitable data space while retaining data sovereignty. This makes the data space an enabler for generating new insights from the collected data and incorporating them into consulting and service. For this purpose, all products are delivered as IoT-capable. There is cooperation with industry associations to enforce standardization and free up resources.

Revenue mechanism

Revenue is generated through sales and maintenance services. Another source of revenue results from the further training and consulting services. Data providers (OEMs, fleet operators, etc.) can make the insights from their data available to the company in the data space via usage rights, thereby generating revenue. In a subscription model, data providers can determine the extent to which a defined data quality is available to the company and for what fee.

7.2 Business Ecosystem for Predictive Maintenance

The business ecosystem (BE) developed for the implementation of predictive maintenance describes the setup and design of a collaboration network for a typical system manufacturer, which can use the Data Act without extensive digitalization skills to participate in the data economy through a strong network. The Data Act, with its regulatory and technical frameworks, is the central orchestrator of this business ecosystem.

To describe the business ecosystem in detail, the first step is to define an archetypal persona of a company for which the business ecosystem was designed. This should be as representative as possible of relevant facets in the MPE industry. In this context, a business ecosystem is intended to describe the bringing together of players for the joint creation of services that are orchestrated centrally within a common set of rules (see Teece 2018, p. 1).

Initial situation

The company has around 7,500 employees and is part of the MPE industry. In its existing business, it produces and sells new plants with a service life of 20 years or more. Service is included in the sale of new plants. Plants are also modified or can be developed according to specific modifications. Its plants are used by customers in the early stages of the value chain, e.g., in the production of raw materials. Accordingly, the customer base is characterized by B2B relationships. The company has no additional experience working with software other than in the development of plant control systems and would like to improve its skills in IT/OT. The aim is also to optimize production processes and extend the life cycle of the plants sold.

The following dimensions are used to describe the structure and design of the business ecosystem described in Figure 12:

- Benefits
- Prerequisites
- Shaping the business ecosystem
- Initialization

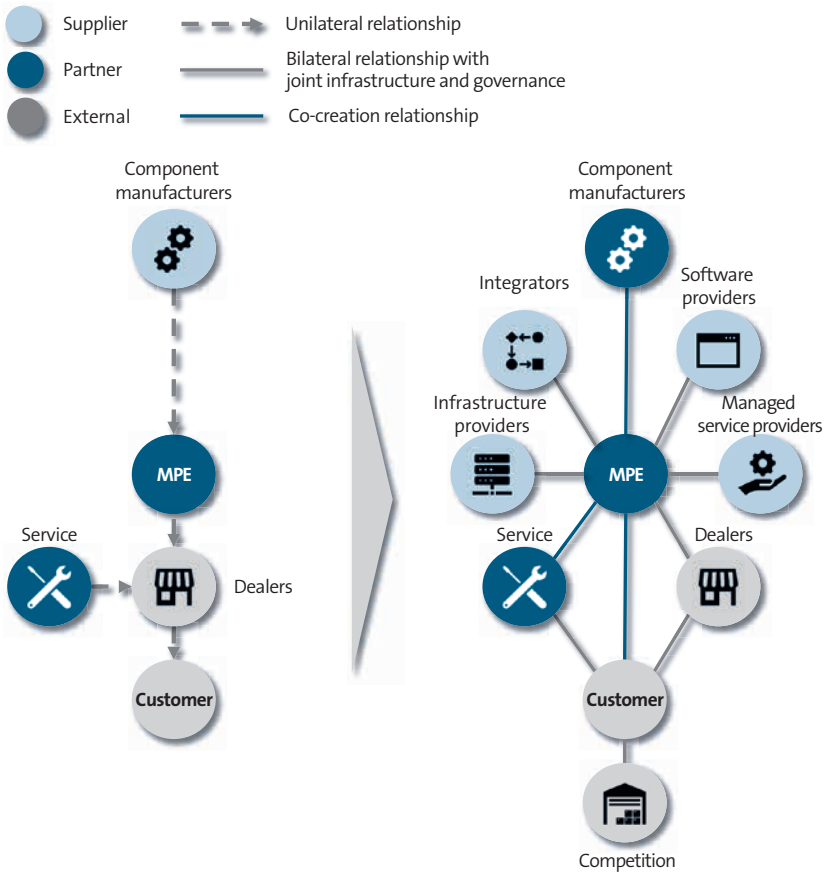
Benefits

The business ecosystem is used to ensure that the company can now offer its customers not only plants and conventional service, but also predictive maintenance through the sale of suitable IoT equipment for the plant as a whole. The life cycle of the plants can be extended and a new form of revenue generation can be used by introducing a subscription model, for example.

Prerequisites

To implement predictive maintenance, the plant and its components must be equipped with the appropriate sensor technology. In addition, the data must be available in a processable form. The plant manufacturer needs access to prediction models for the installed components and must also develop its own models for the entire plant. A suitable service provider is also needed to carry out the work.

Figure 12 Illustration of a Business Ecosystem for Predictive Maintenance



Source: Institute for Industrial Management (FIR) at RWTH Aachen University

Shaping the business ecosystem

The regulatory and technological requirements of the EU Data Act are the central orchestrator of the business ecosystem. These provide the governance structures necessary to orchestrate the secure exchange of data and the creation of new services. As a technological dimension, data spaces are responsible for implementing access management. The orchestrator could also be used to protect against plagiarism by taking appropriate measures to ensure that only verified components, machines and plants can share data.

The company must enter into a partnership with the component manufacturer in the business ecosystem, unlike before when it only offered the plant as a whole. Component manufacturers must provide the necessary prediction models as a first step if the company wants to develop its own model for the entire plant. The component manufacturer will always be able to optimize its models based on the field data.

8 Conclusion

The Data Act opens up new potential for the mechanical and plant engineering industry through participation in an EU data economy. Nevertheless, at the current stage, the draft law presents companies with challenges – both in ensuring that the measures are implemented in compliance with the law as well as in protecting their own business model and keeping it competitive. The core results of the study are described below in terms of potential, challenges and success factors for mechanical and plant engineering.

Potential

The Data Act can encourage the mechanical and plant engineering industry to implement data-based and digital business models by allowing the legal framework to act as a neutral orchestrator in a business ecosystem that enables machinery and plant manufacturers, component manufacturers and service providers to cooperate. This means that other suppliers and providers of digital services can also jointly generate added value in the ecosystem. At the same time, the Data Act can be used to establish new service-based business models. There is potential to open up new markets and diversify revenue sources, as well as to overcome challenges such as the shortage of skilled workers. Together with the building blocks of the EU data strategy, the Data Act can create a single market for data-driven innovations that can benefit the mechanical and plant engineering industry and safeguard its competitiveness.

Challenges

The study shows that the mechanical and plant engineering industry is still confronted with unanswered questions and hurdles with regard to the current status of the draft law. A central issue for the mechanical and plant engineering industry is that “data access by design” is not clearly defined and, depending on the requirements, may entail considerable need for adaptation. The experts also expect to see incompatibilities with existing laws. It is not yet foreseeable which laws may create conflicts in the final version and how they will be resolved. The study shows that concrete measures are still needed to ensure IP protection, and that legislators must therefore provide the necessary clarity. Overall, it appears that the current definitions of products and data in the draft are not practical for the industry.

Success factors

Companies should initiate the legally compliant implementation of the Data Act internally by launching a project at an early stage. The identified project components in the scouting, assessment, strategy and implementation phases are decisive in this respect. The study shows that companies that already have data-driven and digital business models feel particularly well prepared for the upcoming requirements. Companies should adapt the best practices from the implementation of the General Data Protection Regulation. Furthermore, the legally compliant implementation of the Data Act will involve considerable efforts on the part of the legal organization. New competencies, processes and tools will be required here, especially in the area of contract design. From the study, it is clear that companies should prepare strategically for adjustments with the identified project methods and align their strategies with the guiding principles of the EU data strategy. Appropriate organizational and technical factors have been derived for the use of data spaces to address privacy and data exchange challenges.

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VDMA Software and Digitalization represents the interests of software manufacturers and reflects digital technologies aimed at the mechanical engineering industry. The Informatics department and VDMA Software and Digitalization work very closely together and are managed as a single unit within VDMA.

The aim of the two groupings is to promote cooperation between the software industry and mechanical engineering and thus drive forward the digital transformation.

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