Introduction
Due to the growing digitalization, modern products consist not only of hardware and software elements but also of elements to enable connectivity. The connected products continuously transfer data to providers and users. The share of such products will continue to increase over the next years, same as the amount of data from the use phase. Due to volume, velocity and variety of the generated data, the term Big Data is often used. This term includes not only the data itself, but also the process of analysing them.

To get a clear understanding, subproject A10 defined the term use phase data as all data produced during the use phase by the product itself (e.g. sensor-data) and its connected services (e.g. app-data).

Value from Data
Analyses of use phase data can provide several benefits to companies. The insights of these analyses can help to better understand the usage of products and services. This can lead for examples to an enhanced requirement definition, e.g. by deriving realistic loads. They can also be used to provide additional services, such as non-face-to-face maintenance options.

Thus, application areas and potentials are manifold. However, in industry, the full value is not yet derived from data. In an extensive interview study with practitioners from industry, it was highlighted that one of the biggest impediments is the currently missing support for deriving a data strategy [1]. Consequently, the collection of use phase data is not the central challenge, but companies must begin to systematically identify and implement the possibilities offered by data analysis in product development.

Development of a Process Model for the Development of a Use Phase Data Strategy
Based on the identified challenges, subproject A10 derived a process model for the development of a use phase data strategy, which is depicted in Figure 1. It consists of six steps, starting with assigning team members and determining project’s objectives. In the second step, the company’s digital maturity is assessed and the current situation (i.e. available use phase data, competitive situation, infrastructure, etc.) is analysed. The resulting findings then are merged to obtain a comprehensive status quo of the company. Based on the project’s context, possible application areas are identified and potential use cases can be collected. Afterwards, these use cases are further detailed and
consolidated by determining their data needs in step four. In the following step, the remaining use cases are evaluated in detail to enable a well-founded selection of the most promising use cases. Finally, the use phase data strategy can be formulated in the last step. This enables to derive an initial implementation roadmap. The model ends with reflecting whether the defined goals of the project were achieved, or if the strategy needs to be readjusted before implementation.

Application in Industry – A Use Case Catalogue

The beforementioned process model was developed and continuously improved by several industrial case studies. To enhance the applicability of the model, for each step methods and tools are suggested, such as stakeholder analysis approaches, matrix-based tools for matching use cases and data or an effort-value matrix for decision support in step five.

One of the most crucial steps in the process model is the acquisition of possible use cases. To support this task, a use case catalogue was derived in two case studies containing 245 different use cases. To ease the application of the catalogue a software prototype was developed to search for relevant use cases – users can search for a use case based on keywords, data features (e.g., type of use phase data or data analytics approach), and benefits (see Figure 2).

![Figure 2 – Software Prototype of the Use Case Catalogue][3]

Use Phase Data Strategy as a Superordinate Solution Approach

A strategy is only a first step, since a subsequent implementation is crucial in order to generate value from the use cases. The solution approach of subproject A10 therefore consists of two components: A procedure for the development of a use phase data strategy and an approach for flexible process design. The use
phase data strategy represents an overarching framework. The functional sub-strategy of flexible processes addresses the fact that use phase data integration requires the conversion and extension of existing processes in product development. New methods, tools and roles must be integrated into existing processes as well as selected and applied according to the situation. Since use phase data is often not (yet) available for the entire product portfolio, development processes must be configured according to the specific situation. For this purpose, existing process contexts must first be analysed with regard to their variability and strategically prepared for the new challenges (see Figure 3).

Please refer to the original text for detailed references and further information.