LUND UNIVERSITY

LTH

FACULTY OF ENGINEERING

Master thesis

Assessing the Organizational Value and Cost of Emerging Data-as-a-Service

MIOM05
Master thesis (30 hp - Level A)
Division of production management
Lund University, Faculty of Engineering, LTH
Supervisor: Ingela Elofsson
Examiner: Ola Alexanderson

Authors:
Linnéa Eldh, +46722333344, eldh.linnea@gmail.com
August Rosén, +46739134990, august0424@gmail.com

Date: 19-01-2026 - 12-05-2026

Kurs: Degree Project LTH
Avdelningen för Produktionsekonomi
Lunds Tekniska Högskola (LTH)
Ole Römers Väg 1, 223 63 Lund, Sverige
www.pm.lth.se

Abstract

In recent decades, organizations have undergone a fundamental shift from selling physical products to offering services and most recently, data-driven offerings. This transition has elevated data to a central organizational resource and given rise to new service models, most notably Data-as-a-Service, DaaS. While the costs associated with developing and maintaining data infrastructure are often measurable, the value internal DaaS generates remains difficult to quantify. This gap between value creation and value capturing represents a critical challenge as organizations become more dependent on data for operational and strategic decision-making.

The purpose of this thesis is to describe and analyze Data-as-a-Service internally in an international organization and to identify the associated value and cost. The study is conducted as a qualitative, exploratory and problem-solving case study at E.ON, a large European energy company.

The theoretical framework draws on Kotler's Three Levels of Product, Product-Service Systems, PSS, Service-Dominant Logic, SDL, and frameworks for value creation, value capturing, and cost calculation. These theories are applied to two internal data products at E.ON: *Korttidsprognos för fördelningsstation* and *Basdata med reläskyddshändelser*.

The empirical findings reveal that both data products are best understood as service-oriented offerings where value is not embedded in the data itself, but in the augmented product, where the surrounding services such as maintenance, support and quality assurance ensure continuous and reliable data delivery. From a PSS perspective, both data products are classified as result-oriented, meaning that value is realized through operational outcomes rather than through access to the data.

A key structural finding is the phenomenon of value slippage within the organization, which means that the department creating DaaS is separated from the department that captures the value. The analysis also identifies that while some internal DaaS generates a relatively quantifiable exchange value, other data products primarily generate use value, making their economic impact harder to express in monetary terms.

Regarding cost, the study finds that the existing average costing model, built around a single homogeneous cost object, is insufficient for capturing the true cost of individual data products.

The study shows that the traditional ways organizations think about products, costs and value are poorly studied for internal DaaS. As DaaS offerings become more important, the absence of lacking valuation and cost allocation methods risks leaving critical offerings underfunded and underappreciated. Addressing this requires organizations to treat internal DaaS not as a technical function but as a strategic service with organizational impact.

Keywords: Data-as-a-Service, DaaS, value creation, value capturing, cost allocation, digitalization, data product

Sammanfattning

Under de senaste decennierna har organisationer genomgått ett fundamentalt skifte från att sälja fysiska produkter till att erbjuda tjänster och på senare tid datadrivna erbjudanden. Denna övergång har lyft data till en central organisatorisk resurs och gett upphov till nya tjänstemodeller, framför allt *Data-as-a-Service*, *DaaS*. Kostnaderna förknippade med att utveckla och underhålla datainfrastruktur är ofta mätbara, men värdet som intern *DaaS* genererar är ofta svårt att kvantifiera. Denna skillnad mellan värdeskapande och värdefångst representerar en kritisk utmaning i takt med att organisationer blir allt mer beroende av data för operativ och strategisk beslutsfattning.

Syftet med detta examensarbete är att beskriva och analysera *Data-as-a-Service* internt i en internationell organisation och att identifiera det tillhörande värdet och kostnaderna. Studien genomförs som en kvalitativ, utforskande och problemlösande fallstudie på E.ON, som är ett stort europeiskt energiföretag.

Det teoretiska ramverket bygger på Kotlers tre nivåer av en produkt, *Product-Service Systems*, *PSS*, *Service-Dominant Logic*, *SDL*, och ramverk för värdeskapande, värdefångst samt kostnadsberäkning. Dessa teorier tillämpas på två interna dataprodukter på E.ON: *Korttidsprognos för fördelningsstation* och *Basdata med reläskyddshändelser*.

De empiriska resultaten visar att båda dataprodukterna bäst förstås som tjänsteorienterade erbjudanden där värdet inte är inbäddat i själva datan, utan i den förstärkta produkten, där de omgivande tjänsterna som underhåll, support och kvalitetssäkring säkerställer kontinuerlig och tillförlitlig dataleverans. Ur ett PSS-perspektiv klassificeras båda dataprodukterna som resultatorienterade, vilket innebär att värde realiseras genom operativa resultat snarare än genom åtkomsten av datan.

En viktig insikt är fenomenet *value slippage* inom organisationen, vilket innebär att avdelningen som skapar *DaaS* är separerad från den avdelning som fångar värdet. Analysen identifierar också att medan en del intern *DaaS* genererar ett relativt kvantifierbart *exchange value*, så genererar andra dataprodukter främst *use value*, vilket gör deras ekonomiska utfall svårare att uttrycka i monetära termer.

För kostnader finner studien att den befintliga genomsnittliga kostnadsmodellen, byggd kring ett enda homogent kostnadsobjekt, är otillräcklig för att fånga den verkliga kostnaden för enskilda dataprodukter.

Studien visar att det traditionella sätten organisationer tänker på produkter, kostnader och värde är dåligt studerade för intern *DaaS*. I takt med att DaaS-erbjudanden blir viktigare riskerar avsaknaden av värderings- och kostnadsallokeringsmetoder att lämna kritiska erbjudanden underfinansierade och underskattade. För att motverka detta krävs det att organisationer behandlar intern *DaaS* inte som en teknisk funktion utan som en strategisk tjänst som har organisatorisk påverkan.

Nyckelord: Data-as-a-Service, DaaS, värdeskapande, värdefångst, kostnadsallokering, digitalisering, dataprodukt

Preface

This master's thesis was written by Linnéa Eldh and August Rosén during the spring semester of 2026. The thesis constitutes the final project of the Master of Science in Industrial Engineering and Management, with a specialization in Business and Innovation, at Lund University, Faculty of Engineering.

We would first like to express our warmest thanks to our academic supervisor at the Division of Production Management at LTH, Ingela Elofsson. Her clear guidance, strong academic expertise and genuine support have provided us with invaluable direction and continuous encouragement throughout the research process.

Secondly, we would like to express our sincere gratitude to our supervisors at E.ON, Torbjörn Stenström and Johan Lennerup, for their invaluable guidance, support and engagement throughout the project. Their insights and encouragement have been highly appreciated.

Finally, we would also like to extend our gratitude to all employees at E.ON who participated in interviews and generously shared their knowledge and experiences with us. Without your valuable insights, this thesis would not have been possible to conduct.

Linnéa Eldh
Lund, 12th May 2026

August Rosén
Lund, 12th May 2026

Table of Contents

List of Figures

List of Tables

1 Background and Purpose

In the past decades, society has moved from primarily selling physical products to offering services and, most recently, even selling data and data-driven offerings (Vandermerwe & Rada, 1988). This market shift has been enabled by rapid digital transformation, which has changed the way organizations create and capture value. The digitalization has contributed to the emergence of data as a central resource and enabled new forms of value creation, such as data-driven personalization.

While digitalization simplifies greater access to data, it simultaneously contributes to unfamiliar organizational and economic challenges. In order to transform raw data into actionable insights, organizations must invest in data management, and as a result, increasingly data-related activities correspond to higher organizational cost (Bharadwaj et al., 2013; Davenport & Prusak, 2000). However, since data is intangible and therefore difficult to measure, the challenge is to capture the generated value.

This transformation has contributed to a situation where data management services are becoming critical for organizational development, performance, and competitiveness, but the tools for valuing and justifying these activities remain unclear.

1.1 The Emergence of the Service Economy

Historically, the industrial economy accounted for a major share of the economic output in developed countries. During the late twentieth century and the beginning of the twenty-first century, a market shift to a more service-led economy emerged. The transition has largely been driven by technological development in society, which enabled new ways of creating and delivering value to customers. (Greenhalgh & Gregory, 2001)

This transformation is often described through the concept of servitization, where service is used as a value-adding resource to the core product. The switch to a more service-oriented solution can be seen in most industries, but has mostly been driven by the customers. The change is therefore similar to other market-driven approaches, but instead of focusing on the customers' needs and how to satisfy them through core business activities, the service approach focuses more on ways to broaden their offerings. (Vandermerwe & Rada, 1988)

Together with technological development, new forms of services have evolved together with it. One of them is the use of Software-as-a-Service, SaaS, which is when software is accessed digitally, instead of being locally installed. The model can be designed in many different ways, either through free access, subscription-based, or usage-based payment. (Wojnarowski, 2025)

1.2 Digitalization of the Society and Organization

Digitalization of society has been discussed since the 1970s, when the computer was first defined as a powerful "information-disseminating machine" with the potential to transform everything from bureaucracy to scientific research (Wachal, 1971). Society has moved from a time when the challenge was to make information visible to a time where data is available as a service, regardless of physical location, contributing to the emergence of modern models such as Data-as-a-Service, DaaS.

The digitalization has radically transformed organizations' way of working with data, in terms of data generation, data accessibility and data usage. Technological development has enabled the scalability of data, allowing organizations to store, process and distribute large volumes of data both internally and externally. Scalability has also contributed to the increased availability of data and made it more feasible for different functions within an organization (Wojnarowski, 2025). The increasing volume of data has increased the complexity of data management, and to manage the complexity by making data more accessible, different digital platforms and cloud-based solutions have been developed (Marston et al., 2009). Besides scalability, digitalization has also enabled access to real-time data, which in turn can be used to support operational and strategic decision-making. (Chen et al., 2012)

As organizations become increasingly data-driven, expectations regarding delivery speed, reliability and data quality have intensified. Data consumers increasingly expect access to real-time, accurate and trustworthy data, which contributes to additional requirements on data management and governance. This also requires a shift in traditional data management from a technical accuracy and "development perspective" to a "customer perspective". (Wang & Strong, 1996)

1.3 Data-as-a-Service

Data-as-a-Service, DaaS, is an emerging service model where data is treated as a primary resource and makes data available for users. In contrast to traditional models such as Software-as-a-Service, SaaS, Platform-as-a-Service, PaaS, and Infrastructure-as-a-Service, IaaS, which is more focused on providing technical software and infrastructure functionalities. DaaS aims to support flexible accessibility of data by enabling broad and rapid access to critical information (Wang & Strong, 1996).

DaaS is often offered within organizations through internal data services that support analytics, reporting and decision-making across different business units. However, the distinction between the created value and the accessibility of data, what Davenport and Prusak (2000) mention as "awash in data", is important since value first emerges when the data have been interpreted and used. Therefore, the value created by DaaS highly depends on how data is processed and applied by users rather than the data itself.

DaaS requires data availability, quality and consistency, and as data becomes available to a broader group of users, organizations must ensure that the data is reliable, updated and delivered in certain timeframes. Those requirements are crucial for effective data usage in decision-making processes (Wang & Strong, 1996). To manage the new requirements, organizations have to allocate resources, which introduces new challenges related to cost and data governance. For organizations to be able to provide DaaS, they require continuous investment and development in data infrastructure, coordination and competencies (Marston et al., 2009). Since the value created by DaaS often remains indirect due to the intangible service, organizations may struggle to justify the value of DaaS.

1.4 Valuation and Pricing Challenges

Despite the growing importance of data-driven services within organizations, the financial value of data remains difficult to define. The rationale for this lies in the fact that data is a unique, intangible product whose value differs from customer to customer. The wide variation in data has led to a lack of consensus regarding appropriate data pricing methodologies. Data valuation can, however, be divided into two broad perspectives, (1) what costs are associated with the creation of data, and (2) what value the data generates for the customer. (Manley, 2024)

The cost-based methods of valuating data determine costs associated with the creation of data, by identifying all costs connected with creating, gathering and storing the data. This part primarily focuses on the costs associated with the raw data, while the value-based perspective primarily focuses on the generated value of the data for the customer. The value-based estimation is therefore more complex than the cost-based estimation, since the model evaluates the potential revenue stream generated by the data insights. (Manley, 2024)

The same data set can be perceived as having different values depending on the user. One determining factor of the estimated value of the data is the internal technical expertise and knowledge within the organization. Consequently, organizations with higher levels of this factor have greater possibilities to generate more value than organizations with lower resources. Additionally, another already discussed factor is the distinction between accessibility of data and received value. (Manley, 2024)

Together, these perspectives illustrate the fundamental challenge of valuating data. While the costs associated with creating the data are usually measurable, the value generated from the insights is complex and harder to define.

1.5 Summary

The transition towards a more service-oriented and digitalized society has positioned data as a central resource for organizations. This has enabled new service models, such as DaaS, to be used for internal activities, and has created new requirements for data management. Greater dependence on internal data affects how organizations work with data governance. While these costs are usually measurable, the value that DaaS generates for the organization is harder to define.

1.6 Purpose

Based on the background outlined in this section, this master's thesis aims to:

Describe and analyze Data-as-a-Service, DaaS, internally in an international organization, and identify the associated value and cost.

2 Methodology

The aim of this chapter is to outline the methodology used in this master thesis to ensure transparency regarding the design and execution to address the purpose of this thesis. This chapter starts by defining the purpose of the research and is followed by the research methodology. The research methodology specifies the methodological design, explaining why a case study is considered the most appropriate strategy to address the research question, and the criteria applied when selecting the case company.

2.1 Research Purpose

According to Höst et al. (2006), it is important to choose the methodology depending on the goal and characteristics of the thesis. Höst et al. (2006) summarize those aims as descriptive-, exploratory-, explanatory- and problem-solving studies. Descriptive studies are characterized by the purpose of identifying and describing how something works or looks like in practice. Exploratory studies investigate to create a deeper understanding of a phenomenon, especially in situations where the information is limited. Explanatory studies seek to identify connections and causal explanations for how and why something works in a certain way. Lastly, problem-solving studies aim to find solutions to an identified problem in a specific context. Consequently, the methodological approach should be customized to the primary objective the thesis aims to achieve.

To fulfill the aim outlined in chapter 1.6, *Describe and analyze Data-as-a-Service, DaaS, internally in an international organization, and identify the associated value and cost*, this study combine both an exploratory- and problem solving orientation. The exploratory phase seeks to understand in depth how DaaS creates value within an organization, while the problem solving phase aims to evaluate DaaS in relation to the associated costs.

2.2 Research Methodology

Different methodologies are suitable for various purposes, and thus choosing methodology is important. According to Höst et al. (2006) the four main methodologies for a master thesis are: (1) Survey, (2) Case study, (3) Experiment and (4) Action research, see Table 1. A case study, with selected criteria presented later in this section, is the most appropriate methodology to fulfill the purpose of this thesis.

Table 1: *Summary of the different methodologies.* (Höst et al., 2006)

Method	**Main purpose**	**Primary data**	**Design**
Survey	Descriptive	Quantitative	Fixed
Case study	Exploratory	Qualitative	Flexible
Experiment	Explanatory	Quantitative	Fixed
Action research	Problem solving	Qualitative	Flexible

2.2.1 Case Study

A case study is characterized by an in-depth analysis of one or a few cases with the purpose of being exploratory (Höst et al., 2006). The methodology of a case study is flexible by nature and can be continuously adopted, for example, by adapting the interview questions to the changed context. Case studies are primarily qualitative, and primary data gathering mainly consist of interviews, observations and archival analysis. In this case study, semi-structured interviews are used for primary data and will be described in more detail in the following section.

Given the nature of this thesis, a single case study was considered the most suitable methodology, as the study aims to create an in-depth understanding of how DaaS creates value and costs in a specific organizational context. However, a comparative analysis of two data products was conducted to illustrate similarities and differences of DaaS within an organization. As outlined in the background, DaaS is complex and a situation-based phenomenon, where value capturing depends on processes and interactions between different actors, and while a method that enables a detailed and holistic analysis is required. A case study is suitable in research where the research question focuses on how and why a phenomenon expresses itself in a real environment, rather than establishing general conclusions. By investigating a single case in its natural form, the conditions are created to integrate multiple data sources to analyze the relationship between value and costs in an in-depth and nuanced way. Consequently, the case study approach enables a contextualized understanding of DaaS on an international organization.

2.2.2 Criteria for Selecting the Case Company

The choice of case study object is a crucial prerequisite for being able to answer the purpose of the thesis with depth and precision. According to Flyvbjerg (2006), it is important to identify the right case company since the method is not only a tool for generating ideas, but a central method for testing hypotheses and building theories. By carefully defining criteria for selection, the study ensured that it can contribute the type of contextual and practical knowledge that characterizes a good case company. The following listed criteria are those for which the case company has to comply:

- International organization
- Operating in Sweden
- Operating within a mature industry
- Undergoing a digitalization journey
- Facilitates DaaS internally

The selected case company, E.ON, fulfills all the predefined criteria mentioned above. First, E.ON SE is an international energy group with operations in 17 European countries, fulfilling the criterion of being an international organization. Second, the case company studied in this thesis, E.ON Energy Networks, operates exclusively within the Swedish electricity grid market, fulfilling the criterion of operating in Sweden (E.ON, 2025). Third, the electricity grid market in Sweden is a well-established and regulated industry with several large and many small actors, characteristics that are typical of a mature industry (Andersson, 2025). Fourth, digitalization is one of two strategic enablers of E.ON Energy Networks proactive strategy towards 2030, and the organization has in recent years actively worked towards a more data-centric architecture that views data as a primary organizational asset. The ongoing transformation shows that E.ON is undergoing a digitalization journey. Fifth, E.ON Energy Networks is actively working with something called *Data Products* that are accessible to all employees. This internal structure demonstrates an active facilitation of DaaS internally, which satisfies the final criterion (E.ON, 2025).

2.3 E.ON: Company Description

E.ON Sverige is part of the international energy group E.ON SE, with headquarters in Essen, Germany. E.ON SE has operations in 17 European countries, with approximately 77000 employees, of which E.ON Sverige consists of 3100 employees, including subsidiaries. E.ON Sverige is divided into three business areas: Energy Networks, Energy Infrastructure Solutions, and Energy Retail, all of which are separate companies within the E.ON Sverige group, see Figure 1. Energy Networks is the largest business area within E.ON Sverige and manages E.ON Sverige's energy grids. E.ON Energy Networks will be the case company for this thesis and will later be referred to as E.ON or the organization. (E.ON, 2025)

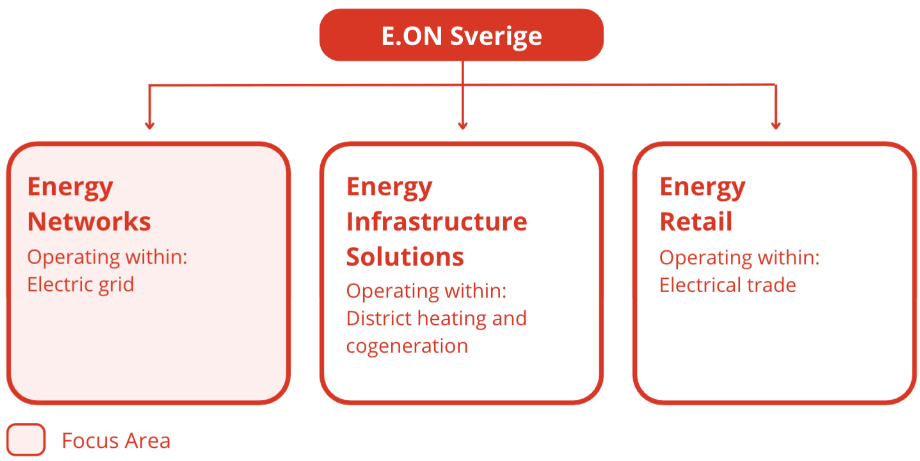

Figure 1: *Illustration of E.ON Sverige's business areas.* (E.ON, 2025)

2.3.1 Operating Market

E.ON operates in the Swedish electricity grid market. The market is divided into two main parts, (1) the transmission grid, which facilitates large-scale electricity transmission throughout Sweden, and (2) the distribution grid, which distributes electricity to customers through regional and local grids, see Figure 2. E.ON operates in the second part, as the first part is monopoly operated and developed by the government owned company Svenska Kraftnät. (Andersson, 2025)

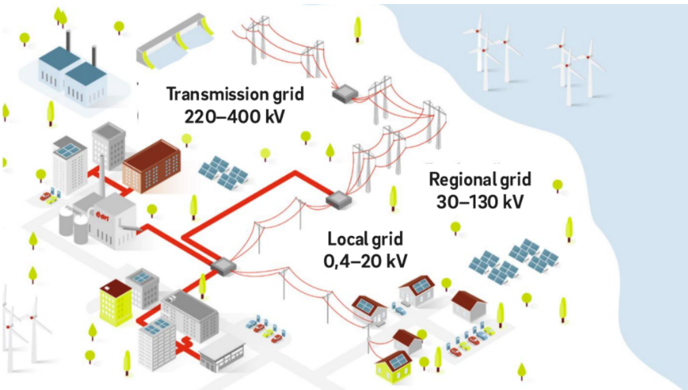

Figure 2: *Illustration of the structure of the Swedish electricity grid.* (E.ON, 2025)

The second part, the distribution grid, is divided into regional and local grids. The regional grid is owned by a few large power grid companies, one of which is E.ON. Regional grids work mainly as a transportation connection between the transmission grid and local grids, but some large electricity customers are directly connected to the regional grid, as are some small- and medium-scale energy producers, such as wind farms. Before entering the local grid, the electricity is transformed at the distribution stations (Sw. *Fördelningsstationer*) to the right voltage. The local grids are owned by several different grid companies, including E.ON, and transport electricity with a lower voltage from the regional grid to less electricity consuming customers. Both regional and local grids are divided into geographical areas that are monopoly owned by a single power grid company, due to the high capital costs of building power grids. E.ON is the largest grid owner in Sweden, with most of its grid in the local grid market. (E.ON, 2025)

2.3.2 Energy Networks

E.ON Energy Networks delivers electricity to 1.1 million customers, mostly private households, but also to companies of all sizes. The organization has most of its operations in southern Sweden, but also some in the middle of Sweden. The business area has approximately 1100 employees across 13 offices in the regions, with its head office in Malmö. (E.ON, 2025)

The business area faces a major challenge in terms of the forecast of electricity demand in Sweden in the near future, see Figure 3. E.ON Energy Networks therefore aims to invest 27 billion SEK in the segment between 2024-2027 to strengthen the grid and to meet the increased demand from customers. (E.ON, 2025)

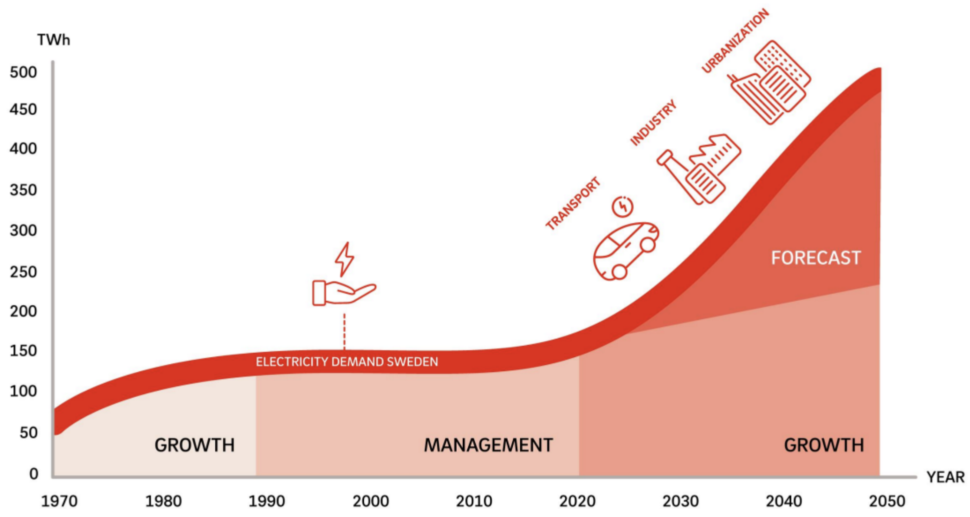

Figure 3: *Forecast of future electricity demand in Sweden.* (E.ON, 2025)

To meet the projected electricity demand, E.ON Energy Networks has created a proactive strategy for 2030, including four areas and two enablers. The areas are (1) Capacity, to meet capacity needs, (2) Availability, have <30,000 customers with >3 outages, (3) Customer relations, Customer Satisfaction Score of 75 percent for private and business customers, and (4) Sustainability, net zero by 2035. The two enablers for this to happen are (1) Digitalization and (2) Safety, culture and competence. In this thesis, the focus will be on the digitalization enabler.

2.3.3 Digitalization

E.ON means that "*In today's competitive landscape, digitalization has become essential for businesses to stay relevant*" (E.ON, 2025). In the last years, E.ON have therefore worked towards a more *Data-centric* architecture that is viewing data as a primary asset within the organization. The digitalization work within E.ON is mainly carried out in the Digital & Business Transformation department. However, the development work related to digitalization and data is mainly carried out by Digital Development, and the Data Management and Data Analytics departments, see Figure 4 for organizational structure.

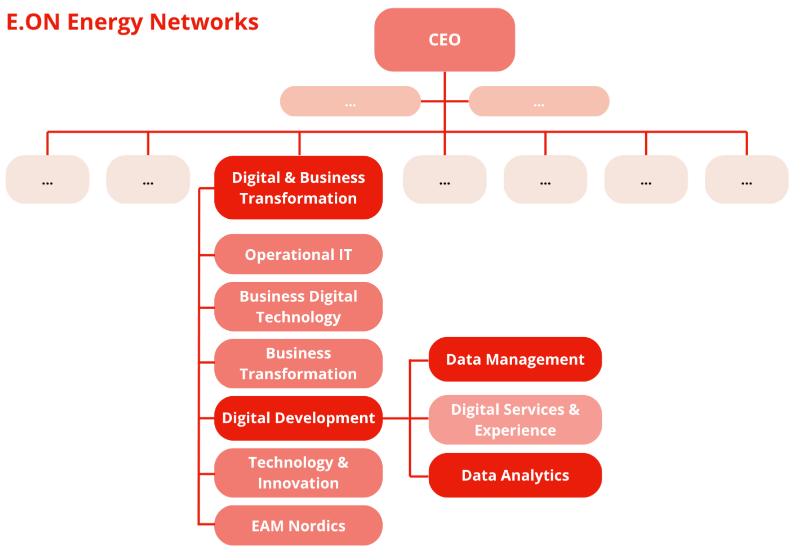

Figure 4: *Illustration of organizational structure within E.ON Energy Networks.* (E.ON, 2025)

Within Data Management, E.ON has created something called *Data Domains* in order to create a more data-centric architecture in the organization. Each Data Domain is responsible for a main business area within the organization and consists of a *Data Team* with a responsible *Data Product Manager*. Every Data Domain also has a connected *Data Owner*, which is someone with insight from the business area who can communicate their thoughts and requests to the Data Product Manager. Data Teams can vary in size, depending on the requirements from the connected domain, and work continuously with development and maintenance of *Data Products* for the connected domain. By comprising multiple employees in the Data Teams, they build organizational redundancy and ensure that competence grows alongside the data products. (E.ON, 2025)

2.3.3.1 Data Products

Data products are developed and maintained by data domain teams, but are accessible to all employees within E.ON through a centralized digital portal, the *Data Catalog* (Sw. *Datakatalogen*). A data product can be defined as a structured and reusable data offering that transforms raw data from several measurement points, such as *Smart Meters* in the electricity grid, into a standardized and user-oriented output. A Data product, therefore, includes the logic, code, and processing required to transform the underlying raw datasets into a usable format. (E.ON, 2025)

However, data products are not immune to errors, and disturbances or other unexpected events can cause them to become temporarily unavailable. When this occurs, the responsible Data Team currently attempts to resolve the issue on a 'Best Effort' basis during normal working hours. Although this approach may be enough for many data products within the organization, it can have larger consequences for more critical ones. For data products where resolution delays have large consequences for the organization, additional support may be required. (Person A, 2026) To discuss whether the cost of additional support is economically sustainable for the organization, it is essential to first analyze the present value and costs generated by the data products.

Criteria for selecting data products

The selection of data products was guided by their relevance and importance to the core operations of the organization. To ensure that the thesis captured meaningful and representative insights, the chosen data products had to be critical to the business and actively integrated into operational processes. This implies that the data products are not only used occasionally, but form an essential part of daily decision-making and workflow execution.

In addition, the selection includes two data products at different stages of maturity. One data product, *Korttidsprognos för fördelningsstation*, is already implemented and continuously used in operational work, allowing for analysis based on established practices. The other data product, *Basdata med reläskyddshändelser*, is currently under development and is planned to be implemented in the near future. Despite not yet being fully operational, it is expected to become critical for enabling a more proactive way of working within the organization.

By including both an existing and an emerging data product, the study captures both current and future perspectives of Data-as-a-Service, while still ensuring that both cases are highly relevant to the organizations operational context.

2.3.4 Pricing Structure at E.ON

E.ON Energy Networks operates under a regulated pricing model for its external customer operations. The electricity distribution tariffs charged to end customers are based on capital investments in the grid combined with an allowed profit margin. Both the margin and the proportion of capital that can be included are regulated by the Swedish Energy Agency (Sw. *Energimyndigheten*), meaning that external pricing is not freely determined by the organization, but constrained by regulatory frameworks. (Person A, 2026)

2.4 Research Approach

According to Daniel and George (2025), research approaches can generally be divided into deductive and inductive, see Figure 5. A deductive approach starts a broad perspective with existing theories and uses them to formulate a specific hypotheses. This approach moves from theory to data, where the empirical findings are used to confirm or challenge the theoretical assumptions. In contrast, an inductive approach starts from the other end and begins with empirical findings and seeks to develop new theoretical insights based on the identified patterns in the data.

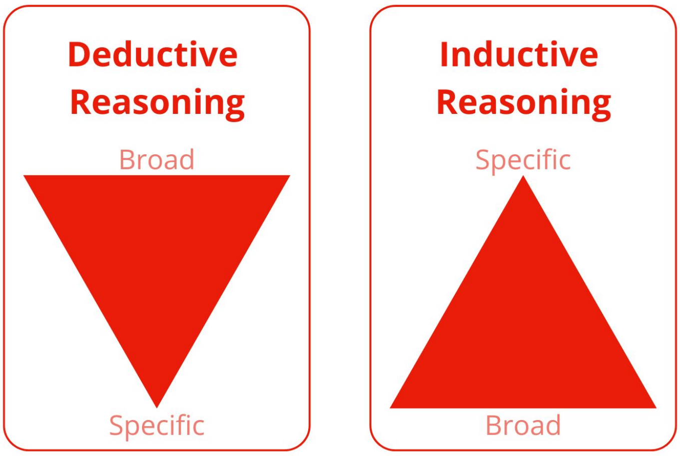

Figure 5: *Difference between deductive- and inductive research approach.*

In practice, it is common to combine elements of both approaches and an abductive approach represents this merger (Philipsen & Hjalager, 2024). The abductive approach involves a continuous interaction between theory and data from empirical findings. This approach allows the researcher to combine theoretical concepts and empirical findings to refine the study and interpretations, rather than strictly testing theory or generating theory from scratch. In contrast to trying to find general theory from multiple observations, the abductive approach seeks to define new theoretical perspectives from the observed phenomenon. However, abductive methodology can be used for multi purposes, both to establish new theories as well as refine existing concepts or for hypothesis generation.

This thesis adopts an abductive approach since the study is based on existing theoretical concepts and simultaneously incorporates insights gained from the empirical data. According to Philipsen and Hjalager (2024) the abductive approach is well suited for case studies since the approach allows a flexible design of the research. The approach also enables the study to both apply existing theories and adapt them to the specific context of Data-as-a-Service.

Given that DaaS represents an emerging form of service and value offering within organizations, the phenomenon under study is still not fully theoretically established. This exploratory nature motivated the use of an abductive research approach, where existing theories are iteratively combined with empirical insights. Rather than strictly testing predefined hypothesis or purely generating theory from data, the abductive approach enables a continuous exchange between theory and empirical findings.

2.4.1 Research Process

The research process has been carried out in different steps where theoretical and empirical elements have gradually been developed and integrated. The research process is outlined in Figure 6 and the process started with meetings with supervisors at the organization, E.ON, to discuss potential research areas and identify a relevant problem area. Based on these discussions, the purpose of this master thesis was formulated to grasp the evaluation problem with Data-as-a-Service. However, before investigating the problem in the organizational context, the researchers initially conducted a literature review to create a theoretical foundation and to identify relevant models and concepts for the research subject. The literature review formed the basis for the theoretical framework presented in chapter 3.6.

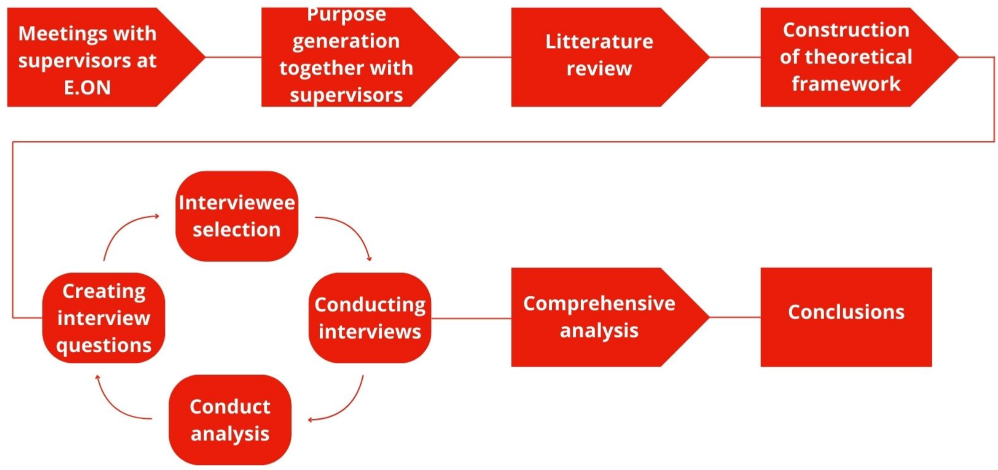

Figure 6: *Illustration of the research process.*

When the theoretical framework was established, the empirical data gathering began. At this stage, an interview guide was developed with relevant interview questions based on the study's purpose and theoretical framework. In parallel, suitable interviewees within the organization were identified and selected. The interviews were later conducted with the selected interviewees and the gathered data was continually analyzed. The interview process was iterative, abductive and semi-structured, which allowed the interviews to be flexible and adapted to gain deeper knowledge about the phenomenon. Finally, the results were compiled into a more comprehensive analysis that formed the basis for the study's conclusions.

2.4.2 Qualitative Analysis

The analysis of a study can be qualitative or quantitative, depending on the type of data on which the analysis is based on. Qualitative analysis consists of data characterized by words and descriptions, which makes it rich in detail and nuanced in its character. Quantitative analysis is based on data characterized by something that can be counted or easily can be classified as, for example, number, color or weight. The analysis of data differs depending on the classification of data. Quantitative data can normally be statistical analysis, due to the nature of the data type, while qualitative data have to be analyzed by other methods which are based on more classification of the data. (Höst et al., 2006)

This study is primarily qualitative, as it is based on insights derived from interviews, which is deeply described in the next section. However, the analysis incorporates elements of quantitative data in terms of estimated values. These estimations are used to support and illustrate the qualitative findings rather than to provide precise measurements.

2.5 Data Collection Method

Data gathering can be divided into primary and secondary data. Primary data refers to the data created or collected by the author, while secondary data belong to someone else. This thesis is based on both secondary sources, where the data collection consisted of a literature review and internal secondary data from the organization, and the primary sources where the data was collected through interviews.

The literature review formed the foundation of the thesis theoretical framework and was used to identify and describe relevant theories. Internal secondary data from the organization provided a deeper understanding of the case context through information about the organization's structure and market environment. Finally, primary data was collected through interviews with different business units within the organizations. The interviews generated valuable qualitative and quantitative insights about value creation and cost structures within the organization. Together, the three chosen methods of data gathering enabled a well-grounded analysis, ensuring both conceptual precision and empirical depth.

2.5.1 Literature Review

A literature review was performed to gain a deeper understanding of relevant areas of study and grasp the organizational dimensions of DaaS. The literature review should according to Höst et al. (2006) be an iterative process, due to the opportunity to include the latest published insights. The review strengthened familiarity with core concepts related to service logic, value creation and cost allocation, enabling the study to be based on established theoretical models. To ensure understanding of these areas, primarily management books and journal articles were used.

Beyond summarizing existing theories, the literature review also revealed areas where research remains fragmented, particularly regarding the valuation of internal data services and the relationship between value realization and cost justification. Finally, by establishing the theoretical framework prior to data collection, the literature review also provided a conceptual foundation that guided the design of interview questions.

2.5.2 Company Secondary Data

The secondary data of the company complemented the literature review with insight into the organization. The primary purpose of including company secondary data was to create a deeper contextual understanding of the organization's structure and function. As it is a complex organization with several business units through which DaaS is developed, managed and used, this insight was valuable. By investigating internal documents such as organizational structures, process descriptions and strategic material enabled a more nuanced review of where DaaS is produced and how it is distributed and used within the organization.

Furthermore, the internal documents were used to understand the organizational size, operating market and its market situation. The material also contributed to identifying relevant actors for interviews and to formulate more contextually adapted interview questions. Overall, the use of company secondary data has strengthened the contextual validity of this thesis and enabled a well-founded analysis of DaaS within the chosen organization.

2.5.3 Interviews

Interviews were conducted to both ensure the relevance of secondary data and to gain a deeper understanding of DaaS internally of E.ON, the captured value and the associated costs. Interviews can be structured in different ways depending on the goal, structure and purpose of the interview, where the most common structures are (1) Structured-, (2) Semi-structured- or (3) Unstructured, see Table 2 for an overview of the different concepts (Höst et al., 2006).

The characteristics of a structured interview are that the form is descriptive or explanatory, the questions are concrete with tied responses, and the goal of structured interviews is to understand the relation between different concepts and connections. On the other hand, unstructured interviews are characterized by a more exploratory form, more open questions, and with the goal of understanding the individuals experiences of a phenomenon. Semi-structured interviews can be considered as the merger between structured- and unstructured interviews. Semi-structured interviews are often a descriptive or explanatory form, but do often have a combination between concrete- and open questions. The goal of semi-structured interviews is to gain insight into how individual's perceive and experience both quantitative and qualitative of a phenomenon. (Höst et al., 2006)

Table 2: *Differences between Unstructured, Semi-Structured and Structured interviews.* (Höst et al., 2006)

	Unstructured	**Semi-Structured**	**Structured**
Goal	The individual's experience of the qualities of a phenomenon	The individual's experiences of quantities and qualities	The interviewer seeks knowledge about the relationship between concepts and connections
Form	Interview guide, open within selected question areas	Mixed fixed questions with bound answers and open questions	Fixed questions with fixed answers
Purpose	Exploration	Descriptive/-explanatory	Descriptive/-explanatory

Semi-structured interviews were considered to be the most suitable for this master thesis. The purpose of the interviews was to gain deeper knowledge and insights about the product, the value creation and the associated costs. Each interview was carried out with the support of a predetermined interview guide that functioned as a structuring framework, but the method also provided space for follow-up questions and in-depth discussions. In some interviews, questions related to perspectives other than those originally intended for the specific interview were also asked when the conversation indicated that additional relevant insights could be obtained.

The initial plan was to ask product-specific questions to those who developed the product, questions about value capture to users of the products, and cost-related products to the finance department and product developers. However, during data collection, it became clear that valuable perspectives also emerged when different interview groups were allowed to reflect on more than the predefined areas. The semi-structured format enabled a flexible and exploratory approach, which contributed to a more nuanced understanding of the relationship between product, value and costs.

2.5.4 Interview Method and Selection

The interview process was designed to capture multiple organizational perspectives on DaaS, including product development, cost structures and value realization.

The data collection began with a series of exploratory semi-structured interviews conducted with the supervisor at the organization. The primary purpose of these interviews was to develop an initial understanding of the organizational context, including how data products generally are developed, managed and utilized within the organization. In parallel, an interview was conducted with a financial controller to learn how costs are structured and allocated within the organization. In addition, an interview with a platform manager for a key IT system was carried out to understand the technical infrastructure supporting the data products.

After this initial phase, the empirical data collection was structured into three rounds of interviews, each targeting different roles within the organization. In the first round, Data Product Managers were interviewed to understand how respective data product functions, how they are developed and maintained, and how resources are allocated within the data teams. These interviews provided insights into both the operational aspects of the product and the effort required to maintain them.

In the second round, Data Product Owners were interviewed with the aim of capturing the perceived value of the respective data product within the organization. These interviews focused on how the data products contribute to decision-making, operational efficiency and organizational performance.

Finally, in the third round, end users of the data products were interviews to further explore how value is realized in practice. This phase provided a user-center perspective, highlighting how the data products are applied in daily operations and how their usefulness is perceived across different functions.

By structuring the interviews across multiple organizational roles and conducting them in iterative rounds, the study was able to capture a comprehensive and nuances understanding of both the value creation and the cost structured associated with DaaS. All interview participants have been anonymized and are referred to as Person A–L, where the order corresponds to the sequence in which they are mentioned in the text.

2.6 Credibility of the Study

Academic research can be credible in various forms. According to Höst et al. (2006), a study can either be credible in terms of well-founded conclusions, capture the phenomenon that the study intends to analyze or be general in terms of result. To create a credible thesis, the understanding of these concepts is important to consider during the research process.

2.6.1 Reliability

Reliability refers to the data collection and analysis credibility, and to what extent the results can be considered to correspond to actual reality. To reach high reliability requires clear and transparent description of the research method, including methods for data collection and how the data have been interpreted and analyzed. Transparency of the method description makes it possible for others to follow the research process and assess its quality. Reliability can also be strengthened by having an external party review the data collection and analysis, for example through supervisions. Furthermore, so-called respondent validation can be used, where interviewees are given complications or interpretations of the collected data to confirm that their statements have been reproduced correctly. Through these measures, the reliability and accuracy of the study can be increased. (Höst et al., 2006)

To ensure reliability of the study, all parameters above were considered. First, a transparent and structured methodological approach was applied, where methods for data collection and interview design were clearly documented. Additionally, continuous discussions with supervisors were conducted throughout the research process which provided opportunities for external review and critical reflection on both the data collection and analytical procedures. Furthermore, respondent validation was applied to ensure the accuracy of the empirical material. In practice, this involved sharing the empirical findings with selected interviewees to confirm that their statements had been correctly understood and presented.

By combining transparent methodology, external review, respondent validation and multiple data sources, the study aims to achieve a high level of reliability.

2.6.2 Validity

Validity refers to the extent to which what is being investigated actually corresponds to what the study intends to measure, thus the connection between the research question and the collected empirical data. High validity means that the investigation truly answers the purpose of the thesis and that the chosen methods are appropriate in relation to the phenomenon being studied. A method for strengthening validity is triangulation, which means that the same phenomenon is studied through several different data sources or methods. (Höst et al., 2006)

In this thesis, the validity has been strengthened through data collection triangulations. By combining literature review, internal secondary data and interviews, DaaS has been examined from multiple perspectives. This approach has enabled comparison across data sources and reduced the risk of one-sided interpretations and thereby enhanced the overall credibility and robustness of the findings

It should, however, be acknowledges that parts of the empirical data are based on estimations provided by interviewees. Such estimations may introduce a degree of subjectivity and potential inaccuracy, which in turn can affect the reliability of the results. To mitigate this limitation, multiple perspectives were included across different organizational roles allowing for comparison and triangulation of responses.

2.6.3 Representativity

The final parameter influencing the credibility of a study is Representativity. A high degree of representativeness increases the extent to which the findings can be generalized to other contexts. However, this study is based on a single case study, which contributes to the representativeness is limited. Singe case studies are generally not considered representative in a statistical sense, meaning that the findings of this master theses should primarily be interpreted as context-specific rather than broadly generalizable. (Höst et al., 2006)

2.7 Research Ethics

In addition to ensuring the credibility of the study, it is important to maintain ethical compliance throughout the research process. According to Denscombe (2010), the following four key principles should be followed to establish high ethical standards.

- Protects the interests of the participants
- Ensures the participation is voluntary and based on informed consent
- Avoids deception and operates with scientific integrity
- Complies with the laws of the land

The avoidance of deception and the maintenance of scientific integrity are core principles for ensuring the credibility of the thesis. This thesis upholds these standards through transparent documentation of the methodology and transparency regarding data collection methods.

This study has been conducted in accordance with fundamental research ethics principles. Measures have been taken to protect the interests of all participants, ensuring that participation was voluntary and based on informed consent. All interview participants have been anonymized as mentioned in *Interview Method and Selection*.

To further ensure confidentiality, sensitive organizational information has been handled with care. All numerical values presented in this study have been anonymized using a consistent scaling factor. While the absolute values have been adjusted, the relative relationships between data points remain unchanged. This approach ensures that the analytical validity of the findings is maintained while protecting confidential information.

2.8 Comments on Usage of Generative AI

Generative AI has been used as a supporting tool throughout this thesis, while all interpretations, analyses and conclusions remain the sole responsibility of the authors. However, the authors take full responsibility for the content of this study. ChatGPT and Claude have partially been utilized for following purposes:

- **Idea generation:** Support in developing approaches, structuring the thesis and designing interview guides.
- **Refinement:** Linguistic review and improvement of written text.
- **Formatting and technical support:** Assistance with formatting references in LaTeX.

3 Theory

To be able to answer the purpose of this thesis: *Describe and analyze Data-as-a-Service, DaaS, internally in an international organization, and identify the associated value and cost*, it is essential to understand DaaS through different perspectives. The three chosen perspectives are: the product perspective, the value perspective and the resource perspective.

To better understand the product perspective, Kotler's Three Levels of Product is applied as an analytical framework. This model facilitates an examination of both the core benefit of an offering and the additional elements that contribute to customer value (Kotler et al., 2016). To complement this perspective, the concept of Product-Service Systems, PSS, is introduced in order to explore the integration and interdependence between products and services (Mont, 2002). Together, these frameworks illustrate how value extends beyond the core product through multiple service layers that enhance and support the offering.

After understanding the product perspective, Service-Dominant Logic, SDL, is applied to understand the value perspective. SDL illustrates that value is not embedded in product but emerge through usage (Lusch & Vargo, 2014). To complement SDL, the distinction between value creation and value capturing is introduced in order to analyze how organizations translate created value into economic terms (Lepak et al., 2007).

To get a comprehensive understanding of the DaaS concept, the cost perspective is also analyzed. First, the fundamental cost-allocation principles are defined in order to clarify how resources are categorized. Thereafter, the costing approaches full- and marginal costing are provided to understand how resources are distributed and assigned within the organization. The full costing can be completed with different methods depending on the nature of production, therefore, the methods: Average Cost Calculation, Absorption Costing and Activity-Based Costing are presented. Together, these methods provide a structured foundation for analyzing how service-related costs arise and allocated within organizations. (Skärvad, 2020)

Finally, rather than treating the theories as separate perspectives, this thesis integrates them to a theoretical framework. The chosen models collectively structure the analysis by clarifying how offerings are configured, how value is created and captured within organizations, and how costs emerge and are distributed across activities.

3.1 Kotler's Three Levels of Product

When organizations develop or evaluate a new offering, a product or a service, it is important to look beyond its physical characteristics and consider all aspects that create value to customers. According to Kotler et al. (2016), a product includes everything that can satisfy a need or want, and includes physical products, intangible products, services and ideas. Thus, services are considered a type of product, however, they are inherently intangible and do not result in ownership of a physical object.

To grasp the value of an offering, Kotler describes products and services through a model consisting of three levels which together illustrate the received value for the customer, see Figure 7. The most fundamental level is referred to as the core benefit, the second level is described as the actual product and the outermost layer is specified as the augmented product. (Kotler et al., 2016)

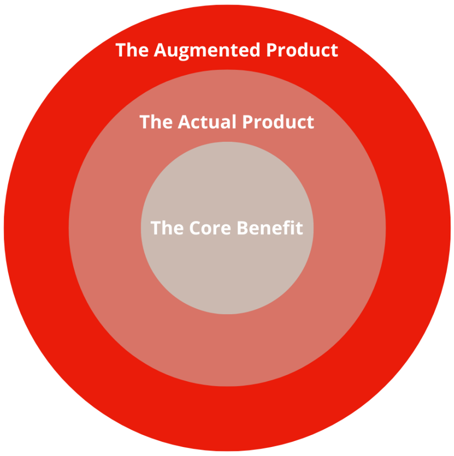

Figure 7: Illustration of Kotler's Three Levels of Product (Kotler et al., 2016).

Kotler's Three Levels of Product clarifies that value is not created solely through the physical product, it also provides a useful analytical framework to understand how offerings can be differentiated and how value can be created beyond the core benefit. (Kotler et al., 2016)

3.1.1 The Core Benefit

The most fundamental level, the core product, represents the key benefit, need or value the offering brings in order to meet customer needs. This layer serves the central problem the product or service aims to solve. At this point, organizations focus on identifying the fundamental benefit that motivates the purchase decision. (Kotler et al., 2016)

3.1.2 The Actual Product

The aim of the second level, the actual product, is to shift focus from the product or service itself, to the functionality. The actual product focuses on the tangible aspects of the offering and consists of the concrete characteristics that deliver the core product, for example design, quality and performance. While the core benefit focus on the most fundamental benefit, the actual product illustrates how this benefit is delivered and plays a significant role in differentiation and competitive positioning. By improving the product's attributes, such as design, features and quality, can differentiate the offering from competitive solutions. This layer is important since it ensures that the offering is both functional and visually appealing, while aligning with customer preferences and expectations. (Kotler et al., 2016)

3.1.3 The Augmented Product

The final level, the augmented product, includes complementary elements that support or enhance the offering, such as service, support, features, warranties and customizations. This layer, like the previous layer, creates differentiation from competitors through complementary elements and increases the perceived value. The augmented product increases the customer experience and creates the idea of a "complete offering". This increased customer experience creates, in turn, an exclusive feeling or a higher level of security, which can encourage brand loyalty and justify premium pricing. (Kotler et al., 2016)

3.2 Product-Service Systems

Traditional resource-intensive product use is increasingly being substitutes by service-based offerings that deliver value without the need for full ownership. The transition represents a fundamental change in how value is delivered and consumed. To enable accessibility without ownership contributes to the emergence of new consumption models such as leasing and pay-per-use, which differ from traditional patterns of physical goods consumption. This shift illustrates a broader movement from product-centered to service-oriented value creation. (Mont, 2002)

In response to the shift from product-centric to service-oriented offerings, a conceptual model has emerged to describe this transition, named Product-Service Systems, PSS. PSS describes offerings where products and services are integrated to deliver value to the customer as a coherent system. Instead of focusing on ownership of a physical product, PSS emphasize how value is created through use, function or result. PSS is normally divided into product-oriented, use-oriented and results-oriented systems, where the latter focuses on delivering a specific result rather than a product or service itself. (Beuren et al., 2013)

From a customer perspective, PSS implies a shift from moving away from physical goods towards accessing services. This shift requires greater involvement and understanding within the organization since value is realized through usage. From an organizational perspective, PSS encompass greater responsibility across the entire life-cycle of an offering. This includes integrating user perspective early in the design process and to coordinate activities across business units in order to deliver meaningful solutions. From an economic perspective, PSS can be advantageous when costs and benefits are managed at a system level. By incorporating usage- and life-cycle related costs and investigating alternative usage scenarios, organizations may create additional value or reduce existing costs. (Mont, 2002)

Besides the benefits of adopting a PSS, there are cultural, organizational, and economic barriers to overcome. A commonly identified challenge is the cultural shift required for customers to accept functionality and access rather than ownership of physical products. Acceptance of PSS is, therefore, highly dependent on, and influenced by, societal norms. Studies show greater adoption in contexts where shared or usage-based solutions are already established. From an organizational perspective, organizations face significant challenges related to changes in profit logic and business models. These barriers include limited experience in pricing integrated product-service offerings, concerns about absorbing risks that were previously borne by customers, and a lack of organizational capabilities required to design, deliver, and manage PSS solutions. Another barrier to PSS is the increased system complexity compared to traditional product-based offerings, which requires changes at both functional and system levels within organizations. (Baines et al., 2007)

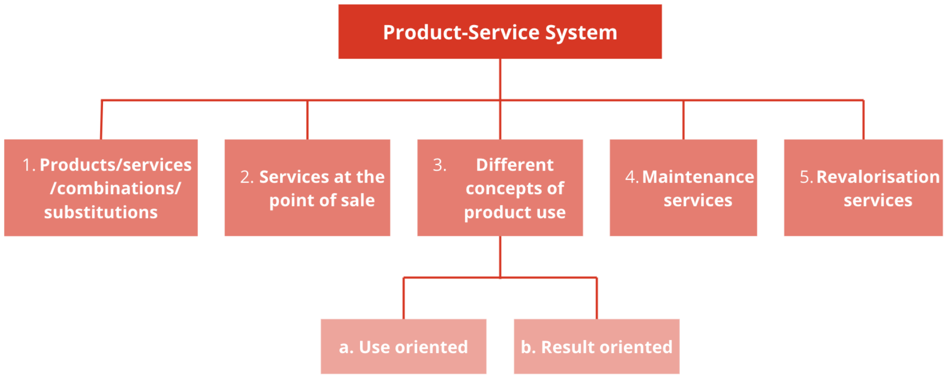

Figure 8: Overview of Product-Service Systems (Mont, 2002).

As illustrated in Figure 8, PSS consists of several theoretical levels of product-service integration. These five levels emphasize offerings where products and services are combined to deliver value in different ways. These levels include: (1) the most basic level where value is created through combinations or substitutions of products and services to enhance the core offering, (2) services are provided at the point of sale, which facilitates product use, (3) different concepts of product use, where value is delivered through access to functionality rather than ownership, (4) maintenance services focus on ensuring functionality and performance over time, and finally (5) revalorisation services aim to recover or extend value after the primary use phase. (Mont, 2002)

3.2.1 Products/Services/Combinations/Substitutions

The first level includes combinations of products and services or cases where services partly replace traditional products. The aim at this level is to increase the value of the core product through supplementary services, for example through counseling, digital additions, or user support. The focus is still on the product as the central value carrier, while services are used to differentiate the offering and improve the customer experience. (Mont, 2002)

3.2.2 Services at the Point of Sale

At the second level, services are directly integrated at the point of sale. These kinds of services can for example, include installation, education, configuration or initial support. This type of service aims to reduce customer uncertainty and ensure that the product can be used effectively from the start. (Mont, 2002)

3.2.3 Different Concepts of Product Use

This level distinguishes between ownership and accessibility, where value is created through access to functionality rather than through ownership of a physical product. At this point, the relationship between supplier and customer changes, since the supplier often retains ownership and is responsible for the function over time. (Mont, 2002)

3.2.3.1 Use Oriented or Result Oriented

PSS includes two concepts of product use: (1) use-oriented and (2) result-oriented. In use-oriented concepts, customers get access to a product during a certain time period or within a certain scope of use, for example through leasing or pay-per-use models. The supplier keeps ownership and is responsible for maintenance and operations. Result-oriented concepts, in contrast, focus on delivering a predefined outcome or result rather than on usage of the product. As value is closely connected to outcomes in use, it becomes more context-dependent and, therefore, more difficult to quantify and measure. (Mont, 2002)

3.2.4 Maintenance Services

The fourth level includes services that ensure that the product continues to work according to expectations over time. These kinds of services can include repairs, proactive maintenance, upgrades and technical support. These services result in more stable value creation and a good relationship between supplier and customer by focusing on the lifetime of the product and its reliability.(Mont, 2002)

3.2.5 Revalorisation Services

The last level, revalorisation services, aims to recover or extend the value after the products primary usage phase has completed. This can occur through reuse, repair or reconfiguration for new areas of usage. At this level, value is viewed as something that can continue to evolve beyond the initial usage phase, contributing to a more long-term and system oriented perspective on the offering. (Mont, 2002)

3.3 Service-Dominant Logic

While PSS provides a structural framework for understanding how products and services can be combined to deliver value, it does not fully explain how value is realized in practice. To conceptualize value creation, a service-based perspective on value is therefore required.

One framework that offers such a perspective is Service-Dominant Logic, SDL, developed by Lusch and Vargo (2014). SDL focuses on value creation through use and interaction rather than on value embedded in a product or service. It emphasizes that value emerges through use and co-creation among multiple actors and is, therefore, context dependent for each user.

SDL is based on a core set of axioms, which can be viewed as analytical assumptions for the framework. The four axioms are: (1) Service is the fundamental basis of exchange, (2) The customer is always a co-creator of value, (3) All economic and social actors are resource integrators, and (4) Value is uniquely and phenomenologically determined by the beneficiary. (Lusch & Vargo, 2014)

3.3.1 Axiom 1: Service is the Fundamental Basis of Exchange

The first axiom frames indirect exchange, through money or products, as a form of service and suggests that markets can be understood as a service-for-service environment. Service is, therefore, the primary unit of exchange, since products and applications are a distribution mechanisms for service provision. (Lusch & Vargo, 2014)

3.3.2 Axiom 2: The Customer is Always a Co-Creator of Value

The second axiom challenges the idea that value is created during manufacturing and instead argues that value is created and realized through use. The user is, therefore, a co-creator of value, which makes SDL explicitly customer-oriented. (Lusch & Vargo, 2014)

3.3.3 Axiom 3: All Economic and Social Actors are Resource Integrators

The third axiom goes beyond traditional roles and instead views all participants in value creation as actors. It emphasizes that value creation results from the integration of resources, including organizational, private, and public resources. The integration of resources is also the foundation of innovation. (Lusch & Vargo, 2014)

3.3.4 Axiom 4: Value is Always Uniquely and Phenomenologically Determined by the Beneficiary

The fourth axiom argues that value is not fixed, but rather context specific and varies across users because it is grounded in experience. Each service exchange is therefore unique, and the value depends on context and how resources are used. While direct user value is difficult to measure for services, organizations can assess economic efficiency. (Lusch & Vargo, 2014)

Capturing value within a service-dominant logic perspective is challenging, as value is co-produced through interactions between multiple actors and is, therefore, context-dependent (Lusch & Vargo, 2014). Consequently, the value DaaS creates within an organization differs depending on the context. Understanding value creation in this context requires understanding of how it is perceived, integrated and realized in an specific organizational settings (Lepak et al., 2007).

3.4 Value Creation and Value Capturing in Organizations

Value creation is a central part of an organization's operations. However, defining value creation is often challenging, as there is limited consensus on what it is and how it should be achieved. Lepak et al. (2007) addresses this by distinguishing between two processes: value creation and value capture.

3.4.1 Value Creation

To better understand value creation in an organization, it is necessary to clarify what is meant by *value*. Value can be described in two forms: use value and exchange value. Use value refers to the specific qualities of a product or service and how well it corresponds to user's needs, e.g., speed and performance. The assessment of use value is, therefore, subjective and depends on each user's expectations. Exchange value, in contrast, concerns the monetary impact of a product or service over a specific time period and therefore requires that it can be sold for money. (Lepak et al., 2007)

Together, these two forms of value illustrate that value creation depends on user's perceived benefits and their willingness to exchange money for them. For value creation to be sustainable, the value generated must exceed the monetary costs of creating it, and the new product or service must outperform existing solutions. (Lepak et al., 2007)

Value creation for an organization can be described as occurring when a task is performed using a newly developed method, technology, or approach. The main focus remains the end user's perspective and whether the product or service creates additional value for them, thereby increasing the benefit of using it. The value-creation process, therefore, includes all activities that generate additional value for customers and, in turn, increase their willingness to pay.

In addition, value creation can be viewed from the organization's perspective, i.e., in terms of the new advantages an activity creates for the organization. This can be considered from both internal and external perspectives and may include the development of products or processes. Finally, value creation can be viewed in terms of the new knowledge or information an activity brings to the organization, as this can support an organization's innovative capability. (Lepak et al., 2007)

However, what constitutes a value-creating activity can be viewed differently depending on the stakeholder and their goals. For example, an investor is likely to define value-creating activities from a monetary perspective, whereas environmental stakeholders within the organization may define activities that reduce environmental impact as value creating. Clarifying what is meant by value is, therefore, important in order to define value-creating activities. (Lepak et al., 2007)

3.4.2 Value Capturing

Whereas value creation focuses on where value is produced, value capture concerns where in the organization that value is monetized over time. In many cases, value creation and value capture occur in different parts of the organization. This phenomenon is sometimes described as *value slippage* and refers to situations in which the department that creates value is not the one that retains it. This is especially common for products and services with high use value but with low exchange value. It is, therefore, important to understand the value-capture process within an organization. (Lepak et al., 2007)

To analyze the value-capture process in an organization, Lepak et al. (2007) emphasize the importance of examining several areas. One is to analyze resource attributes, which can be accessed by measuring how unique the created resources are relative to competitors. More unique resources, for example, inimitable or non-substitutable resources, increase the potential to capture value and limit competition.

It is also important to examine the resource management process within the organization to understand how internal resources are managed. This can be done by analyzing how the organization structures its resource portfolio, how it combines resources into bundles with unique capabilities, and how these resources are used to leverage and exploit new market opportunities. (Lepak et al., 2007)

In addition, the authors highlight the importance of understanding how value slippage occurs within the organization. This can be examined by assessing the bargaining power of different groups, e.g. departments, to determine who retains the created value. Finally, value capture can be assessed by studying the gap between exchange value and the producer's costs to evaluate whether an activity is sustainable for the organization. (Lepak et al., 2007)

3.5 Cost Calculation in Organizations

As discussed in the previous section, for value creation to be sustainable, the generated value must exceed the monetary costs of creating it (Lepak et al., 2007). It is, therefore, important to understand the costs for organizational activities, defined as the value of resources consumed, and how these costs are calculated. Consequently, this section will describe how costs can be defined with cost-allocation principles, before describing two methods of how it can be executed. (Skärvad, 2020)

3.5.1 Cost-Allocation Principles

Cost is the value of resources consumed over a certain time frame and can be viewed through three cost-allocation principles. The first is the business-volume perspective and is most applicable to production companies. The business-volume perspective divides costs into two categories: fixed and variable costs. Fixed costs are costs that do not have a strong correlation with production volume, while variable costs do. The second perspective is the cost-allocation principle, used to calculate the costs of a specific cost object, normally a product or a service. This principle divides costs into two categories: direct and indirect costs. Direct costs are costs that can be directly attributed to cost objects, while indirect costs do not have a direct connection. Costs can also be viewed from a decision-making perspective and then divided into two categories: incremental costs (Sw. *Särkostnader*) and common costs (Sw. *Samkostnader*). Incremental costs are costs affected by a decision, while common costs are not.

The cost allocation can further be carried out with two different methods: (1) *Full Costing* and (2) *Marginal Costing*, depending on the time frame and the scope of the cost allocation. (Skärvad, 2020)

3.5.2 Full Costing

The most commonly used method is full costing (Sw. *Självkostnads-kalkyl*), since it represent a complete method for calculating the total cost, as it includes both direct and indirect costs associated to a product or service. By allocation all relevant costs to the correct cost carriers, the method enable a more accurate cost calculation for organizations. Full costing is commonly used for long term decisions, such as profitability analyzes and price calculations. (Skärvad, 2020)

To calculate the total cost of a product or service can, however, be challenging, as it is difficult to define which costs are associated with it. Full costing can, therefore, be applied with different calculation methods: *Average Costing*, *Overhead Costing* and *Activity-Based Costing*. The choice of method depends on the organization's production structure and how accurate the cost allocation should be carried out. (Skärvad, 2020)

In organizations that produce a small number of products with high similarity, average costing is often sufficient. In contrast, for organizations with high number of products and diversity, overhead costing or activity-based costing is often used, due to higher indirect costs. Overhead costing is the most traditionally and widely used of the two methods. However, as indirect costs have increased in many organizations, partly due to digitalization and cross-functional use of digital solutions, activity-based costing was developed to provide a more accurate allocation method for indirect costs. (Skärvad, 2020)

3.5.2.1 Average Costing

Average Costing (Sw. *Genomsnittskalkyl*) is the simplest form of the full cost principle and is often used for capital-intensive organizations with a limited number of similar products. For process costing, all costs are defined as direct, and the cost per item is estimated by dividing the total cost by the total number of produced items. (Skärvad, 2020)

3.5.2.2 Overhead Costing

Overhead Costing (Sw. *Påläggskalkyl*) is one of the most commonly used costing methods. It is implemented by dividing the organization into cost centers in which indirect costs are accumulated. These indirect costs are then allocated to each cost object, by using allocation bases. The allocation percentage for each cost center is calculated by dividing the total indirect costs within that cost center by an appropriate cost base, such as direct labor, to reflect the relationship between the cost object and the origin of the cost. The allocation percentage is then multiplied with the appropriate cost base to get the allocation amount. The allocated indirect cost, together with the direct costs for a product or service, generate the total cost. (Skärvad, 2020)

3.5.2.3 Activity-Based Costing

Activity-Based Costing, ABC, is a more detailed calculation method compared to overhead costing. Instead of allocating indirect costs through a few cost centers, ABC identifies and divides the indirect costs to several activities, such as purchasing or invoices. The total cost for each activity is calculated and allocated to the correct cost objects, by using cost drivers that reflect the extent to which a product or service has consumed the activity. The cost driver is selected based on its connection with the activity, such as, number of purchase orders could serve as a cost driver for the purchasing activity. The total cost of the activity is divided by the number of cost drivers, to determine a cost per cost driver. The total cost of a product or service can then be calculated by taking the sum of its direct costs and the allocated costs for each activity it consumes. (Skärvad, 2020)

3.5.3 Marginal Costing

Marginal costing (Sw. *Bidragskalkyl*) is a more simplified cost calculation method compared to full costing, as it allocated only specific costs to a cost object while excluding the common and fixed overhead costs. The method solely focus on costs that change with the level of output, while ignoring the total cost structure of an organization. Consequently, marginal costing may be considered as an incomplete method from a long-term perspective since it overseas shared and indirect cost that must be covered sometimes, contributing to the method is primarily used in short-term decision-making contexts. The method is particularity useful when there is idle capacity, since the fixed costs are not affected by additional production, or in situations where organizations face bottlenecks and must prioritize constrained resources in order to maximize output per limiting factor. (Skärvad, 2020)

3.6 Theoretical Framework: Application of Theory

To be able to describe and analyze DaaS internally in an international organization and to identify the associated value and cost, a structured theoretical framework that integrates the product-, value- and cost perspective is necessary. Those three perspectives are described with theoretical models in previous chapters, and enables a comprehensive evaluation of the organizations DaaS offering.

Firstly, Kotler's Three Levels of Product offers a deep understanding of DaaS through the following three dimensions: core benefit, the actual product and the augmented product. The framework illustrates how value extends beyond the primary functionality of an offering by empathizing that value is not only created through the core benefit, but also through supplementary elements. To further describe and analyze the service in terms of augmented product, Product-Service System is applied. PSS shift focus from isolated products to integrated product-service configurations and illustrates how value is delivered through combinations of those. Together, Kotler's Three Levels of Product and PSS establish a structural understanding of how DaaS is configured and how value is embedded across multiple layers.

While these models clarify the structure of offerings, they have to be complemented with models that describe how value is realized in practice. Therefore, Service-Dominant Logic is incorporated to provide a value-centered perspective for deeper understanding of the context. SDL assume that value is not embedded in outputs, but emerges in use through resource integration and co-creation among multiple users. This model highlights that value is realized differently depending on organizations capabilities and user interaction. To further specify how value becomes economically meaningful, value creation and value capturing is applied. While value creation refers to the benefits of organizational activities and interactions, value capturing concerns how organizations realize these benefits in measurable terms. In service-based contexts, value may be widely distributed and hard to measure, while costs often remain centralized and visible.

Finally, to address the challenge with cost allocation for services, the cost dimension is examined to understand what costs are required to enable the value creation. This is analyzed through the cost-allocation method full costing. This model clarifies how costs are defined and allocated within an organization.

Together, these theoretical perspectives enable a structured way of describing DaaS and a comprehensive analysis of the relationship between value creation and cost justification, see Figure 9. By integrating product-, value- and cost theory, the theoretical framework provides a structured basis for examining how DaaS generates value and how its associated costs can be understood and evaluated.

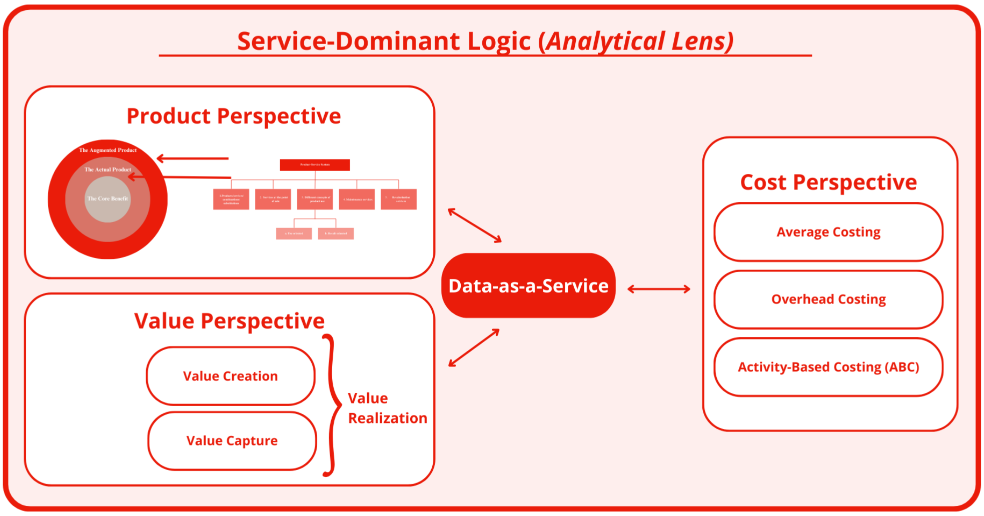

Figure 9: Integrated theoretical framework illustrating the relationship between product-, value- and cost perspective in the analysis of DaaS.

3.6.1 Application of Theoretical Framework

This section outlines the proposed application of the theoretical framework, see Figure 10. The method consist of six steps and combines product-, value- and cost perspectives to support systematic decision-making regarding prioritization, investment and governance of data products. The first five steps is deeply investigated in the empirical context, while the last step is investigated in the analysis section.

Step 1: Identify relevant data product

Establish a clear understanding of the data product and its organizational role. The following questions contributes to a clear understanding of the data product.

- What is the purpose of the data product?
- Which business process does it support?
- Who are the users?
- Is the product operational, analytical, or strategic?
- Is it business-critical or supportive?
- Is it real-time dependent?

Step 2: Map Value Creation

Identify how the data product creates value within the organization. Data products can create use value, exchange value or a combination between both. If the data product just create use value, as *Basdata med reläskyddshändelser*, try to reformulate some of the use value into monetary terms. See examples below for inspiration.

A. Direct economic value

- Cost savings
- Instead of alternative costs
- Reduced outages
- Improved utilization of the grid

B. Indirect economic value

- Improved decision-making
- Knowledge creation and organizational learning
- Increased reliability
- Improved customer satisfaction

Step 3: Identify Value Capturing

Analyze where the created value is actually realized within the organization. This step addresses the phenomenon of value slippage, where the unit creating the value is not necessarily the unit capturing the value.

Conduct a "value flow map", and illustrate where the value is created and captured in the organization.

Step 4: Quantify the Value

Estimate the overall value generated by the data product. The valuation can include financial value, strategic value or a combination of both perspectives.

A. Monetary Value Assessment

When possible, estimate:

- Annual cost savings
- Avoided costs
- Reduced downtime costs
- Avoided investments
- Increased operational efficiency

B. Strategic Value Assessment

Certain data products generate primarily use value rather than directly measurable financial value. In such cases, a weighted scoring model can be applied, (Bozarth & Handfield, 2019).

See an example of weighted-point evaluation criteria:

Table 3: Example of weighted-point evaluation system.

Criteria	Dimension Score (1-5)
Strategic importance	4
Operational criticality	5
Customer impact	3
Data quality importance	2

Step 5: Calculate the Costs

Estimate the total cost of developing, CapEx, and maintaining, OpEx, the data product. Today IT-cost are not visible within the organization, resulting in the only cost is labor cost.

$$Laborcost = (hours(CapEx) + hours(OpEx)) * hourlyrate \tag{1}$$

Step 6: Calculate Net Value

The last step of evaluating the data products is to calculate the net value. The net value is the total value after subtracting all costs associated with creating the product or service (Zycus, n.d.).

$$NetValue = Value - Costs \tag{2}$$

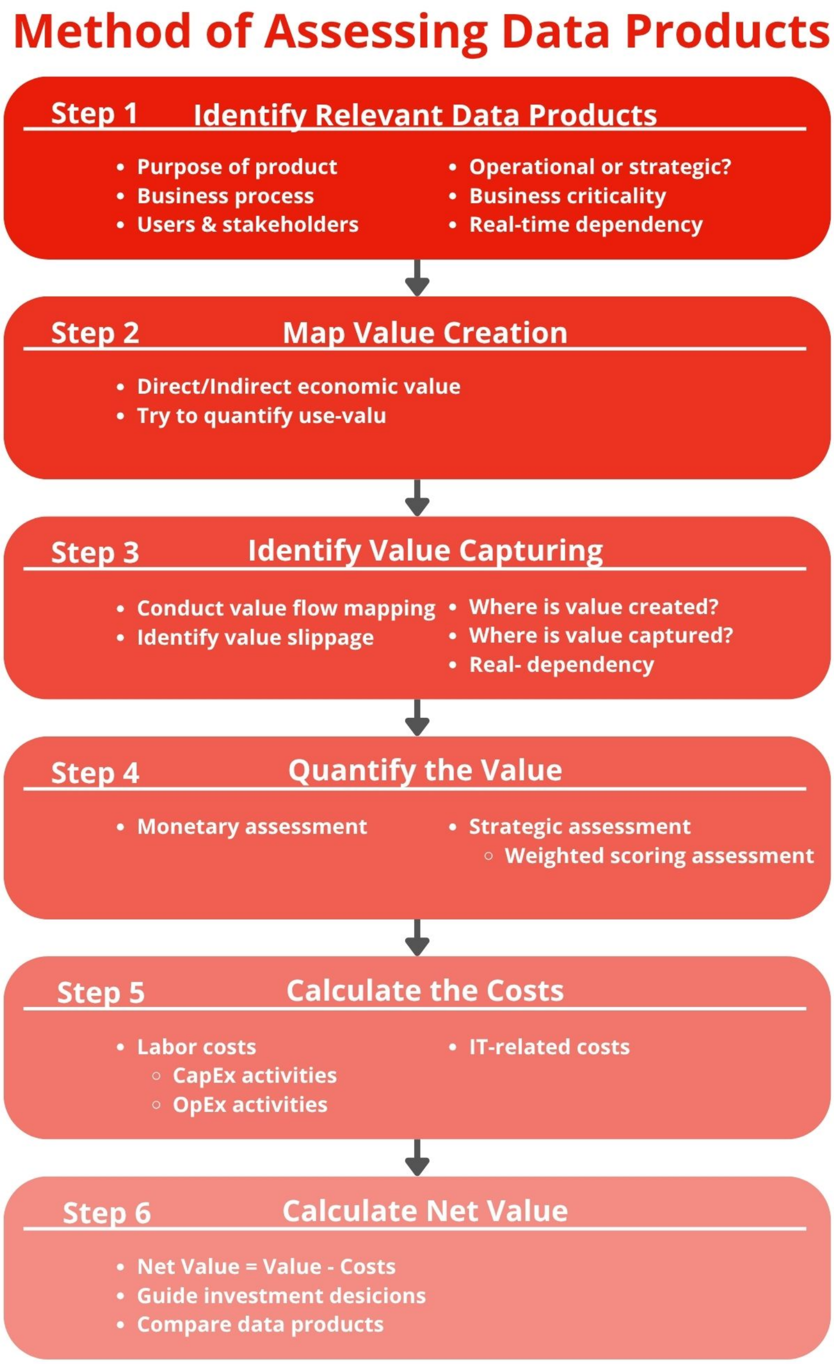

Figure 10: Illustration of how to assess data products.

4 Empirical Context

The case company, E.ON, was introduced and described in the *methodology* section. In this section, the organization will be empirically described based on the theories from the theoretical framework presented in the *theory* section. The selected data products, *Korttidsprognos för fördelningsstation* and *Basdata med reläskyddshändelser*, will be analyzed individually through the product-, value- and cost perspective.

4.1 Korttidsprognos för fördelningsstation

The data product *Korttidsprognos för fördelningsstation* is an internally developed data product, created to provide hourly forecasts of expected electricity demand and flexibility needs for the next seven days (Person C, 2026). The data product will be further analyzed based on the theoretical framework in the following chapter.

4.1.1 Kotler's Three Levels of Product

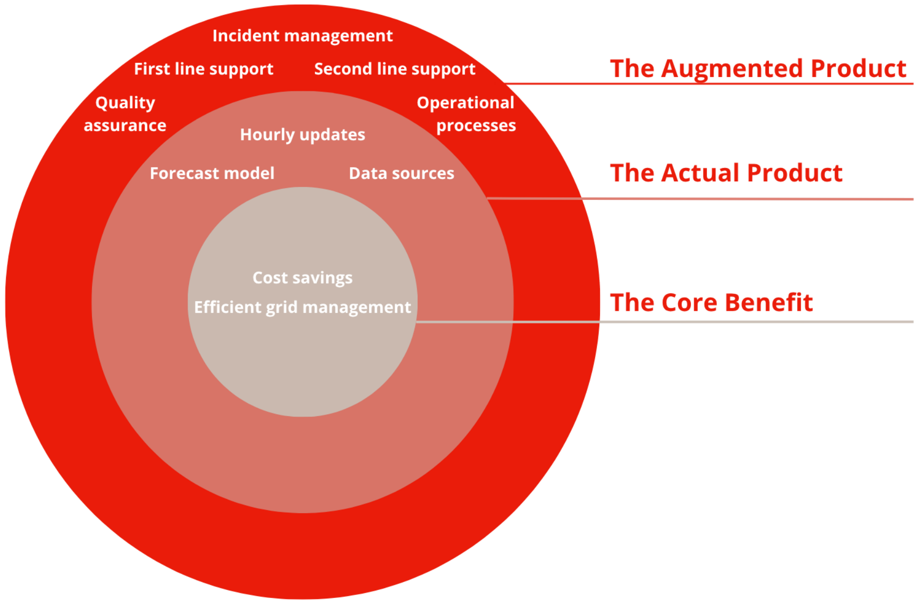

Figure 11: Applied Kotler's Three Level Product of *Korttidsprognos för fördelningsstation*.

4.1.1.1 Core Benefit

The core benefit of the data product *Korttidsprognos för fördelningsstation* is to enable more *efficient grid management* and *cost savings* for the organization, see Figure 11. The data product enables this by predicting demand and available capacity in the grid, making it possible for the organization to take actions with the aim of balancing consumption and avoiding overloading the grid. This type of *efficient grid management* is only possible on so called *flexibility markets* through flexibility agreements with large customers, both consumers and producers, which can be activated to move planned activity. This enables the load on the grid to be managed without the need to expand new grid capacity, creating both operational and economic benefits. (Person C, 2026; Person D, 2026)

The data product also facilitates *cost savings* in two ways. Firstly, prediction of demand and available capacity enables the electricity grid to be used efficiently and minimizes wear and tear on the components of the electricity grid. Secondly, it enables the electricity grid to be used to a greater extent throughout its economic life, due to reduced overcapacity, which is also a cost saving potential. (Person D, 2026; Person E, 2026)

4.1.1.2 The Actual Product

The actual product refers to the data product itself and its technical functionality, see Figure 11. *Korttidsprognos för fördelningsstation* provides *hourly updates* of flexibility forecasts over a seven day horizon, based on a combination of multiple *data sources* within a forecasting model. The *forecast model* aggregates metering and production data together with external inputs, such as weather data, to generate accurate demand and capacity forecasts. (Person C, 2026)

4.1.1.3 The Augmented product

The augmented product for *Korttidsprognos för fördelningsstation* is visualized in Figure 11 and consists of *support, incident management, quality assurance* and *operational processes* that support the technical solution and its use within the organization. Support is provided by the data team through appointed contact persons whom users can contact for questions or problems. Today, support is available primarily during regular working hours and is handled according to the *best effort* principle. The support is divided into *first-line support* and *second-line support*, where the first-line supports manage the incoming incidents while the second-line support are responsible for the more technical problems with the data product. (Person C, 2026)

During periods when the data product is critical to the business, such as during the flexibility season, November to March, additional attention is allocated to the data product to ensure continuous operations. (Person C, 2026)

Incident management takes place through either established processes where disruptions or errors are reported via E.ON's data catalog or through less established processes through Microsoft Teams.When an incident is reported through the data catalog, everyone in the data team is informed, which enables a structured management and follow-up of problems that affect the functioning of the data product or data delivery. However, the data teams are strongly opposed to incident reporting through Microsoft Teams, as such communication bypasses established workflows and does not support the formal processes coordination of incidents. (Person C, 2026)

4.1.2 Product-Service Systems

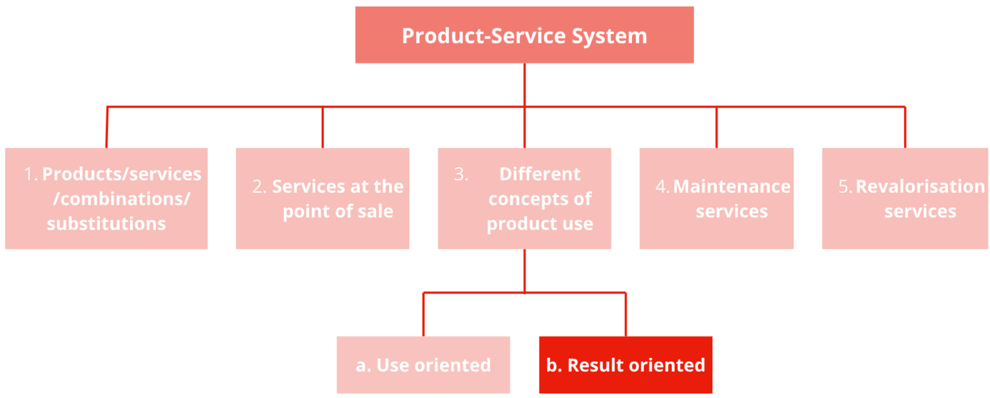

Figure 12: Applied Product-Service Systems of *Korttidsprognos för fördelningsstation*.

4.1.2.1 Products/Services/Combinations/Substitutions

Korttidsprognos för fördelningsstation is a combination of DaaS, a digital data product and associated services. The fundamental offering consists of hourly forecast data outputs and is complemented by services such as support, incident management and quality assurance. (Person C, 2026)

In addition, *Korttidsprognos för fördelningsstation* substitutes the previous way of working with average-based calculations. These calculations are based on historical data and generate a fixed volume of electricity to be traded, based on patterns observed in previous years production and consumption. The data product also substitutes for the alternative of externally purchased forecasts. However, the data product enables more efficient and less expensive approaches to managing flexibility in the electricity grid. (Person D, 2026)

4.1.2.2 Services at the Point of Sale

As *Korttidsprognos för fördelningsstation* is developed and consumed internally, traditional services at the point of sale are limited. Since the data product is free, the data team does not provide these typical services when users get access to the data product. However, the user can contact the data team through channels such as the data catalog or through Microsoft Teams for questions. These activities ensure that users understand how to interpret and integrate the forecasts into their operational processes. (Person C, 2026)

4.1.2.3 Different Concepts of Product Use: Use- or Result Oriented

Use-oriented

The user gets continuous access to the data product and the forecast is produced and updated hourly. It is used for operational work, contributing to the importance of continuous data delivery, stable operations and availability during the flexibility season. (Person D, 2026)

Result-oriented

The value of *Korttidsprognos för fördelningsstation* is captured by the user when the data product automatically placing orders in the event of an imbalance between supply and demand. It works as an operational process and is critical from both a grid management and an economic perspective. Consequently, *Korttidsprognos för fördelningsstation* is considered to be result-oriented in PSS. (Person D, 2026; Person E, 2026)

4.1.2.4 Maintenance Services

Maintenance services are essential for ensuring the continuous operation, availability, incident management and quality of the data product. These include monitoring and troubleshooting, which are performed by the data team. All kinds of maintenance service are critical for the functionality of the data product, particularly in cases of disruptions where additional resources are required. As a result of how the organization reports time, the time spent on maintenance services is not tracked. (Person C, 2026)

Today, the data team provides maintenance services during normal working hours and not during weekends, nights or vacation periods. However, the data team value the operation of the data product highly, and thus has monitoring of it during vacation times, outside of regular working hours. (Person C, 2026)

4.1.2.5 Revalorisation Services

Revalorisation services are limited in the context of this data product, as it do not involve physical assets that can be reused or repurposed.

4.1.3 Service-Dominant Logic

From an SDL perspective, the data product *Korttidsprognos för fördelningsstation* should not be seen as a forecast or a dataset, but instead as a service that enables *efficient grid management* that results in *cost* *savings*. The value of the data product, therefore, first emerges when the forecasts are being used within operational processes, and not by the forecast itself. (Person D, 2026; Person E, 2026)

4.1.3.1 Axiom 1: Service is the Fundamental Basis of Exchange

Connected to the first axiom, the fundamental basis of exchange is through the service the data product provides. Rather than delivering raw data, the data product functions as a service that creates forecasts, enabling E.ON to act upon imbalances in electricity demand and supply, in order to optimize the utilization of available capacity. (Person E, 2026)

4.1.3.2 Axiom 2: The Customer is Always a Co-Creator of Value

The value of the data product is identified to be co-created with its users. Although the data product provides electricity grid forecasts, it is the user who acts upon the forecasts to enable operational decisions. This interaction is done both through automated processes, where AI helps in putting orders with human supervision during normal working hours, and through direct human intervention. Consequently, value is not embedded in the data product itself, but emerges through its integration with the user. (Person D, 2026)

4.1.3.3 Axiom 3: All Economic and Social Actors are Resource Integrators

The data product would not be possible without the underlying systems and, therefore, depends on the integration of both internal resources, such as metering data and external resources, such as weather data. This connects to the third axiom that sees all parties involved in the value creation process as actors. (Person C, 2026)

4.1.3.4 Axiom 4: Value is Always Uniquely and Phenomenologically Determined by the Beneficiary

The value of the data product is always unique, as the importance of flexibility solutions varies throughout the year. The data product mainly creates value during the flexibility season, November to March, with the highest value during the days with the largest difference between demand and supply. This connects to the fourth axiom that value is context-dependent. (Person D, 2026; Person E, 2026)

4.1.4 Value Creation and Value Capturing

4.1.4.1 Value Creation

The data product *Korttidsprognos för fördelningsstation* is classified as a value creating service, as previous ways of doing it through average-based calculations of historical data were not as accurate and trustworthy. The value creation is generated by the data team: *Asset Management* through their development and management of the data product. The development was enabled by combining *data sources* with an created *forecasting model* that generates an *hourly updated* supply and demand forecast of the electricity grid for the next seven days. The data team also creates value through the management of the data product, in the forms of *support*, *quality assurance* and *incident management*. (Person C, 2026)

The value of the data product is defined in the form of *use value*, as it covers the users needs of creating more accurate and reliable forecasts, insights that are crucial for creating *efficient grid management* in the organization. In addition, this leads to *exchange value* for the users, as the data product enables them to create monetary impact for the organization, but this will be further discussed under value capturing. (Person D, 2026)

Finally, value is created by the data teams through the internal development and ownership of the data product. By continuously developing and refining *Korttidsprognos för fördelningsstation* internally, the organization builds and retains critical technical expertise. (Person D, 2026)

4.1.4.2 Value Capturing

The value capturing process of *Korttidsprognos för fördelningsstation* occurs in the business department *Energy Systems* where the *Flexibility Solutions* group is located, see Figure 13. The *Flexibility Solutions* group, later referred to as the user, is responsible for the flexibility market. (Person D, 2026)

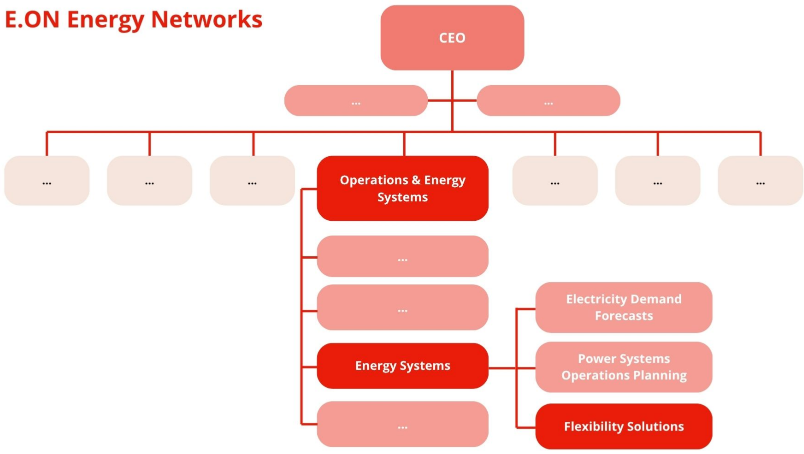

Figure 13: Value capturing department of *Korttidsprognos för fördelningsstation*.

The captured value can be divided into two parts: (1) Efficient grid management and (2) Cost savings, see Figure 14. Efficient grid management can be further categorized into: (1) Efficient electricity trading, (2) Utilizing the electricity grid until its economic lifetime, and lastly (3) More customers without expanding the electricity grid. The second part, cost savings, can be further analyzed by comparing the captured value with alternatives to the data product, either through (1) Average-based calculations, (2) Externally purchased forecasts, or (3) Expanding the grid. (Person D, 2026; Person E, 2026)

In addition, the realization of the value capturing process is highly dependent on the availability and reliability of the data product. This includes not only ensuring continuous operations, but also maintaining high data quality. In particular, minimizing errors in the forecasts, as inaccurate outputs can lead to significant economic consequences. (Person C, 2026; Person D, 2026)

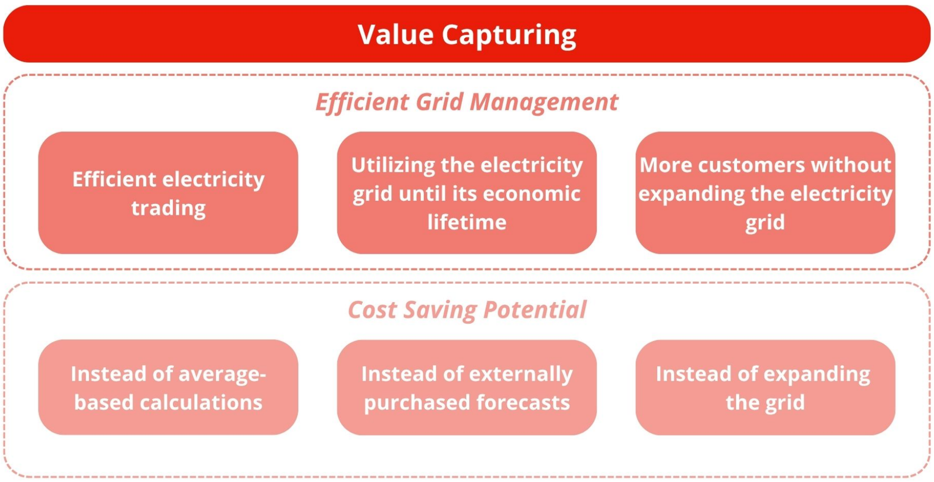

Figure 14: Value capturing areas for *Korttidsprognos för fördelningsstation*.

Efficient grid management

Korttidsprognos för fördelningsstation is crucial for the flexibility market, since the produced forecasts are used in an operational manner to control the electricity market. Based on the insights of the data product, the user adjusts the imbalance between electricity production and consumption, which enables *efficient electricity trading*. (Person D, 2026)

The forecasts enable the user to avoid overloading the electricity grid, through proactive actions to reduce electricity demand during peak hours. The grid components are negatively affected when the grid is overloaded and result in a reduced technical and economic lifespan. Consequently, forecasts enable the user to manage demand more efficiently and avoid unnecessary strain on the infrastructure. This allows grid components to be utilized throughout their full economic lifetime. (Person D, 2026)

Improved grid management enables for a higher degree of optimization in the way existing capacity is utilized. Through more accurate forecasts and better operational decision-making, the grid can be managed more efficiently. This allows E.ON to increase the number of customers without exceeding capacity limits on existing electricity grid. By leveraging *Korttidsprognos för fördelningsstation*, E.ON is able to expand its service capacity without the need for immediate physical grid expansion. (Person D, 2026)

Cost Saving Potential

The cost saving potential presented in this chapter corresponds to alternative solutions to *Korttidsprognos för fördelningsstation*. If the data product had not existed, E.ON can use the following alternative methods: (1) average-based calculations, (2) externally purchased forecasts or (3) expanding the grid.

In the absence of the forecasts produced by *Korttidsprognos för fördelningsstation*, the user can apply the first method: average-based calculation of production and demand. This alternative method is not as accurate as using the data product, since the average calculations are not influenced by real-time data such as weather. (Person D, 2026) Therefore, it can be argued that the value captured for *Korttidsprognoser för fördelningsstation* corresponds to the potential cost savings that the forecasts have compared to the average-based calculations, see Table 4. According to a calculation performed by Person D (2026), the forecasts result in 60% lower costs in flexibility trading, corresponding to approximately SEK 16,7X annually, compared to using average-based calculations.

Table 4: Benefits of having *Korttidsprognos för fördelningsstation* compared to average-based calculations.

With the data product	Without the data product
Accurate forecasts	Average-based forecasts
Semi autonomous decisions	Manual decisions
Lower costs (approx. 60%)	Higher costs
Real-time data	Historical data
Efficient flexibility utilization	Inefficient purchasing av utilization

The second alternative is to purchase short-term forecasts from an external supplier. However, this entails major security risks and a lot of data that E.ON preferably want to keep in-house. The cost of the external forecasts is SEK 0,015X - 0,025X per month and is another way to argue the value the data product captures. (Person D, 2026)

The final alternative to the data product would be to expand the electricity grid and replace transformers and other capacity limiting objects to meet increasing electricity demand, see Table 5. However, grid expansion represents a substantial capital investment and constitutes a business case in itself. Assets within the electricity grid are associated with predetermined depreciation periods, meaning that replacing them before the end of their economic lifetime would result in double depreciation costs. Consequently, this form of value capture enables E.ON to optimize the utilization of existing assets, thereby minimizing the need for large-scale capital investments in grid expansion. (Person D, 2026; Person E, 2026)

Table 5: Business case between flexibility market and vs. grid expansion.

Option 1: Grid expansion	Option 2: Flexibility market
High investment costs	No investment costs but higher flexibility cost
Long depreciation	Uses existing infrastructure
Double depreciation	Singe depreciation
Benefit: potential of increasing number of customers	Benefit: potential of increasing number of customers

In summary, the captured value of *Korttidsprognos för fördelningsstation* can be understood through two main dimensions: efficient grid management and cost-saving potential. By enabling more efficient electricity trading and optimizing grid utilization, E.ON can connect more customers to the grid without the need for expansion. As a result of utilizing the grid more efficient and by avoiding overloading the grid, the possibility of using the infrastructure during its full economic lifetime increases. The second dimension includes significant cost savings by replacing less accurate average-based calculations, contributing to 60% cost savings, or by reducing the need for externally purchased forecasts, which corresponds to SEK 0,18X - 0,29X annually. Finally, both options avoid costly investments in the grid infrastructure.

4.1.5 Cost Calculation at E.ON

E.ON applies an average costing approach as its general method for cost calculation, historically built around the organizations core operation of delivering electricity to end customers. This cost calculation model is a natural and sufficient method when all costs are connected to a single homogeneous cost object, such as the amount of electricity delivered to end customers. However, the model becomes less straightforward to apply when the cost object changes in nature, as is the case with data products, where the unit of output is fundamentally different. The associated costs for each data product can be divided into two main categories: (1) labor costs and (2) IT-related costs associated with data storage and processing. (Person B, 2026)

4.1.5.1 Labor Cost

E.ON's internal labor cost per hour is SEK Y and they categorize the labor costs into Capital Expenditure, CapEx, and Operating Expenditure, OpEx. CapEx corresponds to development activities for data products, while OpEx is equivalent to maintenance activities. Within the organization, there is an imbalance in the way these costs are captured and measured. (Person B, 2026)

Today, E.ON tracks resource allocation in terms of CapEx and this resource allocation refers to the time spent by data teams on developing and improving their data products. For *Korttidsprognos för fördelningsstation* the development includes, for example, optimizing forecasting models and adapting the product to evolving business needs. Development efforts are ongoing and are approximately equal to one full-time employee per year, 2 080 hours per year, but divided into 2-3 members of the data team. (Person C, 2026)

In contrast, OpEx, which refers to the time spent maintaining the data product, is not systematically tracked. Maintenance activities for *Korttidsprognos för fördelningsstation* include monitoring, problem solving, and ensuring continuous operation and availability. The time spent on OpEx enables the stability of the data product. In cases of disruption or incidents, the required maintenance effort is crucial to solve the identified problem. Maintenance time increases for such events to be able to identify and solve the issues. Even though OpEx resource allocation is invisible within the organizations, the work is critical for E.ON as it establishes a prerequisite for both data availability and quality. The estimated time spent on maintenance is around 100 - 200 hours per year. (Person C, 2026)

$$Laborcost = (hours(CapEx) + hours(OpEx)) * hourlyrate \tag{3}$$

Table 6: Summary of annual labor costs in SEK of developing and maintaining *Korttidsprognos för fördelningsstation*.

Labor cost category	Cost
CapEx (*Development*)	SEK 0,91X
OpEx (*Maintenance*)	SEK 0,04X - 0,09X
Total	**SEK 0,96X - X**

4.1.5.2 IT-cost

The second category, IT-costs, encompasses several underlying systems and functions that support the data product. However, these costs are currently not allocated to individual data products, but are instead aggregated and only visible at a total level. As a result, the organization has no visibility into the share of the total IT-related costs that are connected to *Korttidsprognos för fördelningsstation*.

4.2 Basdata med reläskyddshändelser

The data product *Basdata med reläskyddshändelser* is a soon developed statistical model designed to predict power outages before they occur. The model is based on data collected from E.ON's 14,000 relay protection devices *(SW. reläskydd)* installed throughout the electricity grid in transformers, where the current strength *(SW. strömstyrka)* changes. Relay protection devices play a critical role in grid operations as they continuously assess whether the system behaves as expected. If an abnormal condition is detected, the relay protection device records the event and sends it to the data product for analysis. In case of large deviations in the condition, the relay protection device can automatically interrupt the current to prevent damage to the grid infrastructure and ensure operational safety. (Person A, 2026)

Today, the data product presents the data collected from relay protection devices, which are later manually analyzed for outage detection. In the near future, the data product will automatically analyze the events and identify the type of event and the reason behind it through a statistical model. (Person A, 2026) The user, the operations center (*SW. driftcentralen*), of the data product, will use the analyzes to support decision-making and to find action points to solve the disturbances (Person F, 2026).

The future state of the data product will be analyzed in this thesis, and in the following chapter analyzed based on the theoretical framework. However, the predictive capability of the data product will be limited to disturbances that develop over time, such as continuous wear and tear, and it will not be able to predict sudden external events, such as instant cable damage caused by construction work or extreme weather. (Person A, 2026)

4.2.1 Kotler's Three Levels of Product

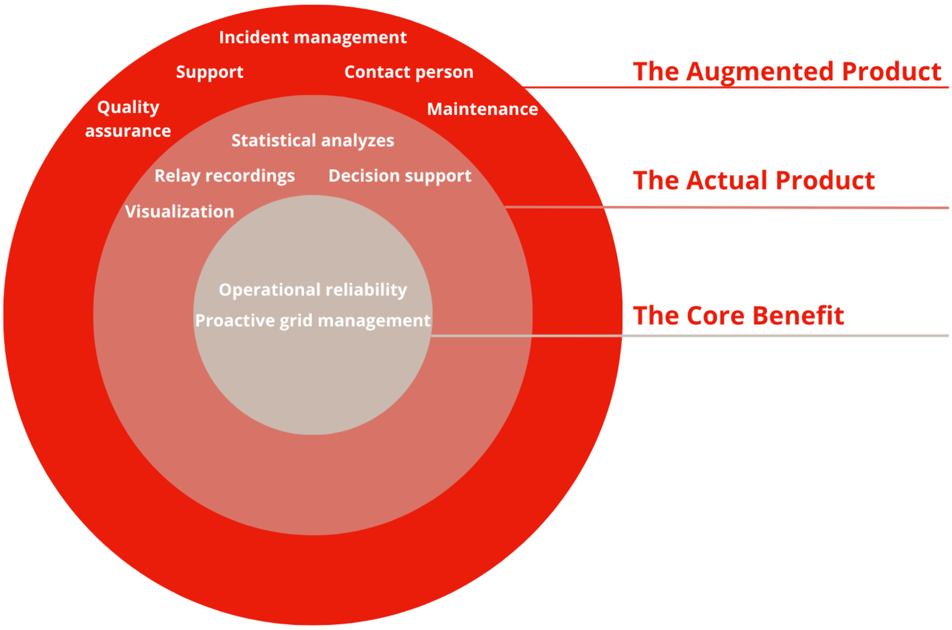

Figure 15: Applied Kotler's Three Levels Product of *Basdata med reläskyddshändelser*.

4.2.1.1 Core Benefit

The core benefit of *Basdata med reläskyddshändelser* is *proactive grid management* and *operational reliability*. The data product enables a proactive way of handling disruptions in the electricity grid, with the aim of predicting power outages before they occur. The purpose of the data product is to detect early signs of potential problems and thereby allow the control center to operate in a proactive manner to solve upcoming problems in the electricity grid. The data product therefore facilitates increased operational reliability in the electricity grid by identifying and analyzing disturbances before they lead to power outages. (Person A, 2026; Person F, 2026)

4.2.1.2 The Actual Product

The actual product is the concrete data that the product provides. *Basdata med reläskyddshändelser* consists of *relay protection recordings (SW. reläskyddsinspelningar), statistical analyzes, visualization* and *decision support*. Relay protection devices record approximately four seconds when they experience grid disruptions. The data products receive these recordings and analyze them statistically. Based on the analysis, the data product functions as a decision support. The data product visualizes both location and the identified problem, and through those visualizations, the user receives action points on how to solve the problem. (Person A, 2026)

4.2.1.3 The Augmented Product

The augmented product of *Basdata med reläskyddsinspelningar* is several services contributing to higher received value in the organization. Those services include *support, contact person, incident management, quality assurance* and *maintenance*. (Person A, 2026)

Support is provided by the data team through appointed contact persons and the data team prioritizes high availability of support of this product due to the criticality of the product. According to the data team, preventing power outages creates a lot of value and consequently they offer good support during normal office hours. The data team works hard to maintain the data product and to avoid larger incidents with the data product. (Person A, 2026)

When incidents are reported, the data team starts directly looking for solutions to the problem. Incident management is handled in the same way as for *Korttidsprognos för fördelningsstation*, either through established processes where disruptions or errors are reported via E.ON's data catalog or through less established processes through Microsoft Teams. When an incident is reported through the data catalog, everyone in the data team is informed, which enables a structured management and follow-up of problems that affect the functioning of the data product or data delivery. (Person A, 2026)

4.2.2 Product-Service Systems

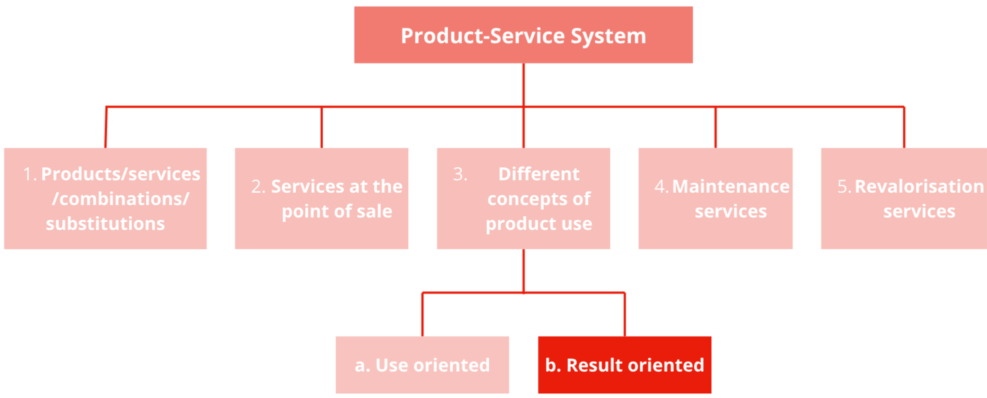

Figure 16: Applied Product Service System of *Basdata med reläskyddshändelser*.

4.2.2.1 Products/Services/Combinations/Substitutions

Basdata med reläskyddsdata is a combination between the data and the services provided that constitute the augmented product. The product itself provides visualization of disruptions in the electricity grid and acts as a decision support for the user of the product. The associated services includes support, contact person, incident management, quality assurance and maintenance. (Person A, 2026)

In addition, the data products capability to statistically analyze relay protection recordings and generate recommended actions for the user replaces the previous way of working. Before the implementation of the data product, operators at the control center would manually analyzed these recordings. Locating and processing the relevant data manually took approximately 30 minutes and analyzing it would differ much in time, making it significantly slower than the automated process provided by the data product. (Person F, 2026) Consequently, *Basdata med reläskyddsdata* enables much faster data collection and improved data analysis, since both aggregation and statistical analysis are performed automatically, resulting in more timely and actionable information. Furthermore, the data product facilitates a shift towards proactive grid management, thereby replacing the previous reactive approach, where the control center primarily responded to power outages after they had occurred rather than preventing them. (Person G, 2026)

4.2.2.2 Services at the Point of Sale

As *Basdata med reläskyddshändelser* is internally developed and consumed, traditional services at the point of sale are limited. The data product is not purchased by users. Rather, the focus lies on ensuring accessibility to the data, which means that no predefined service package is provided. However, support is available during normal office hours, contributing to a consistently high level of accessibility to assistance when needed. (Person A, 2026)

4.2.2.3 Different Concepts of Product Use: Use- or Result Oriented

Use-oriented

The data product is use-oriented in terms of that the user wants the product to be continuous available. The user value having the data product in their ongoing work and highly value continuous access to the decision support. (Person A, 2026)

Result-oriented

The value of *Basdata för reläskyddshändelser* is realized when the data product enables the identification of grid components that require maintenance or replacement in order to prevent power outages. The decision support provided by the data product is therefore result-oriented, as it contributes to reducing the number of power outages and improving the overall *operational reliability* of the grid. (Person F, 2026; Person G, 2026)

4.2.2.4 Maintenance Services

Maintenance services play a crucial role in maintaining the continuous operation, availability, incident handling and overall quality of the data product. These activities include monitoring and troubleshooting, which are carried out by the data team. Such maintenance efforts are vital for ensuring the functionality of the data product, particularly during disruptions when additional resources may be required. Due to the way the organization reports working hours, the time allocated to maintenance activities is not formally tracked. (Person A, 2026)

Today, the data team provides maintenance services during normal working hours and not during weekends, nights or vacation periods. However, for the future state of the data product that is being analyzed, the data team will value the operation of the data product higher than before. Thus, monitoring and controlling the data product outside of regular working hours will be viewed as more important. (Person F, 2026)

4.2.2.5 Revalorisation Services

Revalorisation services are limited in the context of this data product, as it do not involve physical assets that can be reused or repurposed.

4.2.3 Service-Dominant Logic

From an SDL perspective, *Basdata med reläskyddshändelser* should not be viewed as a dataset or a technical solution, but instead as a service that enables *proactive grid management* and *operational reliability*. The value of the data product appears first when the data is used within operational processes, and not from the data itself.

4.2.3.1 Axiom 1: Service is the Fundamental Basis of Exchange

Connected to the first axiom, the fundamental basis of exchange of the data product is through service. Rather than delivering raw relay data to the users, the data product functions as a service that enables E.ON to detect future power outages in the electricity grid. This enables the organization to work proactively in power outage prevention and to increase operational reliability. (Person A, 2026)

4.2.3.2 Axiom 2: The Customer is Always a Co-Creator of Value

The value of the data product is co-created with its users, primarily the operations center, as the data product alone does not create value. The value is created together with the users who analyze the data insights and take actions based on it. The value realization of the data product is first done when the information is actively used in a decision-making process, making the user a co-creator of value. (Person F, 2026; Person G, 2026)

4.2.3.3 Axiom 3: All Economic and Social Actors are Resource Integrators

The functionality of *Basdata med reläskyddshändelser* depends on the integration of several underlying systems, mostly internal, such as relay protection systems and analytical tools, but also some external systems. All underlying resources are therefore part of the value creation process and the final value depends on how well the different resources are combined and utilized within the organization. (Person F, 2026)

4.2.3.4 Axiom 4: Value is Always Uniquely and Phenomenologically Determined by the Beneficiary

The value of the data product will vary depending on the accuracy of prevented outages and their potential size (Person A, 2026). The value of the data product also influence on the timing of the data. The earlier a potential fault can be detected, the greater opportunity E.ON has to prevent the power outage. The value of the data product will therefore be unique for every prevented outage. (Person F, 2026; Person G, 2026)

4.2.4 Value Creation and Value Capturing

4.2.4.1 Value Creation

Basdata med reläskyddshändelser is classified as a value creating service, as it enables E.ON to go from reactive to proactive grid management. The value creation is generated by the data team: *Network Operations* through their development and management of the data product. The development enabled *statistical analyzes* of the *relay protection recordings* that can predict when and how a potential power outage will occur. *Visualization* of the recordings and *decision support* with suggestions for solving the problem was also developed to increase the ease of use and to meet the users needs. In addition, the data team also creates value through the management of the data product, in the forms of *support, contact person, incident management, quality assurance* and *maintenance.* (Person A, 2026)

The value of *Basdata med reläskyddshändelser* can primarily be defined as *use value*, as it does not exchange any direct monetized value, *exchange value*, but instead supports the users needs by providing data-based insights for improved decision-making and reduced power outages.

This enables users to proactively maintain the most critical parts of the electricity grid before an power outage occur, something that was not possible before the data product. As a result of this, *exchange value* will be created as a secondary effect from a successful outage prevention for the user, but this will be further discussed under value capturing. (Person F, 2026; Person G, 2026)

In addition, value creation can also be seen from an organizational perspective. By internal development and maintenance of the data product, new knowledge is generated in the area, which enables further development of proactive processes or data-driven decisions. Furthermore, development activities support continuous learning and strengthen the innovative capabilities at E.ON. (Person D, 2026)

4.2.4.2 Value Capturing

Value capturing of *Basdata med reläskyddshändelser* occurs in the business departments *Active Network Operations*, *Local Grid Asset Management*, *Asset Maintenance* and *Asset Analytics*, where the operation center for local and regional networks is located, see Figure 17. The operation center, known as the user, is responsible for maintaining the grid infrastructure. (Person F, 2026)

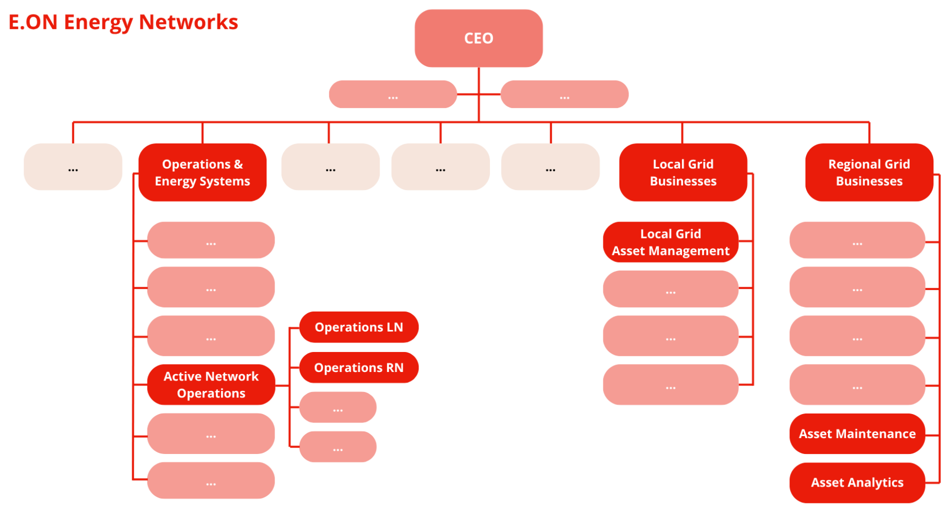

Figure 17: Value capturing department of *Basdata med reläskyddshändelser*.

The captured value can be divided into three parts: (1) Proactive grid management, (2) Operational reliability and (3) Cost saving potential, see Figure 18. The first two points are considered as the core benefit of *Basdata med reläskyddshändelser*, therefore, the primarily value capturing parts, while the third part, cost saving potential, is considered as a secondary outcome of the first two, which will be investigated deeper later. Proactive grid management can further be categorized into: (1) Faster disturbance analysis, (2) Proactive grid monitoring and (3) Improved resource allocation. The second part, operational reliability can be understood through (1) Risk mitigation, (2) Reduced outage duration and (3) Improved fault detection. As a result of proactive grid management and improved operational reliability, E.ON can achieve cost savings. Therefore, the last part, cost saving potential, can be further analyzed by comparing the captured value with the possible cost savings made by the data product, either through (1) Reduced fault correction costs, (2) Reduced customer compensation or (3) Reduced regulatory penalty costs. (Person F, 2026; Person G, 2026)

However, the realization of the value is highly dependent on the availability and reliability of the data product. In order for the identified benefits to be captured, the data product must ensure continuous operation and high data quality. Without continuous operation, the user cannot act and without reliable data quality, the user can take inaccurate decisions leading to economic consequences. However, since this data product aims to identify disturbances that potentially lead to outages weeks to months in advance, the data product can be unavailable for 24-72 hours before it becomes critical to the users work. (Person F, 2026; Person G, 2026)

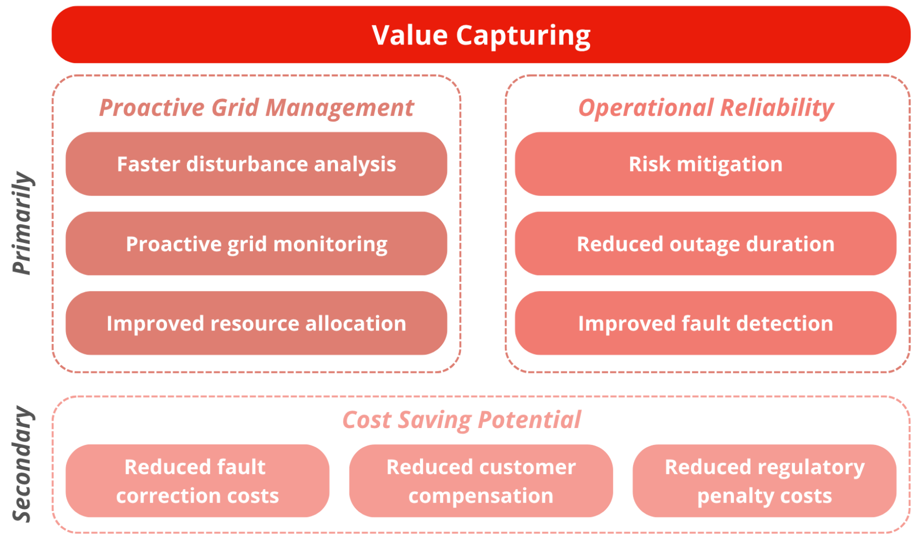

Figure 18: Value capturing areas for *Basdata med reläskyddshändelser*.

Proactive Grid Management

Basdata med reläskyddshändelser is an important data product for the user, since it enables a *faster disturbance analysis* in the electricity grid and a proactive working method for the user. The data product allows the operations center to quickly understand and act on problems in the grid. Since the data product both identifies, visualizes and acts as a decision support, it enables an efficient and faster root cause analysis. (Person F, 2026; Person G, 2026)

The analysis of the relay protection recordings made by the data product supports *proactive grid monitoring*. This allows the user to identify potential issues at an early stage and take preventive actions, such as maintaining or replacing critical components before they collapse. As a result, proactive grid monitoring creates value for E.ON by reducing the costs associated with power outages and by increasing customer satisfaction and company reputation. (Person G, 2026)

The analysis generated by the data product contributes to *improved resource allocation*. Through automated analysis and visualization of disturbances, personnel in the operations center no longer need to manually interpret relay recordings, allowing them to focus on executing maintenance activities more efficiently. Furthermore, the decision support functionality enhances resource allocation by reducing unnecessary field visits. Instead of first driving to the disturbance location to diagnose the issue and then retrieving the required resources, the user can assess the situation in advance and dispatch the appropriate resources directly, resulting in more efficient and targeted interventions. (Person F, 2026; Person G, 2026)

Operational Reliability

By managing the grid proactively contributes to increased operational reliability. The data product reduces operational risks by providing early warnings of potential faults, allowing users to act before issues escalate to larger disturbances that affect multiple customers. Proactively maintaining and monitoring the grid leads to *risk mitigation*, as potential problems are identified and addressed in a timely manner. (Person F, 2026; Person G, 2026)

Since the data product, as mentioned before, enables fast root cause analysis and decision support, it contributes to a *reduced outage duration*. Addressing problems on the grid before they escalate contributes to a reduced outage duration and a reduced number of affected customers. (Person F, 2026)

The data product contributes to *improved fault detection* by allowing a more accurate and earlier identification of abnormalities and disturbances in the grid. By analyzing relay protection data, a greater number of faults can be detected and located more efficiently, allowing operators to better understand and address the underlying problems. (Person F, 2026; Person G, 2026)

Cost Saving Potential

Using proactive grid management to avoid power outages primarily contributes to maintaining a stable electricity system and ensuring high customer satisfaction. Although this also results in cost savings potential, it should not be considered the primary purpose of the data product, but rather a secondary effect. The main value lies in improving operational reliability and reducing the risk of disruptions for end users. (Person G, 2026)

Nevertheless, avoiding outages can lead to reduced costs, as power interruptions are associated with economic consequences for E.ON. As mentioned above, the data product cannot detect all types of outage and is limited to disturbances that develop over time. This type of problems can mainly be identified within the local grid, as the higher voltage in the regional grid causes quicker outages (Person F, 2026).

However, the cost savings related to preventing outages are highly context-dependent, since the costs depend on the duration and severity of the interruption, resulting in large differences. According to the empirical findings, power outages are associated with three main types of cost: (1) Fault correction costs, (2) Customer compensation and (3) Regulatory penalty costs. (Person A, 2026; Person H, 2026)

Fault correction costs arise from the resources required to locate and repair faults in the grid. This cost can never be fully eliminated, as issues will always arise in the grid that need to be addressed. However, resolving problems proactively is less costly compared to handling them re-actively. By addressing issues in advance, the need to manage urgent faults during evenings, weekends and holidays is minimized, when it can be more difficult to access the right resources and when costs are typically higher. The estimated cost for fault correction re-actively is approximately SEK 0,042Z per outage. The corresponding cost of proactive fault mitigation is estimated to be 10% - 15% lower, resulting in cost savings of approximately SEK 0,004Z - 0,006Z per outage. Based on historical data from the past five years, the annual number of fault corrections for outages that could potentially be identified by the data product is approximately 1,338 within the local grid. Assuming that the data product can detect 60% of these outages, this corresponds to an annual cost savings potential of SEK 3,37Z - 5,06Z. (Person A, 2026; Person G, 2026; Person H, 2026)

The second cost is customer compensation costs, which only apply to outages that last more than 12 hours. The compensation may, for example, cover spoiled goods if the power is out for an extended period. According to empirical insights, approximately 10% of customer compensation costs are related to the category of outages that can be predicted. These outages correspond to an estimated annual cost of SEK 5,24Z, on average over the past five years (Person H, 2026). Assuming that the data product can contribute to reducing this category of outages by 60%, this would result in an annual cost savings of approximately SEK 3,14Z (Person A, 2026).

The third cost is the most complex to calculate as it is based on how the organization performed in the previous years. As a rule of thumb, E.ON incurs penalty fees to authorities for customers who have experienced more than three outages longer than three minutes within a year. However, this is not always strictly the case as a benchmark is established for each regulatory period based on prior performance. If E.ON performs better than this benchmark, it can generate revenue, while under-performance results in penalty fees. According to empirical insights, these regulatory costs and revenues have historically eliminated each-other over a longer period and should therefore be excluded from the analyzes as the value from a shorter time frame would present incorrect numbers. (Person I, 2026)

In summary, the data product creates high use value in terms of operational reliability and stability by eliminating thousands of annual outages. In an attempt to reformulate parts of the value into exchange value, this thesis presents the secondary outcome of the captured value as cost saving potential. This secondary outcome annually amounts to a cost savings potential between SEK 6,51Z - 8,20Z.

4.2.5 Cost Calculation at E.ON

As described in section 4.1.5, E.ON applies an average costing approach as its general method for cost calculation. The associated costs for *Basdata med reläskyddshändelser* can be divided into the same main two categories: (1) labor costs and (2) IT-related costs.

4.2.5.1 Labor Cost

E.ON's internal labor cost per hour is SEK Y and they categorize labor costs into CapEx and OpEx for this data product as well. See Table 7 for a visualization of the size of labor cost, calculated according to equation 1. (Person B, 2026)

CapEx, developing and improving activities, is tracked for *Basdata med reläskyddshändelser* and includes, for example, improving the statistical model for outage prediction and adapting the data product to meet the business needs. Development efforts for this data product are comprehensive and are approximately equal to 400 hours per year. (Person A, 2026)

OpEx, maintaining activities, are not systematically tracked by the organization, but is crucial for the operation of the data product. Maintenance activities for *Basdata med reläskyddshändelser* include monitoring, problem solving and ensuring the continuous operation and availability. OpEx activities, especially in case of problems with the data product, are critical for the organization since it is a prerequisite for data availability and quality. The estimated time spent on maintenance activities is approximately 400 hours per year. (Person A, 2026)

Table 7: Summary of annual labor costs in SEK of developing and maintaining *Basdata med reläskyddshändelser*.

Labor cost category	Cost
CapEx (*Development*)	SEK 0,5Z
OpEx (*Maintenance*)	SEK 0,5Z
Total	**SEK Z**

4.2.5.2 IT-cost

The second category, IT-costs, encompasses several underlying systems and functions that support the data product. However, these costs are currently not allocated to individual data products, but are instead aggregated and only visible at a total level. As a result, the organization has no visibility into the share of the total IT-related costs that are connected to *Basdata med reläskyddshändelser*.

5 Analysis

The aim of this section is to analyze the data products *Korttidsprognos för fördelningsstation* and *Basdata med reläskyddshändelser* to achieve the stated purpose of this thesis. The objective of this thesis is to *"Describe and analyze Data-as-a-Service, DaaS, internally in an international organization, and identify the associated value and cost"*.

To achieve this, the analysis examines how DaaS is utilized across different business units and how it contributes to value capture in practice. The analysis is guided by the theoretical framework presented in the *theory* chapter, incorporating perspectives from Kotler's Three Levels of Product and Product-Service Systems, alongside Service-Dominant Logic, Value Creation, Value Capturing and Cost calculation. Together, these frameworks provide a foundation for understanding data as a service enabling resource and for understanding how value emerges through its use within the organization. The frameworks are first applied to the data products individually and then comparatively analyzed.

This section draws on insights from the conducted interviews and identifies how DaaS contributes to operational and strategic outcomes. In addition, it explores how disruptions in data availability influence those outcomes. By linking empirical findings with theoretical concepts, this section aims to provide a structured approach to assessing the economic value of internal DaaS.

5.1 Kotler's Three Levels of Product and Product Service System

To analyze E.ON's product offering, Kotler's Three Levels of Product was integrated together with the Product-Service System. The combination of these two frameworks illustrates how a high level of service creates value in the outermost layer of the product, in the augmented product.

5.1.1 *Korttidsprognos för fördelningsstation*

Korttidsprognos för fördelningsstation can be understood as a service-oriented offering rather than a traditional product. The core benefit lies in enabling *efficient grid management* and *cost savings*, while the actual product is mainly represented by the forecasting model. However, a significant part of the captured value is embedded in the augmented product, including primarily *support* and *quality assurance*. This indicates that the value of *Korttidsprognos för fördelningsstation* is not solely dependent on its technical functionality, but on the surrounding service components that ensure availability and, most importantly, reliability of the received forecasts.

From a PSS perspective, *Korttidsprognos för fördelningsstation* can be classified as primarily result-oriented. The user does not capture value from accessing the forecasts themselves, but from the outcomes they enable. This implies that the data product is integrated into an operational process and that continuous high availability and reliability are critical for value realization.

5.1.2 *Basdata med reläskyddshändelser*

Similarly, *Basdata med reläskyddshändelser* can also be understood as a service-oriented offering where the value is embedded in the augmented product rather than in the raw data itself. The core benefits are *proactive grid management* and *operational reliability*, while the actual product is the concrete data that enable the core benefit, mainly represented by the *relay protection recordings* and the *statistical analyzes*. However, an enabler for the actual product to work continuously and deliver reliable analyzes, is the augmented product, consisting of *support, maintenance, quality assurance, incident management* and a dedicated *contact person*.

From a PSS perspective, *Basdata med reläskyddshändelser* is classified as result-oriented, as the value is realized when the data product enables preventive maintenance before components fail, resulting in avoided power outages. Therefore, the captured value comes from the outcomes the data product enables and not from the data product itself.

5.1.3 Comparative Analysis

By applying Kotler's Three Levels of Product and PSS to both data products identifies several important similarities and differences.

At the *core benefit level*, a clear similarity emerges as both data products changes how E.ON manages the electricity grid. *Korttidsprognos för fördelningsstation* enables a more efficient utilization of the grid by supporting optimized electricity trading and load balancing, while *Basdata med reläskyddshändelser* enabled a shift towards proactive grid management by identifying disturbances before they develop into power outages. Despite this shared focus on improving grid operations, the nature of core benefit differs. For *Korttidsprognos för fördelningsstation*, cost savings constitute a central and explicit part of the core benefit, whereas *Basdata med reläskyddshändelser* primarily emphasizes operational reliability rather than direct economic outcomes.

At the second level, *the actual product*, the data products differ more in their composition. *Basdata med reläskyddshändelser* consists of multiple components, including relay protection recordings, statistical analysis, visualization and decision support activities. In contrast, *Korttidsprognos för fördelningsstation* is centered around a forecasting model that generates regularly updated predictions, supported by underlying data resources. This indicates that while both are data-driven products, they differ in how the data is processed and presented to the user, either as analytical decision support or as predictive outputs integrated into operational systems.

A key difference between the data products concerns the nature of their respective products. *Korttidsprognos för fördelningsstation* delivers hourly updated forecasts that are directly integrated into automated operational processes, making its availability relevant hour-by-hour. *Basdata med reläskyddshändelser*, on the other hand, delivers event triggered recordings and connected statistical analyzes on a more ad hoc basis. Therefore, short-term unavailability would have less immediate consequences. However, a long-term unavailability would prevent the shift from reactive to proactive grid management.

At the third level, *the augmented product*, the two data products show strong similarities. Both data products heavily rely on surrounding services such as support, maintenance and incident management to ensure functionality. The PSS perspective complements the Kotler's model by emphasizing that value is not only embedded in the core and actual product, but also in the service components that enable continuous availability and functionality. The main different in this level related to the maturity of the data products, *Korttidsprognos för fördelningsstation*, is supported by both first- and second-line support structures, while *Basdata med reläskyddshändelser*, still in a development stage, currently relies on a single support organization.

Both data products, *Korttidsprognos för fördelningsstation* and *Basdata med reläskyddshändelser*, are classified as *result oriented* from a PSS perspective. The classification connects to how the value of DaaS should be assessed within the organization, since the value is realized through outcomes rather than access. The ability to ensure continuous and high quality data output therefore becomes an essential part for value capturing. Both data products show high performance in *Products/services/combinations/substitutions* and in *Maintenance service*, see Figure 19. However, the two data products show limited performance in *Services at the point of sale* and *Revaloriation services*.

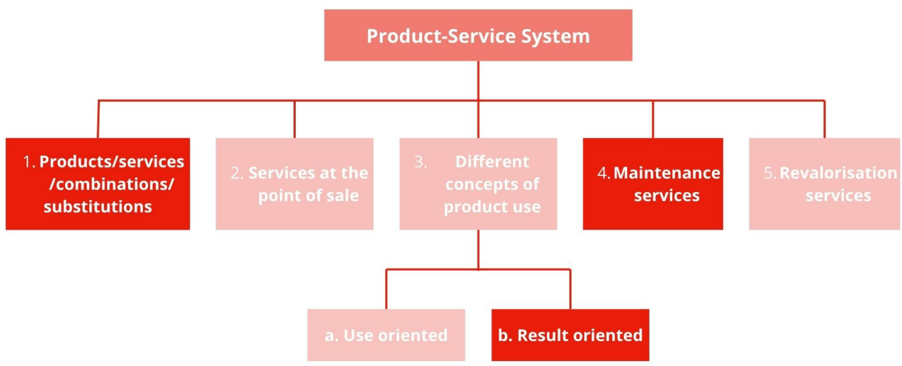

Figure 19: Applied PSS for both data products.

In summary, the comparison shows that while both data products share a similar service-oriented structure and heavily rely on augmented services, they differ in their core value logic and in how their actual products are constructed and delivered.

5.2 Service Dominant Logic

5.2.1 *Korttidsprognos för fördelningsstation*

By applying Service Dominant Logic, it becomes clear that value is not embedded in the data product itself but is co-created through its usage. The forecast only generates value when they are integrated into decision-making processes. Consequently, this highlights the role of the user as a co-creator of value and reinforces the idea that the data product functions as a service rather than a single output.

This is further shown by the fact that the data product is used in an automated operational process, placing orders in the flexibility market based on the forecasts. In this process, value emerges through the combination of the output of the data product and the operational capabilities of the users. Therefore, the data team acts as an enabler of the service, while the user is the one who transforms the forecasts into economic value.

The fourth axiom is also noticed as the value of the data product is unique and depends on the flexibility requirements for the coming period. The requirements are during the flexibility season, November to March, when the demand fluctuations are the largest and supply the lowest, creating the highest value of the data product during this period.

5.2.2 *Basdata med reläskyddshändelser*

From an SDL perspective, *Basdata med reläskyddshändelser* should not be viewed as a dataset but instead as a service that enables E.ON to detect future power outages. The service enables the organization to act proactively with the maintenance of the grid, reducing the number of power outages. The exchange is therefore conducted through the service, rather than delivering raw relay data to the users.

Furthermore, the value is co-created with the user, as the data product itself does not provide maintenance of the grid. The data product therefore works as decision support for the user who will take the appropriate course of action. The value is therefore jointly produced by the data teams development and maintenance of the product and the user actions.

The value of each prevented outage will differ depending on the size of the affected area and the duration of the prevented outage. The value of the data product can therefore not be predetermined and will always be unique for all prevented outages.

5.2.3 Comparative Analysis

Applying SDL to both data products highlights a similar pattern in which, in both cases, value is realized through the integration of the data products output into the users operational context, rather than through the data itself. This insight has important implications for how the organization should understand and communicate the value of DaaS internally.

A key difference between the two data products from an SDL perspective connects to the degree of automation in the co-creation process. For *Korttidsprognos för fördelningsstation*, a large part of the value co-creation is automated, which reduces the degree of direct human involvement in the value realization process. On the other hand, for *Basdata med reläskyddshändelser*, the value co-creation is more dependent on human involvement from the user. The difference implies that *Korttidsprognos för fördelningsstation* is more sensitive to data quality, since incorrect data directly affect automated decisions, while *Basdata med reläskyddshändelser* rely on higher competence of the user.

Furthermore, both data products illustrate the challenge of value capturing in a service-dominant context. The value is co-created between different business units and always unique, making it difficult to measure and attribute the economic impact for both data products within the organization. The challenge directly connects to the question of how costs should be allocated and justified for internal DaaS offerings.

5.3 Value Creation and Value Capturing

5.3.1 *Korttidsprognos för fördelningsstation*

From a value creation perspective, the data product generates use value for the user, which in turn creates exchange value for the organization. Use value is created by providing increased forecast accuracy to the user, which in turn improves their decision-making in grid operations. This confirms that the value is realized primarily from the user perspective, as the generated forecasts enable more efficient grid management. In addition, by internally developing and maintaining the data product, this contributes not only to operational improvements but also to the accumulation of knowledge and technical capabilities within the organization. This internal capability can be interpreted as a strategic form of value creation, as it strengthens long-term competitiveness and reduces dependence on external actors, limiting the risks of knowledge loss and data leakage that can arise from outsourcing.

From a value capturing perspective, the captured value can primarily be categorized as *efficient grid management* and *cost savings*. These outcomes represent exchange value for the user, as they have a direct economic impact. The captured value in terms of efficient grid management can be measured in different ways, either through improved electricity trading, the extended asset lifetime of the grid, or through the ability to connect more customers without the need of expanding the grid. These effects can be quantified by comparing the forecasts produced by the data product with comparable alternatives, such as relying on average-based calculated forecasts, purchasing external forecasts or investing in grid expansion. Using the data product forecasts instead of the average-based calculated forecasts, E.ON saves approximately SEK

16,7X annually. The cost of externally purchased forecasts ranges between SEK 0,015X - 0,025X per month, corresponding to SEK 0,18X - 0,29X per year. Although there are no direct estimates for the cost savings related to avoided grid investments, the combined value of the data product can be placed between SEK 0,18X - 16,7X per year. Connecting back to the risks associated with outsourcing a critical data product and the internal value it contributes to the organization, it could be argued that the value is placed in the higher range of the interval.

In addition, the user highly prioritizes data availability, both in terms of response times for perceived disruptions, but above all, data quality. An important insight from the user interviews is that users prefer not to receive data rather than receiving inaccurate forecasts. While short disruptions, ranging from a few hours up to approximately one day, can be tolerated and managed through existing forecasts, inaccurate data can lead to greater consequences. In line with the theoretical perspective on value creation, where use value is determined by how well a service meets user needs, inaccurate data can not only eliminate value, but also create negative consequences by leading to incorrect decisions. This implies that reliability in terms of accuracy is more critical than continuous delivery for this data product. Consequently, ensuring high data quality becomes a central requirement for sustaining value creation, as the risk associated with incorrect output may outweigh the benefits of continuous data access.

A key insight from analyzing value creation and value capturing is where it occurs. The data team *Asset management* is responsible for the value creation process through developing and maintaining the data product, while value capturing occurs in a different business department by the *Flexibility solutions* group. This phenomenon illustrates a clear case of value slippage presented by Lepak et al. (2007), where the unit that generates the value is not the one that captures it. This separation creates challenges in justifying investments and allocating costs, as benefits are realized in different business departments.

5.3.2 *Basdata med reläskyddshändelser*

From a value creation perspective, the data product *Basdata med reläskyddshändelser* is primarily driven by enabling a shift from reactive to proactive grid management. The data product generates substantial use value by improving operational reliability and supporting proactive decision-making. In addition, by internally developing and maintaining the data product, new knowledge and capabilities are generated within the organization, enabling further development of data-driven processes for proactive work within the organization.

The captured value for the data product is hard to estimate due to the high levels of use value. The benefits are primarily related to the avoidance of outages and improved reliability of the grid, which makes the exchange value more difficult to quantify as it is not direct. As mentioned above, indirect exchange value can be identified from the cost savings potential of preventing power outages. By annually preventing 803 outages, estimated from the interviews, the organization has a potential annual cost savings of SEK 6,51Z - 8,20Z. However, since the primarily core benefit of this data product is *proactive grid management* and *operational reliability*, it is hard to argue only for the exchange value.

The primary value of the data product is, therefore, use value, as it directly supports the users ability to work proactively with grid management and operational reliability. These are outcomes that cannot easily be translated into monetary terms, but are nonetheless critical to the organization. This is further reinforced by E.ON's strategic goal for 2030 of reducing the number of power outages by 50%, which reflects an organizational focus on improving grid stability for customers rather than achieving direct financial gains. The data product can thus be seen as an enabling component in reaching this target, where the primary objective is to enhance reliability and customer satisfaction, rather than to generate measurable economic returns. (Person G, 2026)

For *Basdata med reläskyddshändelser*, data availability is important for the operational process to be able to work proactively with grid management. However, since the data product aims to detect potential disturbances that will lead to a power outage weeks to months in advance, unavailability for 24-72 hours would not have significant consequences, even if time is crucial to prevent outages. Data quality is also important for detecting and preventing potential power outages. Incorrect or misleading data can lead to inappropriate actions or missed faults. However, there is always a human making the final decision in the operation center. Personnel in the operation center can analyze the recordings manually, but this takes a longer time. Consequently, to be able to manage the grid proactively, it is important but not critical to ensure reliable and continuous data.

Similarly to *Korttidsprognos för fördelningsstation*, the phenomenon of value slippage is identified for the data product. From analyzing the *Basdata med reläskyddshändelser*, the value creation process is carried out by the *Network Operations* data team through developing and maintaining the data product. The value capturing, on the other hand, occurs in several other business departments.

5.3.3 Comparative Analysis

When comparing the two data products, several similarities and differences emerge in terms of value creation and value capturing. A common characteristic is that both data products create significant use value through improved decision-making and operational efficiency. In both cases, value is generated internally through the development of knowledge and technical capabilities, reinforcing the strategic importance of maintaining data products in-house.

Furthermore, both cases exhibit clear signs of value slippage, where the unit responsible for creating value is not the one capturing it. This supports the theoretical assumption that value creation and value capture are often separated in service-oriented contexts.

The two data products differ from a use value and exchange value perspective. Both data products exhibit high use value, as they are adapted to and integrated in operational processes. However, *Korttidsprognos för fördelningsstation* has a higher exchange value than *Basdata med reläskyddshändelser*, see Table 8. According to the theory, products and services characterized by high use value but low exchange value are often undervalued within organizations, as their benefits are more difficult to quantify and translate into monetary terms.

Table 8: Annually cost saving potential for each data product.

Data product	Cost saving potential
Korttidsprognos för fördelningsstation	up to SEK 16,7X
Basdata med reläskyddshändelser	up to SEK 8,20Z

This is reflected in the case of *Basdata med reläskyddshändelser*, where the primary value lies in avoided outages and improved reliability, to maintain high customer satisfaction. Although these benefits are critical for the organization, they are inherently indirect and harder to measure compared to the more explicit cost savings and revenue-related impacts generated by *Korttidsprognos för fördelningsstation*. As a result, there is a risk that data products with high use value are de-prioritized.

This highlights an important challenge for internal DaaS: the ability to capture and communicate value is not only dependent on the actual benefits generated but also on how those benefits can be quantified in economic terms.

When comparing the data products in terms of availability and data quality, the findings reinforce that DaaS is highly context-dependent. While *Korttidsprognos för fördelningsstation* is integrated in the user's operational workflow and integrated in an automatic process based on the last entered data, *Basdata med reläskyddshändelser* is more event-driven and enables a more efficient working method in the operation center. These differences are reflected in both the downtime tolerance and the data quality requirements. For *Korttidsprognos för fördelningsstation*, disruptions of a few hours can have economic impacts in critical situations, although operations can be managed without updated data for approximately one day. In contrast, *Basdata med reläskyddshändelser* can be unavailable for 24-72 hours without significant operational impact due to its longer time horizon. Similarly, while data quality is critical for *Korttidsprognos för fördelningsstation*, as inaccurate forecasts directly affect automated electricity trading decisions, it is less critical for *Basdata med reläskyddshändelser*. This is due to human operators are always involved in the latter case, allowing for manual validation and approving of the suggested actions, reducing the immediate risk associated with lower data quality.

5.4 Cost Calculation at E.ON

5.4.1 *Korttidsprognos för fördelningsstation*

The cost structure of *Korttidsprognos för fördelningsstation* is characterized by a strong dominance of development related costs, CapEx, in relation to maintenance costs, OpEx. The empirical findings show that the annual development cost amounts to approximately SEK 0,91X, while the maintenance cost is estimated at SEK 0,04X - 0,09X. This distribution indicates that the majority of the visible costs are associated with development activities, while the operational costs remain relatively low. In addition to labor costs, IT-related costs associated with the data product remain unallocated at the individual data product level, which means that the figures presented represent only a partial view of the total cost.

Comparison Between Value and Cost

Based on the empirical finding, the net value of *Korttidsprognos för fördelningsstation* is up to SEK 15,7X, see Table 9. However, the value of the data products depends on the alternative cost that is assumed. The calculated net value is based on the highest value of the product, which means that the net value can be misleading depending on the value at which the product is calculated. Another misleading factor is the absence of IT-related costs. These costs also affect the net value of the data product, meaning that the calculated net value is based on an incomplete cost structure.

Table 9: Net value of *Korttidsprognos för fördelningsstation*.

Aspect	Number
Labor cost	up to SEK X
IT cost	undefined
Total exchange value	up to SEK 16,7X
Net value	**up to SEK 15,7X**

5.4.2 *Basdata med reläskyddshändelser*

The cost structure of *Basdata med reläskyddshändelser* is characterized by a more balanced distribution between development and maintenance costs. Both CapEx and OpEx are estimated to be approximately the same amount, corresponding to SEK 0,5Z each. This indicates that maintenance activities constitute a substantial share of the total cost, highlighting the importance of continuous operation of this data product. As with *Korttidsprognos för fördelningsstation*, the IT-related costs associated with the data product remain unallocated at the individual data product level, meaning the figures presented similarly represent only a partial view of the total cost.

Comparison Between Value and Cost

For Basdata med reläskyddshändelser, the empirical findings indicate that the net value amounts to SEK 7,2Z, see Table 10. However, it is important to emphasize that the exchange value of the data product should primarily be viewed as a secondary outcome. As previously discussed, the main value of the data product lies in its use value rather than generating direct economic returns. Similarly to the previous data product, the absence of IT-related costs is considered as a misleading factor. These costs also affect the net value of the data product, meaning that the calculated net value is based on an incomplete cost structure.

Table 10: Net value of *Basdata med reläskyddshändelser*.

Aspect	Number
Labor cost	up to SEK Z
IT cost	undefined
Total exchange value	up to SEK 8,2Z
Net value	**up to SEK 7,2Z**

5.4.3 Comparative Analysis

Comparing the costs of the two data products reveals both similarities and differences. In terms of differences, the distribution between CapEx and OpEx varies significantly. *Korttidsprognos för fördelningsstation* is development-intensive, with CapEx constituting the clear majority of labor costs at approximately SEK 0,91X annually, while maintenance costs remain relatively low at SEK 0,04X - 0,09X. *Basdata med reläskyddshändelser*, on the other hand, shows a more balanced distribution, with both CapEx and OpEx estimated at SEK 0,5Z each, reflecting greater time spent on continuous operational maintenance relative to development. This difference may have to do with the maturity of the two data products, as *Korttidsprognos för fördelningsstation* is an established product where the forecasting model is largely developed, while *Basdata med reläskyddshändelser* is still in its pre-developing phase and simultaneously requires substantial maintenance to ensure reliable operation.

A key similarity is that both data products lack comprehensive cost allocation. This connects back to the underlying costing model, *average costing*, which E.ON applies as described in the empirical context. The model is historically built around the delivery of electricity as a single homogeneous cost object, but as the organization has developed and digitalization has become increasingly important, the model starts to fall short. This is particularly evident for data products, as each involves a distinct combination of labor and IT infrastructure that cannot be meaningfully distributed across a single unit of output in the same way as the cost of delivering electricity. This complexity is further highlighted when comparing the internal and external cost object. While the external offering is connected in a relatively straightforward unit of measurement, the internal offering of data products lacks an equivalent common unit, making cost allocation considerably more complex.

A central reason why the average costing model fails in this context is that the organization lacks a formal internal cost allocation system for data products, meaning that IT-related costs cannot be systematically attributed to individual data products. This is evident for both data products, where IT-related costs remain unallocated, leaving the cost figures limited to estimated labor costs and represents only a partial view of the true cost of providing internal DaaS.

Comparison Between Value and Cost

Both data products demonstrate a positive net value, where the net value of *Korttidsprognos för fördelningsstation* is approximately six times as high as of *Basdata med reläskyddshändelser*, see Table 11. However, there are uncertainties associated with both estimations. For *Korttidsprognos för fördelningsstation*, the exchange value spans a relatively large range, and the calculation presented is based on the upper value estimate. In contrast, the net value associated with *Basdata med reläskyddshändelser* primarily reflects a secondary outcome of the data products use value rather than its core purpose. In addition, the absence of IT-costs for both data products result in an incomplete cost picture leading to a misleading net value. Consequently, the calculated net values should be interpreted as estimations and indicative guidelines rather than exact measurements of the economic value generated by the data products.

Table 11: Comparative net value of both data products.

Data Product	Net Value
Korttidsprognos för fördelningsstation	up to **SEK 15,7X**
Basdata med reläskyddshändelser	up to **SEK 7,2Z**

6 Conclusion

This thesis aimed to *describe and analyze Data-as-a-Service, DaaS, internally in an international organization, and identify the associated value and cost*. Based on the empirical findings and the conducted analysis, several key conclusions can be drawn regarding how DaaS functions within an organizational context.

Internal DaaS is best understood as a service-oriented offering rather than a standalone product. The data products function as enabling resources that support operational decision-making and more efficient ways of managing the electricity grid. In line with Kotler's Three Levels of Product and the Product-Service System framework, the value of internal DaaS is not embedded in the data itself, but rather in *the augmented product* that ensures continuous and reliable data delivery. Furthermore, both data products are classified as *result oriented* from a PSS perspective, meaning that value is realized through the outcomes the data enables, rather than through access to the data itself. Both data product have high performance in *maintenance service*, which implies that the service components surrounding a data product are as critical to value realization as the technical solution itself, see Figure 20. The low performance in Services at the point of sale is limited for both data products since there is no internal formalized transaction.

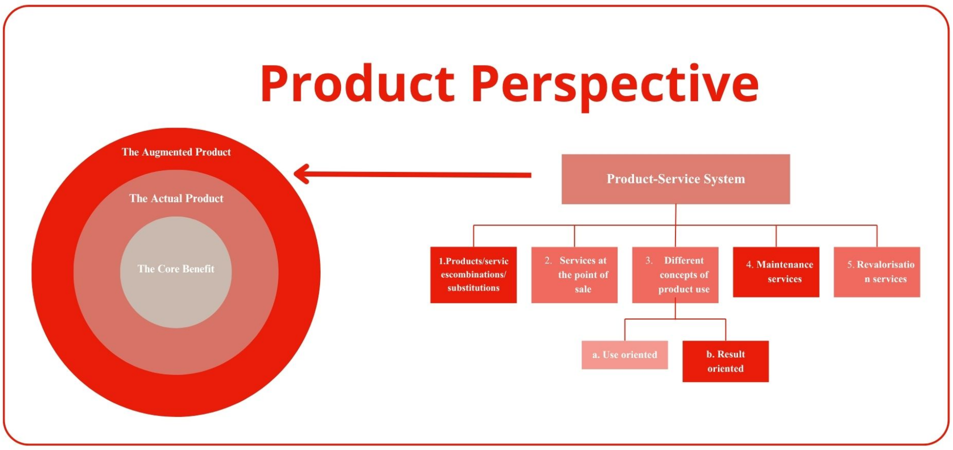

Figure 20: Illustration of conclusion from the product perspective.

The functioning of internal DaaS aligns with Service-Dominant Logic, where value is *co-created* between data teams and users and emerges when the data product is integrated into *operational processes.* A structural consequence of this is the identified phenomenon of value slippage, where the organizational unit responsible for *creating value* is *separated* from the unit that *captures it*, see Figure 21. This separation creates *institutional challenges* in *justifying investments* and *allocating costs* for *internal DaaS*, as the economic benefits are realized in a different part of the organization than where the costs are incurred.

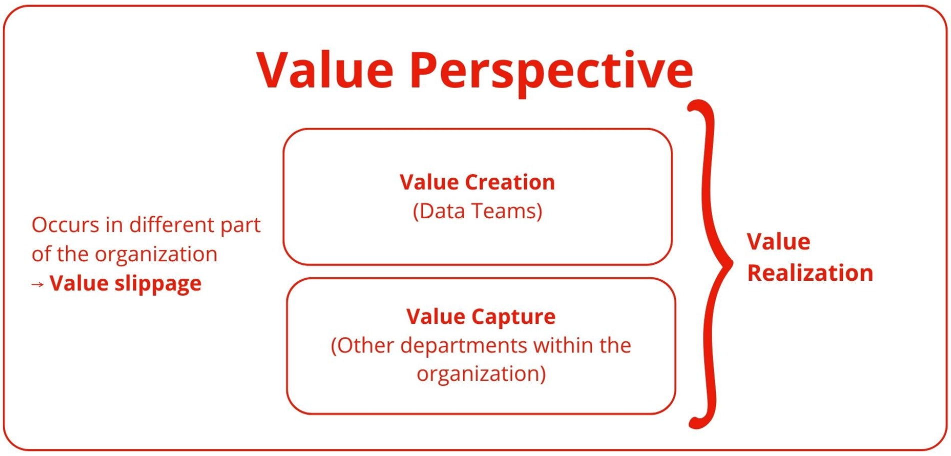

Figure 21: Illustration of conclusion from the value perspective.

The value of internal DaaS is *highly context-dependent* and differs significantly depending on the nature and purpose of the data product. While some internal DaaS generates both high *use value* and relatively quantifiable *exchange value*, such as direct cost savings through more accurate forecasting, other data products primarily generate use value through improved *operational reliability* and *proactive decision-making* support. For these, the economic impact is more indirect and more difficult to express in monetary terms. This distinction has important organizational implications, as data products with high use value but low exchange value have a risk of being undervalued or de-prioritized, despite being critical for operations. Communicating the value of internal DaaS therefore requires *moving beyond purely financial metrics* and *developing ways to articulate operational and strategic contributions.*

Finally, the cost structure of internal DaaS consists of labor costs, divided into CapEx and OpEx activities, and IT-related costs. However, the findings reveal that the *average costing model*, built around a single homogeneous cost object, is not sufficient for capturing the true cost of individual data products, see Figure 22. The absence of a formal internal cost allocation system means that IT-related costs cannot be systematically attributed to individual data products. As a result, the cost figures available for internal DaaS represent only a partial view of the true cost, providing an incomplete basis for evaluating whether the associated costs are justified by the value generated. As the organizations internal value offering becomes more complex, the cost model needs to evolve to support new and more complex internal offerings.

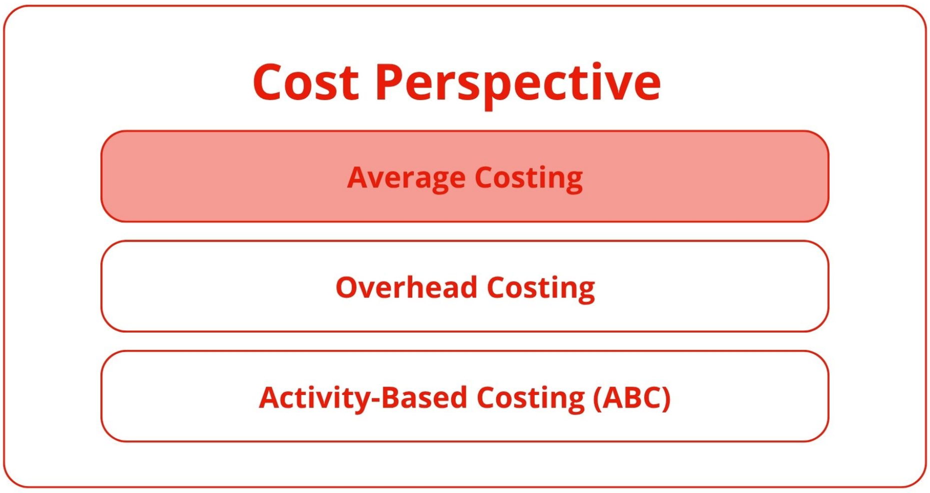

Figure 22: Illustration of conclusion from the cost perspective.

In summary, internal DaaS creates significant organizational value, both in terms of operational efficiency and cost savings, but this value is highly context-dependent, intangible and structurally difficult to capture and measure. To fully realize and communicate the value of internal DaaS, organizations need to develop more comprehensive frameworks both for value attribution and cost allocation, that account for the service-oriented nature of data products and the organizational separation between those who create and those who capture value.

7 Knowledge Contribution, Reflection and Further Studies

This section aims to describe the broader implications of the case study. The first part, *Knowledge contributions*, describes how this thesis contributes to insights from an industry, company and academic perspective. The second part, *Refection*, aims to further discuss relevant perspectives from the interviews that did not fit within the main scope of the study and is therefore not academically grounded. The last part, *Further studies*, identifies areas where additional research is needed and highlights opportunities to further develop the understanding of Data-as-a-Service.

7.1 Knowledge Contribution

7.1.1 Industry

This study contributes to the broader understanding of Data-as-a-Service as an emerging, service-oriented phenomenon driven by technological development. It highlights how the shift from product-based to service-based offerings introduces new conditions for value creation and value capturing, where value is no longer embedded in the data itself but realized through its use in operational processes. Furthermore, this study point out that cost tracking is both difficult and complex when developing new offerings, particularly in internal business to business contexts.

Energy distribution companies possess large amounts of data, which creates significant opportunities for new organizational capabilities where DaaS is likely to play a central role. This development indicates a strong potential for the industry to establish new approaches to operational management based on data-driven services. However, the shift towards DaaS also introduces internal implications, particularly related to co-production and the integration of data into operational processes. As value is increasingly co-created between data providers and users, new organizational requirements emerge, placing greater demands on coordination, collaboration and governance structures.

A key contribution to the energy industry is the identification that result-oriented DaaS appears to have the greatest impact, as value is primarily derived from the operational outcomes enabled by the data rather than the data itself. This highlights the inherent operational character of DaaS, where value is created through its integration into day-to-day processes. Consequently, DaaS should be understood within a service-dominant logic, where value is co-created and context-dependent.

Another key insight is that DaaS require a lot of *Maintenance services*, including services that reinforce the value offering and the augmented product. Those maintenance services are context-dependent to meet the needs of maintaining the DaaS.

A key limitation identified in this study is that average-based cost calculation methods are not well suited for complex service-oriented DaaS. These methods assume a relatively stable and homogeneous cost structure, which contrasts with the dynamic and context-dependent nature of DaaS. In practice, DaaS involves varying levels of resource consumption depending on usage, maintenance needs and integration into operational processes. As a result, average-based calculations risk oversimplifying the cost structure and hiding the true allocation of resources.

Furthermore, as value creation and value capture often occur in different parts of the organization, there is an increased need to accurately link costs to specific services and outcomes. Traditional average-based costing fails to capture this complexity, particularly in organizations where DaaS are expected to scale and where costs and value capturing occurs in different business units. Consequently, relying on such methods can lead to misleading conclusions and hinder effective decision-making regarding investments in DaaS.

Lastly, the study highlights a general challenge for data-intensive organizations: while DaaS can generate substantial use value, its indirect and intangible nature makes it difficult to quantify economically. This indicates that traditional evaluation models may be insufficient and that organizations undergoing digital transformation need new approaches to understand and assess the value of data-driven services.

7.1.2 E.ON

For E.ON, this study provides a structured understanding of how internal DaaS, data products, creates and captures value within the organization. It shows that the two data products are deeply integrated into operational processes and play a key role in enabling proactive grid management and efficient decision-making. Furthermore, the findings emphasize the need to account for both use value and exchange value when evaluating data products. Relying solely on financial metrics risks undervaluing data products that contribute significantly to operational reliability and long-term performance.

A central knowledge contribution from this study is that the value of DaaS is not solely embedded in the data or the technical solution, but largely to the surrounding services that enable its use. The empirical findings shows that the augmented services, as support, maintenance, quality assurance and incident management, is crucial to secure availability, reliability and continuous functionality of the data products. Thus, this study contributes with the key insight to both theory and reality, that the primary value creation is not the data itself, but the surrounding services that enable data to be delivered, interpreted and used reliably in the business. This means that organizations implementing DaaS should place greater focus on developing and allocating resources to these surrounding services, rather than focusing solely on data collection and technical development.

The study also highlights the importance of mapping how data products are used in practice to fully understand their value. This is particularly relevant for E.ON, where value is created in one part of the organization but captured in another, complicating cost justification and investment decisions. Furthermore, this illustrates that DaaS can be seen not only from a technical perspective, but also from a organizational perspective. The challenge for E.ON is not the data itself, but how to incorporate DaaS into governance, responsibility and incentives.

In addition, the study identifies limitations in current cost allocation practices, particularly the lack of systematic tracking of OpEx and IT-related costs. The current IT-cost allocation method is absent, maybe due to the historical average-based cost calculation method. The emergence of DaaS has complicated how cost should be allocated and to meet this problem, it is recommended to change the cost calculation method to fit the new requirements. Addressing these limitations could improve cost transparency and support more informed decision-making regarding internal DaaS investments.

Finally, this study highlights the importance of data availability and data quality. During the interviews, it has become evident that the data products require high availability and quality in order to meet E.ON's digitization journey.

7.1.3 Academia

The application of different established models on an international company, operating in Sweden, illustrates how different concepts can be used to explore the combinations of product- and service offerings. The combination of Kotler's Three Levels of Product, Product-Service System and Service Dominant Logic demonstrates a unique approach of describing a rather emerging offering, DaaS. The models show how synergies between product- and service offerings can justify value creation, but also illustrate how the phenomenon of value slippage complicates cost justification.

The main purpose of Service-Dominant Logic is to illustrate how value is created through co-creation between the provider and the consumer. Traditionally, the consumer is considered to be an external customer, however, this study extends SDL to the context of internal data services. The findings confirm that SDL is applicable within an internal organizational setting, thereby reinforcing that the framework can be used to understand value creation not only in external markets but also within organizations.

7.2 Reflection

In the following sections, reflections connected to the challenges and insights that emerged from the empirical findings, but which did not fit into the purpose of this thesis, will be discussed and analyzed.

7.2.1 Inadequate Monitoring of Critical Data Products

Currently, there is a lack of continuous monitoring of critical data products. The data teams responsible for maintaining and monitoring these products operate during office hours, while users of certain critical data products work twenty four hours a day, or the data products themselves act automatically depending on their application. If failures occur in some of these data products, they can lead to significant economic consequences, whereas others may have little to no direct financial impact. This further illustrates that DaaS is designed and utilized differently depending on the context, resulting in varying levels of value creation and cost implications. However, a key challenge arises from the fact that these data products are only monitored during office hours, but are used and generating value outside of that timeframe.

Reliance on Employee Effort Beyond Regular Working Hours

The implementation of the data products is relatively recent, and several interviews indicate that the data teams treat their products with great care, prioritizing high availability and data quality. As a result, the teams have adapted their work practices to ensure continuous monitoring, even during periods of leave. For example, vacations and holidays are planned in a way that allows the data products to be checked at least once per day. Today, there is no system for error message, but requires a human factor that manually checks if something looks wrong. This means that employees, despite being on leave, take turns monitoring the systems, particularly during extended holidays, to ensure that everything functions properly and to address any issues that may arise.

Relying on a “taking one for the team” culture may function in the short term, as long as employees are willing to take on additional responsibility beyond their formal roles. However, this approach entails significant risks and is not sustainable in the long run. Building organizational reliability on individual goodwill makes operations vulnerable and dependent on personal commitment rather than structured processes. Similarly, planning employee leave around the constant need for knowledgeable personnel is increasingly unsustainable given current resource constraints. Therefore, it is recommended that E.ON implements a more robust and formalized system for monitoring and maintaining critical data products, one that does not rely on individual efforts but ensures reliability through established processes and organizational support.

Addressing the Lack of Formal Monitoring

There are several ways to address the lack of formal monitoring and incident management for data products. One potential solution is to develop a centralized system that continuously analyzes all data products and automatically signals when issues occur. Such a system would reduce the need for employees to manually troubleshoot data products, allowing more time to be allocated to further development. It would also mitigate the current situation where employees need to access systems during their leave to check for potential issues.

However, this solution would not fully eliminate the risk of incidents occurring during periods when no personnel are available, but it represents an important first step toward formalizing the incident management process. The system should be designed to notify both the data teams responsible for the products and the end users, enabling users to pause any automated processes connected to the data products in order to minimize potential economic consequences.

In addition, the system should include a chat function to facilitate efficient communication between those responsible for resolving issues and the affected users. Since the data catalog already includes a chat function, it is recommended that the monitoring and incident management system is integrated in the data catalog. This would provide a unified platform for communication and coordination, improving transparency and efficiency for all involved stakeholders.

One way to address the issue of employees having to coordinate their vacations and perform work during holidays is to introduce an on-call support team dedicated to monitoring and incident handling. E.ON already has an established on-call function, Operational IT (*SW. Operativ-IT*), which operates around the clock. This function could serve as a valuable internal benchmark and source of inspiration when designing a similar setup for monitoring the data products.

An on-call support team for data products would require a high level of technical competence, as it needs to understand multiple interconnected IT systems on which the data products depend. With approximately 366 data products, this implies the need for broad and specialized expertise to effectively manage incidents across different systems. The on-call function could either be staffed by existing experts within E.ON or by a newly recruited team with strong technical capabilities. However, in an initial phase, leveraging existing internal expertise is likely the most viable approach to ensure sufficient domain knowledge and system understanding.

Another alternative is to explore closer collaboration with the existing Operational IT function, which could create synergies by combining competencies from different parts of the organization. This approach could improve both efficiency and knowledge sharing while providing a more robust and scalable solution for monitoring and incident management of data products.

7.2.2 Service Level Agreement

As E.ON continues its digital transformation, increasing demands are placed on data availability and data quality. An additional challenge identified during the interviews concerns the current interpretation of "best effort." In this context, best effort implies that data teams address issues as time allows during working hours. However, since the data products are highly prioritized by the data teams, incident handling in practice goes beyond this definition, with teams often de-prioritizing other tasks to resolve issues as they arise. While this approach improves responsiveness, it also creates challenges in workload management.

At the same time, some data product managers report that users expect certain data products to maintain high availability and not be unavailable beyond specific time limits. While some users requires high availability, other users requires high data quality. These expectations introduce additional pressure on data teams and require continuous re-prioritization of tasks.

Need for Formalized Service Levels in Data Management

To address this challenge, there is a need for a more formalized and standardized approach to incident management. One way to achieve this is by introducing internal Service Level Agreements. A Service Level Agreement, SLA, is a formal agreement between the service provider, in this case the data teams, and the users that defines the expected level of service. It specifies measurable criteria such as availability, response times, performance and responsibilities, as well as how incidents should be handled and resolved. The purpose of an SLA is to ensure clear expectations, accountability and consistent service quality.

A potential risk associated with implementing Service Level Agreements is the emergence of internal tensions, as formalized requirements introduce expectations and consequences if these are not met. Such conditions may lead to a more defensive or adversarial mindset between data teams and users, where interactions become characterized by a "hands-off" or contract-driven approach rather than collaboration. To mitigate this risk, SLAs should be developed in close collaboration with all relevant stakeholders, ensuring that expectations are clearly defined, mutually agreed upon and well communicated.

Furthermore, when formalizing service agreements, it is important to strengthen services at the point of use in line with a Product-Service System perspective. This includes enhancing user support, communication channels and overall usability, thereby fostering a more collaborative relationship between data teams and users rather than reinforcing rigid contractual boundaries.

Context-Dependent Design of Service Level Agreements

The content of Service Level Agreements should be determined by both user requirements and what data teams can realistically commit to delivering. For example, SLAs may include expected service levels, data quality, availability and performance metrics. During the conducted interviews with users of different data products, it was highlighted that priorities vary depending on the context, with different users emphasizing different aspects of potential SLAs.

This variation underlines the importance of designing SLAs collaboratively between data teams and users, ensuring that they are tailored to the specific characteristics and needs of each data product. This further confirms that DaaS is context-dependent.

Applicability of Service Level Agreements

Based on the findings of this study, Service Level Agreements are most relevant for data products that are embedded in operational processes and used continuously in day-to-day decision-making. These types of data products carry a different level of responsibility, as their availability and performance directly influence ongoing operations. This perspective is also supported by insights from the interviews, where it was suggested that Service Level Agreements are primarily meaningful for data products with operational significance, while they may be less relevant for data products used sporadically for analysis or forecasting.

This reasoning aligns with how the data products in this study were selected, based on their critical role in core operations and their integration into daily workflows. From this standpoint, it becomes apparent that the need for formalized service levels is not universal across all data products but rather context-dependent, where operationally embedded data products warrant a higher degree of formalization compared to those used on an ad hoc basis.

Recommended Approach of Conducting Service Level Agreements

A recommended method for investigating and conducting Service Level Agreements is to use *Scenario Planning*, see Appendix C for an in-depth description of the proposed method. Scenario planning is a method used to explore and analyze different possible future situations by developing structured scenarios based on uncertainties and assumptions. Instead of predicting a single outcome, it helps organizations understand how different factors can interact and what implications various future developments could have.

In the context of implementing Service Level Agreements, scenario planning can be a valuable tool as it allows organizations to assess how different Service Level Agreement designs might affect operations, costs and stakeholder relationships under varying conditions. For example, scenarios can highlight potential risks such as increased workload, conflicts between teams or unmet expectations, as well as benefits such as improved reliability and synergies. This makes it possible to make more informed decisions and design agreements that are robust across different situations.

Internal Fictive Pricing Structure for Service Level Agreements

Implementing Service Level Agreements for specific data products introduces additional operational costs for the organization. These costs arise from the additional resources required to monitoring the data products outside of normal working hours or the increased on-call capacity for faster incident management. Without a pricing mechanism attached to SLAs, there is a risk that users will demand the highest available service tier regardless of actual operational need, since the costs today does not effect the user, but the creator.

Since E.ON currently does not apply internal pricing for data products, and there is no organizational intention to introduce such a model, the implementation of internal pricing is not recommended. However, introducing a fictive pricing structure related to Service Level Agreements could provide value by improving cost justification and increasing transparency regarding the resources required to maintain different levels of service, availability, and support.

Introducing a fictive internal pricing structure for SLAs is therefore necessary and serves a dual purpose. Firstly, it aligns with the need of a more accurate cost allocation within the organization, and secondly, it creates a natural incentive for data product users to request SLAs that reflect their operational requirements.

Recommended Fictive Pricing Model

The fictive internal pricing model recommended for SLAs is the Cost-Plus pricing model. The model is a straightforward pricing methodology in which the price of a service is determined by calculating the total direct and indirect costs connected with delivering the service, with an additional predetermined margin on top of the total cost. In a commercial context this margin represents a predetermined profit, but for internal context, the margin is instead added to reflect overhead costs. (Umbrex, n.d.)

The Cost-Plus model is recommended for several reasons. Firstly, the model is an easy and transparent way of communicating costs. This fits well for E.ON's organizational structure that today does not transfer money between departments and instead wants a model used for decision making and valuation purpose. Secondly, the model does not require any external data or complex valuation methodology. The implementation therefore requires low-effort and is immediately applicable. Lastly, the model is a well-established framework used for the allocation of costs within organizations and is consistent with industry standards (Umbrex, n.d.).

7.2.3 Data Contract

Another alternative to Service Level Agreements is Data Contracts. Data Contracts are formalized contracts between the data provider and the data user. Data contracts work in a similar way as Service Level Agreements, but have a larger focus on ownership, quality, and the terms of usage of the data, and less focus on in what time-frame data need to be delivered. The larger focus on quality aligns with the findings in this report, where data quality emerged as a critical factor for value creation across both data products.

Furthermore, Data Contracts improve the communication between the data providers and data users. This is an essential first step for the organization to align both parties expectations and understand the data products criticality.

7.2.4 Cost of Missing a Data Product

As identified in the analysis, the captured value of both data products is significant, meaning that the absence of a data product would have a direct negative effect on the value captured by the organization. However, the cost of missing a data product is highly context dependent, as it varies for each data product. Understanding what value is lost during periods of unavailability is important, as it provides the organization with a basis for discussing what resources are justifiable to allocate in order to restore data products that are down.

To illustrate this, a short calculation example is presented for the data product *Basdata med reläskyddshändelser*, showing how the organization can assess the missed value for different time frames.

Calculation Example for *Basdata med reläskyddshändelser*

The annual cost savings potential with *Basdata med reläskyddshändelser* is up to SEK 8,2Z, corresponding to the prevention of 803 outages annually. Based on interviews with Person A (2026), approximately 60% of the identified outages develop within a time frame of one week, while the remaining develop at a slower pace. Assuming that outages are distributed linearly throughout the year, this corresponds to an average of 15.4 outages per week, of which 9.3 are estimated to develop and result in an outage within a one-week period.

Consequently, if the data product were unavailable for one week, it could be argued that 9.3 outages would go undetected during this period. This would equal to a missed cost savings potential of approximately SEK 0,09Z, due to the unavailability of the data product. The estimated cost of unavailability could therefore serve as a reference point when evaluating what resources should be used to restore the data product.

7.3 Further Studies

7.3.1 Valuation of Customer Satisfaction

One area that falls outside the scope of this thesis, but which emerged as relevant throughout the empirical findings, is the valuation of customer satisfaction in the context of external Daas. As identified in the analysis, certain data products at E.ON are not aimed at internal users but instead have the goal of improving the experience for the end customers. This could be through improved information sharing or by minimizing the risk of power outages. Since these data products are free of charge for the end customers and often just expected for them, the value they generate for the organization cannot be captured through direct revenue, making the quantification of their value particularity challenging.

This challenge is directly connected to a key finding of this thesis, namely that data products characterized by high use value but low exchange value have a high risk of being undervalued or de-prioritized within the organization. For external DaaS aimed at improving customer satisfaction, this challenge becomes even more pronounced, as the value chain extends beyond the organization and the economic impact is realized indirectly, through dimensions such as improved customer retention and strengthened brand reputation. A recommended approach for evaluating data products with high use value is the weighted-point evaluation method. This method captures perspectives beyond direct monetary value and enables the organization to incorporate strategic, operational and qualitative dimensions into the evaluation process (Bozarth & Handfield, 2019).

The ability to quantify this indirect value is important for E.ON, as it would enable the organization to include customer satisfaction as a measurable input in their internal evaluation processes when allocating resources to data product with use value from a customer perspective. One established approach to measuring customer satisfaction is through Net Promoter Score, NPS. By analyzing changes in NPS in relation to specific external DaaS initiatives, it could be possible to establish a connection between data product investments and customer satisfaction outcomes, and translate these into economic terms. Therefore, this thesis recommends that a separate master's thesis with the purpose: *quantification of customer satisfaction in the context of external DaaS* should be carried out. The study could analyze how the value of improved customer satisfaction can be systematically measured and translated into economic terms, and how this value can be incorporated into existing frameworks for evaluating and prioritizing internal data product. This would complement the findings of this thesis and contribute to a more complete understanding of the full value of DaaS, both internally and externally, within an organization.

7.3.2 Lack of Visibility in IT Cost Structures

As discussed throughout this thesis, a key challenge lies in the limited allocation of IT-related costs. Currently, E.ON allocates IT costs at the level of the entire data catalog rather than at the individual data product level. Interviews with a business controller further revealed a lack of transparency regarding how these costs are allocated and which IT systems are associated with specific data products. This indicates a general uncertainty in the current cost allocation process, which is problematic from an analytical perspective.

As present, IT costs are allocated using an average-based costing approach, which is a traditional method developed under the assumption of relatively simple cost structures, often linked to a single product or offering. However, with the introduction of multiple data products, the cost structure becomes significantly more complex. Internal data-driven offerings, such as DaaS, are inherently more complex than traditional customer-facing products, as they rely on interconnected systems, continuous updates and varying usage patterns. As a result, the current costing approach is insufficient, as it does not capture the true distribution of costs across data products. This limitation is further exacerbated by the absence of an internal cost system adapted to service-based and data-intensive offerings.

To achieve a more accurate and complete cost allocation, alternative costing methods should be explored, particularly those that can better reflect the complexity and variability of data products, for example Activity-Based Calculation. In addition, OpEx-activities need to be systematically included in the cost structure, as their exclusion prevents a comprehensive understanding of the total cost of Data-as-a-Service.

For future research, it would be valuable to investigate which cost objects and costing approaches are most suitable as data-driven offerings become increasingly complex. This includes further exploration of how IT costs can be mapped and allocated more accurately at the data product level, enabling more improved cost transparency.

8 References

Literature & Written Sources

Andersson, A. (2025, December). *Elsystemet och elmarknaden*. Energimyndigheten. Retrieved February 10, 2026, from https://www.energimyndigheten.se/energisystem-och-analys/nulaget-i-energisystemet/om-det-svenska-elsystemet/

Baines, T. S., Lightfoot, H. W., Evans, S., Neely, A., Greenough, R., Peppard, J., Roy, R., Shehab, E., Braganza, A., Tiwari, A., Alcock, J. R., Angus, J. P., Bastl, M., Cousens, A., Irving, P., Johnson, M., Kingston, J., Lockett, H., Martinez, V., . . . Wilson, H. (2007). State-of-the-art in product-service systems. *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture*, *221*(10), 1543–1552.

Beuren, F. H., Gomes Ferreira, M. G., & Cauchick Miguel, P. A. (2013). Product-service systems: A literature review on integrated products and services. *Journal of Cleaner Production*, *47*, 222–231. https://doi.org/10.1016/j.jclepro.2012.12.028

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital business strategy: Toward a next generation of insights. *MIS Quarterly*, *37*(2), 471–482. https://doi.org/10.25300/MISQ/2013/37:2.3

Bozarth, C. C., & Handfield, R. B. (2019). *Introduction to operations and supply chain management* (5th ed.). Pearson.

Chen, H., Chiang, R. H. L., & Storey, V. C. (2012). Business intelligence and analytics: From big data to big impact. *MIS Quarterly*, *36*(4), 1165–1188. https://doi.org/10.2307/41703503

Daniel, D. B., & George, D. G. (2025). Inductive vs. deductive research methods: A comprehensive methodological guide for bachelor's and master's theses. *International Journal of Scientific Research* *in Engineering and Management*, *9*(9), 1–9. https://doi.org/10.55041/IJSREM52576

Davenport, T. H., & Prusak, L. (2000). *Working knowledge: How organizations manage what they know*. Harvard Business Review Press.

Denscombe, M. (2010). *The good research guide: For small-scale social research projects* (4th ed.). McGraw-Hill Education.

E.ON. (2025). Företagspresentation 2025 [Internal company document]. *E.ON*.

Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative Inquiry*, *12*(2), 219–245. https://doi.org/10.1177/1077800405284363

Greenhalgh, C., & Gregory, M. (2001). Structural change and the emergence of the new service economy. *Oxford Bulletin of Economics and Statistics*, *63*, 629–646. https://doi.org/10.1111/1468-0084.63.spe1.2

Höst, M., Regnell, B., & Runeson, P. (2006). *Att genomföra examensarbete*. Studentlitteratur.

Kotler, P., Armstrong, G., & Parment, A. (2016). *Principles of marketing: Scandinavian edition* (2nd ed.). Pearson Education Limited.

Lepak, D. P., Smith, K. G., & Taylor, M. S. (2007). Value creation and value capture: A multilevel perspective. *Academy of Management Review*, *32*(1), 180–194. https://doi.org/10.5465/amr.2007.23464011

Lindgren, M., & Bandhold, H. (2024). *Scenarioplanering: Länken mellan framtid och strategi*. Vulkan.

Lusch, R. F., & Vargo, S. L. (2014). Axioms and foundational premises. In *Service-dominant logic: Premises, perspectives, possibilities* (pp. 53–82). Cambridge University Press. https://doi.org/10.1017/cbo9781139043120.006

Manley, A. (2024). What is the value of data? a review of empirical methods. *Journal of Economic Surveys*, *38*, 1317–1337. https://doi.org/10.1111/joes.12585

Marston, S. R., Li, Z., Bandyopadhyay, S., Ghalsasi, A., & Zhang, J. (2009). Cloud computing: The business perspective. *SSRN Electronic Journal*, *51*(1). https://doi.org/10.2139/ssrn.1413545

Mont, O. K. (2002). Clarifying the concept of product–service system. *Journal of Cleaner Production*, *10*(3), 237–245. https://doi.org/10.1016/S0959-6526(01)00039-7

Philipsen, K., & Hjalager, A.-M. (2024). Theory building using abductive search strategies. In *Contributions to management science* (pp. 45–60). https://doi.org/10.1007/978-3-031-70149-8_3

Skärvad, P.-H. (2020). *Företagsekonomi 100 fakta*. Liber.

Umbrex. (n.d.). *Cost-plus pricing*. Umbrex. Retrieved May 6, 2026, from https://umbrex.com/resources/frameworks/pricing-frameworks/cost-plus-pricing/

Van Der Heijden, K. (2010). *Scenarios: The art of strategic conversation*. John Wiley & Sons, Ltd.

Vandermerwe, S., & Rada, J. (1988). Servitization of business: Adding value by adding services. *European Management Journal*, *6*(4), 314–324.

Wachal, R. (1971). Humanities and computers: A personal view. *The North American Review*, *256*(1), 30–33. Retrieved February 2, 2026, from https://www.jstor.org/stable/25117163

Wang, R. Y., & Strong, D. M. (1996). Beyond accuracy: What data quality means to data consumers. *Journal of Management Information Systems*, *12*(4), 5–33. https://doi.org/10.1080/07421222.1996.11518099

Wojnarowski, B. (2025). *Software development as a service (saas): Business model and challenges*. J-Labs. Retrieved February 2, 2026, from https://www.j-labs.pl/en/tech-blog/software-development-as-a-service-saas-business-model-and-challenges/

Zycus. (n.d.). *What is net value*. Zycus. Retrieved May 7, 2026, from https://www.zycus.com/glossary/what-is-net-value

Interviews

Person A. (2026). Data product manager. Multiple interviews conducted between 2025-12-04 and 2026-05-11, Malmö.

Person B. (2026). Business controller. Interview conducted 2026-03-02 and 2026-03-31, Malmö.

Person C. (2026). Data product manager. Interview conducted 2026-03-12, Malmö.

Person D. (2026). Flexibility analyst. Interview conducted 2026-03-17, Malmö.

Person E. (2026). Product owner switch. Interview conducted 2026-03-20, Malmö.

Person F. (2026). Data product owner. Interview conducted 2026-03-24, Malmö.

Person G. (2026). Data product owner. Interview conducted 2026-04-16, Malmö.

Person H. (2026). Data analyst. Interview conducted 2026-03-31 and 2026-04-14, Malmö.

Person I. (2026). Data analyst. Interview conducted 2026-04-14, Malmö.

Appendix

Appendix A: Interview Guide: Data Product Manager

1. Overview of the Data Product

Can you provide a brief description of the data product?

2. Product and Value

What core need does the data product address (e.g., decision-making, efficiency improvements)?

Are there any similar data products that fulfill the same need?

What type of data is delivered by the product?

What additional services or benefits are provided alongside the data product (e.g., data team support, guarantees, etc.)?

3. Result- or Use-Oriented Value

Is the data product primarily focused on delivering a specific data output (result-oriented)?

Or is the focus on delivering data continuously over time (use-oriented)?

Is the customer value based on achieving a specific result from the data (result-oriented)?

Or is the value based on continuous access to the data (use-oriented)?

4. Dependencies and Data Flows

Which underlying systems does the data product depend on?

At what intervals is data retrieved from these systems? (How frequently is the data updated?)

5. Operations and Disruptions

How often is the data product unavailable due to disruptions or unplanned events?

How do you detect that the data product is experiencing a disruption or delivering incorrect data?

Have customers expressed requirements regarding resolution times for disruptions?

If yes, what types of time requirements exist?

6. SLA and Delivery Requirements

What SLA requirements do you expect customers to demand for the data product?

Do time requirements vary throughout the year?

- What requirements exist on weekdays?
- What requirements exist on weekends?
- What requirements exist during holiday periods?

What SLA levels (e.g., resolution times) do you estimate are currently being delivered?

Do employees currently work outside regular hours to handle incidents or issues?

7. Resource Perspective

What resources would be required to meet different SLA levels for:

- Weekdays: SLA of X hours

- Weekends: SLA of X hours
- Holiday periods: SLA of X hours

Estimate: What proportion of your working time is spent on this data product?

Estimate: What proportion of the data team's total time is spent on this data product?

8. Development and Maintenance

What proportion of this time is spent on developing the data product?

What proportion of this time is spent on maintaining the data product?

Appendix B: Interview Guide: Data Product Owner & User

1. Usage Context

How frequently do you use the data product (e.g., daily, weekly, ad hoc)?

Is it integrated into an operational process, or is it mainly used for one-off decisions?

What has the data product enabled in your work (e.g., efficiency gains, improved decision-making, increased customer satisfaction)?

2. Alternative Costs

How did you perform these tasks before the data product was available, and what resources were required (e.g., time, reliability, security)?

Has the data product had any impact on costs within your department?

3. Business Criticality

Is the data product critical for your operations?

Are you dependent on it to perform your work?

What would be the impact if the data product were unavailable for a short period? (e.g., financial consequences, halted processes, delays)

What would you define as a "short period"?

What would be the impact if the data product were unavailable for a longer period?

What would you define as a "long period"?

If incorrect data is delivered, what consequences would that have?

4. SLA Expectations

What requirements or expectations would you have for Service Level Agreements (SLA) for this data product?

Do these requirements vary throughout the year (e.g., periods with higher demand or criticality)?

- What time requirements would you expect on weekdays?
- What time requirements would you expect on weekends?
- What time requirements would you expect during holiday periods?

5. Willingness to Pay for SLA

Introducing stricter SLA levels would likely increase costs for the provider (e.g., E.ON). Would you be willing to bear additional costs for increased reliability and service levels?

Appendix C: Scenario Planning

Organizations often work with strategic planning and future thinking, but according to Lindgren and Bandhold (2024) is *"strategic planning or strategy thinking without scenario thinking more or less meaningless"*. In organizational and strategic contexts, decision-making is often characterized by uncertainty. To address such conditions of uncertainty, the analytical approach Scenario analysis has emerged. Rather than aiming to predict the future, scenario analysis seeks to explore a set of logical alternative futures. By establishing scenarios based on different assumptions, the approach enables ideas on how outcomes may vary across contexts.

Scenario Analysis as a Strategic Tool

As a result of events such as geopolitical conflicts, pandemics and trade tariffs, the environment is characterized by increasing dynamism and uncertainty. Organizational success is often associated with the ability to adapt and respond quickly to change. Technological development and shifting market conditions are just two examples that put pressure on organizations to continuously adjust strategies, structure and operations (Lindgren & Bandhold, 2024). However, flexibility alone is not sufficient, since responsiveness may weaken reliability, consistency and long-term performance, resulting in organizations facing a fundamental balancing between stability/robustness and flexibility. Navigating this dilemma requires more than reactive decision-making and methods that support preparedness under uncertainty (Van Der Heijden, 2010).

Scenario planning addresses this challenge by providing a structured way to explore alternative future conditions and their potential implications. By examining how different alternatives affect, for example, resource allocation and performance, scenario planning supports strategic learning and helps organizations to prepare for change without compromising robustness. (Lindgren & Bandhold, 2024; Van Der Heijden, 2010)

What is Scenario?

The concept scenario lacks a distinct and universally accepted definition, since different authors emphasize different aspects depending on purpose and context. Despite these variations, there is broad agreement that scenarios are not the same as forecasts or visions, see Table 12. Instead, scenarios often aim to investigate uncertainty and complexity. Scenarios are often described as possible and plausible descriptions of alternative future states, instead of probable or desired states. See Table 12 for full comparison between scenarios, forecasts and visions. (Lindgren & Bandhold, 2024)

Table 12: Differences between scenarios, forecasts and visions. (Lindgren & Bandhold, 2024)

Scenarios	Forecasts	Visions
Possible, plausible futures	Probable futures	Desired futures
Uncertainty based	Based on certain relations	Value based
Illustrate risks	Hide risk	Hide risk
Qualitative or quantitative	Quantitative	Usually qualitative
Needed to know what we decide	Needed to dare to decide	Energizing
Rarely used	Daily used	Relatively often used
Strong in medium to long-term perspective and medium to high uncertainties	Strong in short-term perspective and low degree of uncertainty	Functions as triggers for voluntary change

What is Scenario planning?

Scenario planning can be used for different purposes depending on how the method is applied, see Figure 23. It can, for example, be used as a tool for innovation by provoking established trough patterns and to stimulate new perspectives. Additionally, scenario planning can contribute to organizational learning by making underlying assumptions visible and creating reflection on how current decisions can function under different future conditions. Furthermore, scenario planning is used for organizational evaluation and development that focuses on the existing business. Finally, scenario planning is often used in strategic and planning contexts, where scenarios are used to test robustness and support long-term decision-making. (Lindgren & Bandhold, 2024)

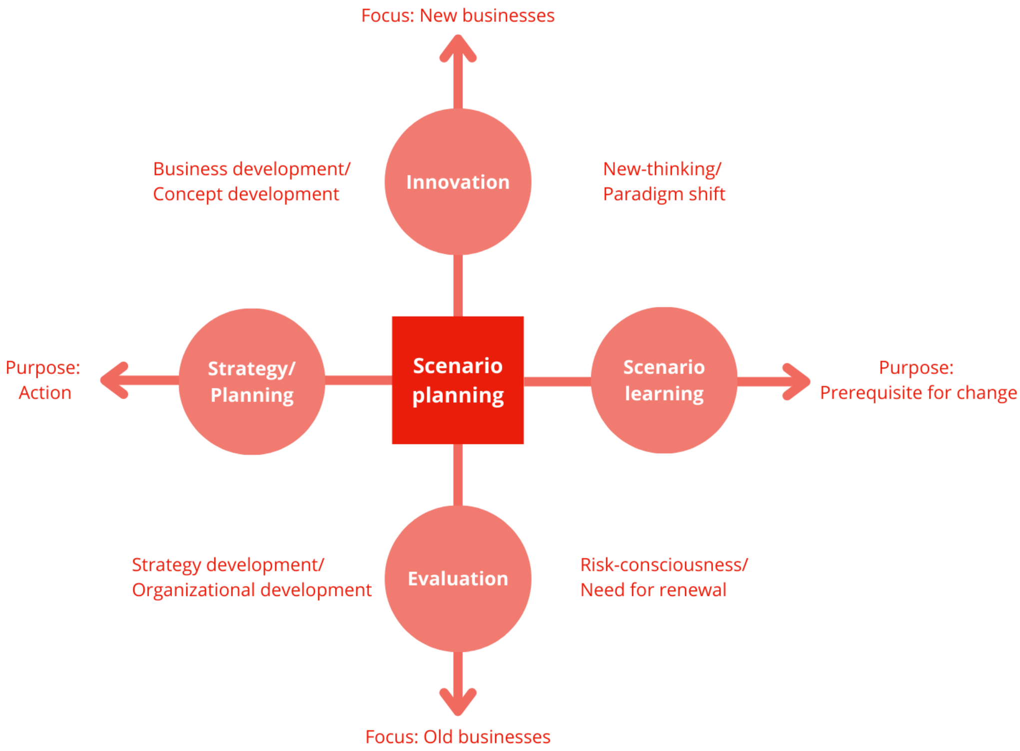

Figure 23: Different purposes and focuses with scenario planning (Lindgren & Bandhold, 2024).

In these terms, scenario planning works as a link between scenario analysis and strategic planning. While scenario analysis focuses on constructing and analyzing alternative future states, scenario planning aims to integrate these insights into strategic discussions and decisions. By connecting future-oriented analysis with present-day choices, scenario planning enables a more structured and reflective approach to uncertainty. (Lindgren & Bandhold, 2024)

TAIDA

TAIDA model is an established framework for scenario planning, developed to structure the process for strategic application. TAIDA includes five steps: (1) Tracking, (2) Analyzing, (3) Imaging, (4) Deciding and finally (5) Acting. The framework clarifies the relations between scenario analysis and strategic planning by dividing the process into two major phases. The first two steps, Tracking and Analyzing, constitute the analytical part where changes in the external environment are identified and analyzed to develop alternative scenarios. The following three steps, Imaging, Deciding and Acting, represent the strategic phase where the scenarios are translated into strategic decisions and concrete actions. (Lindgren & Bandhold, 2024)

- **Tracking**: the first step aims to map challenges, driving forces and opportunities in the surrounding.
- **Analyzing**: the analyzing phase means that these changes are processed and structured to identify critical uncertainties and develop consistent scenarios.
- **Imaging**: in this step, desirable future images or visions are formulated which serve as direction for continued strategy work.
- **Deciding**: based on the desirable scenarios, this step aims to identify strategic priorities and development areas that can handle threats and opportunities in the different scenarios.
- **Acting**: finally, the chosen strategies are translated into practical measures and implemented in the organization.

The Process of Scenario Analysis

Preparation

The initial phase is very important for scenario analysis, especially when it comes to preparation. In this phase, organizations need to state the purpose and time horizon of the scenario planning process. As mentioned earlier, scenario planning can have different purposes and focuses, it can be either for (1) risk-consciousness and need for renewal, (2) strategy- or organizational development, (3) business- or concept development or (4) new-thinking and paradigm shift, see Figure 23. Additionally, scenario planning can be beneficial in terms of innovation and is constructed by analyzing emerging trends and projecting development trajectories to explore possible future outcomes. (Lindgren & Bandhold, 2024)

Selecting an appropriate time horizon is crucial in scenario planning. A horizon that is too short may fail to capture meaningful market changes, while a too long horizon increases uncertainty and reduces practical relevance. A relevant factor to consider are also the economic aspects, given that few organizations make decisions based on such long-term investment perspectives. (Lindgren & Bandhold, 2024)

The last part of the preparation phase involves developing an understanding of both the past and current situation, including relevant internal and external factors affecting the organization. This phase also involves specifying the conditions of the scenario planning process and defining the objectives of each respective stage of the TAIDA. (Lindgren & Bandhold, 2024)

Tracking

While the preparatory phase primary focuses on the past and understanding the organizations historical development, the first step of TAIDA model, Tracking, shifts focus to future-oriented developments. At this stage, organizations start to scan the horizon for signals of change that may influence the issue under consideration. (Lindgren & Bandhold, 2024)

This stage aims to identify trends, driving forces and critical uncertainties that may shape future developments. This involves conducting an environmental analysis that captures relevant changes in the broader context the organization operates in, for example, regulatory changes, technological advancements, market dynamic, geopolitical shifts or evolving societal expectations. The responsibility of this environmental scanning varies between organizations and can either be a specialized function within the organization, for example, business intelligence, or any other strategic planning unit.

Organizations often use an inside-out perspective, but in scenario analysis it is important to instead use an outside-in perspective. The outside-in perspective starts in the organization's external environment, which is more suitable for long-term planning. The outside-in perspective aims to seek developments in the broader environment before assessing their implications for the organization. Various methods can be used to identify relevant trends and signals including media scanning, online research, expert interviews, web panels, professional networks, crown-sourcing initiatives, open innovation platforms, focus groups and Delphi studies. These methods capture diverse perspectives and reduce the risk of organizational blind spots. (Lindgren & Bandhold, 2024)

By systematically gathering signals of trends and market changes, the Tracking phase lays the foundation for further analysis. The broad outside-in perspective ensures that scenario development is grounded in a broad understanding of the external environment and strengthens the relevance of the scenarios constructed later in the TAIDA model. (Lindgren & Bandhold, 2024)

Analyzing

The Tracking-phase generates many identified trends and change signals. However, these rarely differ radically from each other, which means that the next step, Analysis, begins with identifying the patterns and connections that exist between them. Some trends may reinforce each other, while others are based on or dependent on more fundamental development lines. The analysis phase therefore aims to understand the driving forces behind the identified trends and what consequences they may have in relation to each other. (Lindgren & Bandhold, 2024)

Once a deeper understanding of the drivers and inter-dependencies of the trends has been established, the work of developing scenarios begins. The process can vary, but one possible starting point is to first formulate the scenario that appears most likely. It is also common to construct best- and worst-case scenarios. One challenge with this approach is that there is a tendency to focus on a single desired scenario, which risks creating an overly one-dimensional picture of the future. (Lindgren & Bandhold, 2024)

Since scenario analysis fundamentally deals with uncertainty, several models have been developed to structure this complexity. One of the most widely used is the quadrilateral or scenario-cross, where two critical uncertainties are identified and combined to generate four distinct scenarios, see Figure 24. After selecting the most significant uncertainty factors, how these interact and affect other identified factors is analyzed, which gradually leads to the design of coherent and logically consistent scenarios. (Lindgren & Bandhold, 2024)

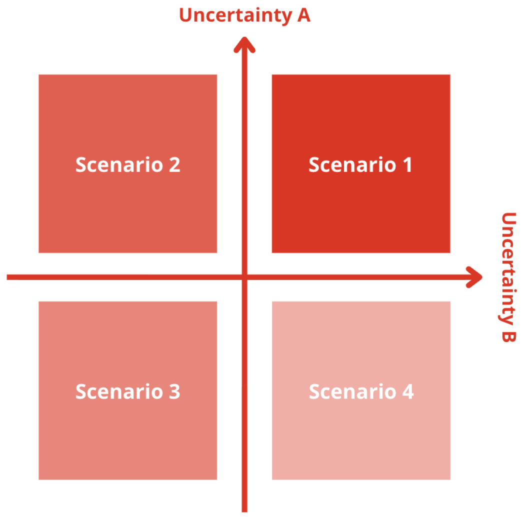

Figure 24: Illustration of scenario-cross (Lindgren & Bandhold, 2024).

Another common tool to use in the scenario creating phase is cross-impact-analysis, which aims to analyze relationships between trends. The most driving trends are placed at the top of a matrix or chart and the most dependent ones are placed at the bottom. By visualizing the relationships between trends using arrows, an overview of the entire trend landscape and its internal dynamics is created. (Lindgren & Bandhold, 2024)

There are certain guidelines to consider to ensure that the scenario communication is effective. Scenarios should be given clear and memorable titles that capture their essence. They should also be presented in the form of a well-written and compelling story that describes a possible future development rather than a static end state. A narrative structure facilitates understanding and makes it easier for recipients to relate to and absorb the content. To further clarify differences and similarities between scenarios, they can be illustrated visually, for example through diagrams, tables or graphical representations. Compiling the scenarios into a comparative table can also contribute to increased clarity and facilitate strategic reflection. (Lindgren & Bandhold, 2024)