Moving to a decentralized organization by adopting data mesh principles: A review and proposal

Master's Thesis

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Abstract

In today's rapidly changing business landscape, digital transformation has become imperative for enterprises striving to maintain competitiveness and relevance. This paradigm shift, fuelled by digital technologies, necessitates a comprehensive re-evaluation of traditional business models and strategies. Digital transformation entails not only the adoption of new technologies but also a fundamental restructuring of business processes, organizational culture, and customer interactions. However, despite its recognized importance, digital transformation remains a complex and multifaceted phenomenon, challenging scholars, and practitioners alike to navigate its implications and implementation challenges.

This study investigates the strategic shift towards decentralized data management at a semiconductor company, leveraging the principles of data mesh. Through a case study approach, the research explores the motivations, challenges, and advantages of adopting a more decentralized approach for data management. Drawing from insights obtained from academic research and real-world examples, the study aims to provide a comprehensive understanding of the complexities and implications of digital transformation initiatives.

The research employs qualitative methods, including interviews and case studies, to capture nuanced perspectives from key stakeholders across different domains within the semiconductor company. By bridging theory with practice, the study seeks to contribute to both academic knowledge and organizational practice, offering actionable insights for leveraging decentralized data management to drive strategic advantages and organizational success. The anticipated outcome is a comprehensive understanding of the tangible benefits and strategic advantages associated with decentralized data management, providing valuable guidance for organizations navigating the complexities of digital transformation in today's dynamic business environment.

The study is focussed on one semiconductor company, this restricts the generalizability of findings to other industries or other semiconductor companies. Potential bias in qualitative methods and the dynamic nature of technology underscore the need for cautious interpretation.

Keywords: Digital transformation, Decentralized data management, Data mesh, Chief Data Officer, Central Data Organization, Case study, Organizational change, Value proposition.

Contents

1. Introduction

In today's dynamic market environment, enterprises are constantly grappling with the challenges of staying relevant and competitive. The arrival of digital technologies has revolutionized the way businesses operate, communicate, and deliver value to customers (Haverkort & Zimmermann, 2017). This paradigm shift has required a fundamental re-evaluation of traditional business models and strategies. Enter digital transformation; a holistic approach aimed at leveraging digital technologies to drive organizational change, enhance operational efficiency, and create sustainable competitive advantages (Kraus, et al., 2021; Brynjolfsson & McAfee, 2014).

Digital transformation is not merely about adopting new technologies, it entails a comprehensive restructuring of business processes, organizational culture, and customer interactions. It covers a range of initiatives, ranging from implementing cutting-edge digital tools and platforms to fostering a culture of innovation and adaptability within the organization (Haverkort & Zimmermann, 2017). At its core, digital transformation represents a strategic move for businesses seeking to thrive in an increasingly digital-centric world. However, despite the widespread recognition of its importance, digital transformation remains a complex and multifaceted phenomenon (Hausberg, et al., 2019). Academics and practitioners are both grappling with defining its scope, understanding its implications, and navigating the multitude challenges associated with its implementation. One of the key challenges lies in striking the right balance between technology-driven initiatives and organizational change management. While technological innovations serve as enablers of transformation, their success depends on the organization's ability to embrace change, promote digital literacy among employees, and foster a culture of continuous learning and adaptation (Vukšić, et al., 2018).

Moreover, digital transformation extends beyond the boundaries of individual organizations, exercising significant impacts on industries, economies, and societies at large. The rise of digital ecosystems, fuelled by interconnected networks of businesses, consumers, and devices, has led in an era of uncommon connectivity and collaboration. This interconnectedness presents both opportunities and challenges, as organizations navigate issues related to data privacy, cybersecurity, and ethical use of emerging technologies (Hausberg, et al., 2019; Nambisan et al., 2019).

In the domain of academia, research on digital transformation is growing rapidly, with scholars from diverse disciplines contributing insights from various viewpoints. From technology-driven studies focusing on the adoption and implementation of digital tools to business-centric research exploring the strategic implications of digitalization, the literature on digital transformation spans a wide spectrum of topics and methodologies. However, despite the growing body of literature, certain gaps and inconsistencies persist, underscoring the need for a more cohesive and integrated approach to research in this domain (Vial, 2019; Nambisan et al., 2019).

The focus of this research is drawn to the transition towards decentralized systems within digital transformation initiatives and the critical areas that needs focus. While considerable literature research has been conducted in this area, the documentation of practical implications remains limited, prompting the need for further investigation. To address this, initial interviews were conducted with employees within a semiconductor company, shedding light on their journey towards digital transformation, particularly in adopting a decentralized data management approach. From these interviews, key gaps and important aspects were identified. Based on these gaps and important aspects a literature review was undertaken. By synthesizing the findings from the interviews with the insights gleaned from the

literature review, a comprehensive understanding of the challenges and opportunities associated with transitioning to a decentralized data management approach emerged. This integrated approach revealed important considerations for companies seeking to embark on a digital transformation journey towards decentralized data management. By combining empirical findings with existing knowledge, organizations can better navigate the complexities of digital transformation and drive meaningful change within their operations.

1.1 Problem statement

The establishment of a Central Data Office signifies a strategic move towards optimizing data management and leveraging information as a key asset (Hund, et al., 2021). The as is state is that the company is federated which is focused on applications. There needs to come a shift to a central data governance with distributed ownership, so data becomes findable, accessible, interoperable, and reusable (Duzha, et al., 2023; Machado, et al., 2022; Pörtner, et al., 2023).

The semiconductor company has strategically opted for a decentralized approach, by implementing the data mesh principles (Machado, et al., 2022). The shift to a decentralized model, by adopting data mesh principles, signifies a strategic move to distribute data responsibilities across departments. This approach aligns with the company's goal to increase agility and scalability by empowering individual teams. This thesis investigates the motivations behind the adoption of data mesh principles. By analyzing the nuanced dynamics of subjects related to decentralized data, providing insights into how the company stands to gain value from embracing the principles of data mesh. The need to adapt decentralized structure approaches came from the lack of clarity of data ownership, unauthorized access, duplicate data, no single source of truth, different data interpretations, further impede collaboration and hinder seamless data flow. There already were related problems and as the company will grow, the scalability challenges become more remarkable, as the absence of well-defined ownership structures complicates effective governance and management of data (Vial, 2019; Amarilli, et al., 2023).

1.2 Relevance

This study holds both academic and organizational relevance.

1.2.1 Organizational relevance

This study holds significant relevance for companies undergoing or considering large-scale digital transformations that require fundamental changes in ownership, culture, data value, and more. Despite the increasing importance of digital transformations in today's business landscape, there remains a scarcity of documentation detailing organizations' experiences with such extensive changes. Particularly noteworthy is the limited information available on the role and responsibilities of Chief Data Officers, a relatively new position tasked with overseeing data-related aspects of transformation initiatives (Nie, et al., 2018; Early, 2017; Nie, et al., 2019).

Given the evolving nature of digital transformations and the emerging role of Chief Data Officers, there exists a need for comprehensive insights and guidance on navigating these complex attempts (Nie, et al., 2018; Lee, et al., 2014). While the decision to appoint a Chief Data Officer is significant, this study underscores the broader importance of effective leadership and strategic management in driving successful transformation programs. By shedding light on critical factors such as organizational culture, data governance, and change management strategies, this research aims to provide valuable knowledge and practical recommendations for companies embarking on transformative journeys. Ultimately, the

study seeks to contribute to the advancement of digital transformation practices and facilitate informed decision-making in organizations striving for innovation and competitiveness in the digital age (Early, 2017; Kraus, et al., 2021). Besides this the outcomes provides the company with actionable insights for leveraging the decentralized approach to data management, ensuring the alignment of data strategies with organizational goals, and facilitating ongoing success in the evolving landscape of data architecture.

1.2.2 Academic relevance

This study holds significant academic relevance as it addresses a gap in the existing literature concerning large-scale digital transformations in organizations. With a limited number of comprehensive reports detailing the learnings and experiences associated with transformative initiatives that reshape fundamental aspects of organizations, academics lack real-world cases from which to extract valuable insights (Verhoef, et al., 2021; Ellström, et al., 2021). By providing an in-depth examination of a digital transformation program that encompasses significant changes in ownership, culture, data value, and more, this research offers a rich and multifaceted case study for academic exploration. Moreover, the study's integration of theory and practice enhances its academic relevancy. By linking theoretical frameworks and concepts to practical insights derived from real-world experiences, the research offers a nuanced understanding of the complexities involved in orchestrating and managing digital transformations. This interdisciplinary approach not only enriches academic discourse but also contributes to the advancement of theoretical frameworks by grounding them in empirical observations and practical applications.

By bridging the gap between academic research and industry practice, scholars can retrieve valuable insights from real-world case studies, while practitioners can benefit from evidence-based strategies and frameworks derived from scholarly inquiry. Moreover, fostering a culture of openness, collaboration, and knowledge sharing can help accelerate innovation and drive meaningful change in organizations across sectors (Hausberg, et al., 2019).

1.3 Research question

What organizational and practical implications arise from the strategic shift to decentralized data approach by adopting data mesh principles as a federated company? And how does the implementation of a Central Data Office impact organizational agility, innovation, and data-driven decision-making within a semiconductor company?

1.4 Thesis outline

The thesis begins with an introduction that explains the research problem, providing context within the domain of digital transformation. Following this, the literature review delves into existing research, focusing on decentralization and data management while highlighting gaps identified through interviews. Subsequently, the methodology section outlines the research setting and approach, detailing the case study methodology and data analysis techniques employed. The results and discussion section presents and analyses interview findings, combining them with insights from the literature review to identify common themes and areas of divergence. Finally, the conclusion summarizes key findings, reflects on study limitations, and proposes directions for future research, drawing conclusions on the effectiveness of decentralized data management in the digital transformation landscape.

2. Literature review

This literature review delves into the critical insights and lessons learned from the employees regarding the organization's digital transformation journey. It discusses the identified gaps and challenges faced during this transition. And it provides a foundation for understanding the complexities involved. Besides this there will also be a study into relevant concepts such as digital transformation and data mesh, which are crucial for this study. The review aims to offer a comprehensive analysis, that highlights both the theoretical foundations and practical implications that are essential for navigating the growing landscape of data management and organizational change.

2.1 Digital Transformation

Digital transformation is a significant shift that organizations undergo to adapt to the digital age, integrating digital technologies into various aspects of their operations and fundamentally changing how they function and interact with stakeholders (Singh, 2023; Nambisan et al., 2019). Digital transformation stands as a critical cornerstone in modernizing organizations across various sectors. By leveraging Information Communication Technologies (ICT), organizations can drive significant improvements in operational efficiency. Digital transformation holds immense value for organizations across industries. It drives efficiency by streamlining processes, optimizing resource utilization, and reducing costs through automation. Moreover, digital tools enable better data analysis, leading to more informed decision-making and improved risk assessment accuracy. Embracing digital transformation also fosters innovation, enhances customer engagement, and ensures regulatory compliance, thereby providing a competitive edge in today's dynamic business landscape. However, successful digital transformations require careful consideration of various aspects and key learnings. These include ensuring data privacy and security, regulatory compliance, and the development of robust cybersecurity measures. Balancing costs and benefits, investing in personnel training for skill development, and fostering a culture of continuous improvement are also vital. By addressing these factors, organizations can navigate the complexities of digital transformation effectively and unlock the full potential of digital technologies to drive innovation, efficiency, and sustainability (Hausberg, et al., 2019; Al-Khouri, 2011; Ellström, et al., 2021; Brynjolfsson & McAfee, 2014).

Several factors drive organizations towards digital transformation, such as competitive pressure necessitates agility and innovation, customer expectations demand seamless digital experiences, and technological advancements like cloud computing, IoT, and AI create new possibilities. Despite its benefits, digital transformation faces challenges such as dealing with legacy systems, organizational inactivity, and security and privacy concerns. Successful digital transformation leads to enhanced efficiency, improved customer experiences, and the creation of new revenue streams. Organizations embarking on digital transformation journeys should prioritize leadership commitment, define clear visions, adopt an agile approach, invest in talent and skills, and foster collaboration. Each organization's digital transformation journey is unique, but embracing digital possibilities is essential for long-term success (Vial, 2019; Verhoef, et al., 2021).

Digital transformation represents more than just adopting technology; it's a strategic journey that involves transforming processes, culture, and customer experiences. In the technology dimension, organizations leverage cutting-edge tools like cloud computing, AI, IoT, and big data analytics to streamline operations, enhance efficiency, and create value. Agility and adaptability are crucial, requiring agile development methodologies and data-driven decision-making. In the actor dimension, leadership

commitment is vital, fostering a culture of innovation and embracing change management strategies. Digital skills, including digital and data literacy, are essential for employees. A customer-centric approach focuses on enhancing customer experiences through personalization, omnichannel interactions, and responsive services. Customer journey mapping and design thinking guide product and service development. Ethical considerations include safeguarding data privacy and security, ensuring compliance with regulations like GDPR, and promoting responsible AI usage through transparency and bias mitigation. Strategic imperatives involve building innovation ecosystems through collaboration with startups and strategic partnerships. Digital ecosystems enable seamless integration and value creation through platforms and APIs (Omol, 2023; Kraus et al., 2021; Nadkarni & Prügl, 2020).

Organizations embarking on a digital transformation journey should take several steps to ensure success in the digital age. Optimizing the organizational structure to support digital transformation is one of them. Restructuring by including self-serve teams with autonomy and flexibility can improve digital agility and fostering a more innovative and responsive environment. By using digital networking within the organization, it facilitates collaboration, innovation, and knowledge sharing. Besides this measuring the success and communicating it is also vital. For this clear metrics needs to be established and goals needs to be defined for tracking the digital transformation journey. Based on these strategies needs to be adjusted so the transformation remains on course and the desired outcomes will be achieved (Verhoef, et al., 2021; Ellström, et al., 2021).

Also, a study examines the routines essential for firms undergoing digital transformation, focusing on sensing, seizing, and reconfiguring capabilities. By understanding and implementing these routines, firms can better manage the complexities of digital transformation and enhance their digital capabilities. The study identifies human factors and the workforce itself as significant challenges when it comes to digital transformation. Like any major organizational change, there is a risk of passivity, and employees may show resistance to change, which can hinder the successful implementation of digital transformation initiatives. Promoting individual contributions and utilizing digital tools in supportive environment can enhance employee engagement, reduce resistance, and improve the success of digital transformation efforts within organizations (Ellström, et al., 2021; Al-Khouri, 2011).

2.1.1 Data mesh

The digital transformation program at the semiconductor company is supported by the foundational principles of data mesh. These four principles serve as a compass for all contributors. Data mesh is an emerging concept in the field of data architecture. It aims to address the challenges associated with centralized, monolithic data architectures by adopting a decentralized approach.
The main purpose of the Data Mesh is to create a decentralized data architecture that enables the extraction of large-scale analytical data. In this context, scale refers to adapting to the proliferation of data sources. Dehghani (2022) argues that a Data Mesh should be based on four core principles: Domain-oriented decentralized data ownership and architecture, Data as a product, Self-serve data platform, Federated computational governance.

Data as a Product: In the data mesh paradigm, data is treated as a valuable product. The idea is to view data as something that is consumed and adds value to the organization. This requires a shift in thinking from purely technical storage to delivering usable data products.
This means that data should have clear ownership, accountability, and value. Just like any other product, data needs to be well-defined, documented, and maintained.

Domain-Driven Ownership of Data: Instead of relying solely on a central data management team, data mesh encourages domain teams to take ownership of their data. Each domain team becomes responsible for collecting, processing, and managing their specific data. This decentralization helps avoid bottlenecks and fosters agility. Traditionally, data architectures revolved around the technology that housed assets, such as data warehouses or lakes. Instead of a central data lake (a monolith) responsible for storing all organizational data, Data Mesh proposes decentralizing ownership. This principle promotes a better understanding and production of data within specific business domains.
Data mesh advocates for distributing data ownership to teams or individuals closest to the source of data. It involves breaking down organizational data into separate domains, each managed by autonomous domain teams. These teams follow the principles of Domain-Driven Design (DDD), which involves decomposing business functions into domains and building software systems around them.

Self-Serve Data Platform: Data mesh promotes self-service capabilities for data consumers. Domain teams should be able to access and use data without relying on intermediaries. A self-serve data platform provides tools and services that empower domain experts to work directly with data. The self-serve data platform in data mesh architecture provides domain-agnostic infrastructure and platform services to empower stakeholders involved in data product creation. It reduces specialization requirements, avoids duplication of efforts, and promotes interoperability. Managed by a centralized team, it offers key components like computing resources, networking capabilities, storage, metadata management, monitoring tools, security services, and business intelligence tools, enabling efficient development and governance of data products.

Federated Computational Governance: Governance in a data mesh is distributed across domains. Rather than having a single governing body, each domain team contributes to the overall governance. This federated approach ensures that decisions align with domain-specific needs while adhering to broader organizational guidelines. Balancing centralization and decentralization are key for effective governance. Global governance involves setting organization-wide standards, policies, and incentives, while local governance focuses on domain-specific data management and quality assurance. Automation is crucial for scaling governance processes, ensuring compliance and efficiency throughout the organization (Machado, et al., 2022; Goedegebuure, et al., 2023).

2.2 Change management

Change management plays a crucial role in supporting organizational change initiatives by providing structured approaches and strategies to effectively plan, implement, and sustain change within an organization. Here are some ways in which change management can help organization change initiatives: Change management helps in developing a comprehensive change management plan that outlines the objectives, scope, stakeholders, communication strategies, and timelines for the change initiative. This planning phase ensures that all aspects of the change are carefully considered and aligned with organizational goals. Change management emphasizes the importance of engaging and involving stakeholders at all levels of the organization throughout the change process. By communicating the rationale for change, addressing concerns, and soliciting feedback, change management helps build support and commitment among stakeholders (Belias & Koustelios, 2014; Errida & Lotfi, 2021; Kotter, 2009).

Effective communication is a key component of change management. It involves creating clear and consistent messaging about the change, its benefits, and the expected outcomes. Communication helps in managing resistance, reducing uncertainty, and keeping employees informed and engaged. Change management ensures that employees have the necessary knowledge, skills, and resources to adapt to the change. Training programs, workshops, and coaching sessions are organized to help employees understand the change, learn new processes, and develop the capabilities required for successful implementation. Training and Education play a vital role, empowering employees with the necessary skills and capabilities for digital transformation. Agile Approaches remain relevant, enabling organizations to adapt quickly to changing market conditions and technological advancements. Organizational Structure may require adjustments to support digital initiatives effectively (Bellantuono, et al., 2021; Errida & Lotfi, 2021). Also, for the sociological perspective, the group-centric approach leverages social influences and networks to facilitate smoother transitions and create a culture of continuous improvement. By addressing group dynamics early in the process, organizations can proactively manage resistance, ensuring the long-term success of their change initiatives (Cummings, et al., 2015). Besides this change management involves monitoring the progress of the change initiative, identifying challenges or resistance, and adjusting as needed. Regular evaluation helps in assessing the effectiveness of the change strategies and making informed decisions to ensure the success of the change initiative. It focuses on embedding the change into the organizational culture and practices to ensure long-term sustainability. By reinforcing new behaviours, recognizing achievements, and celebrating successes, change management helps in institutionalizing the change and creating a culture that embraces continuous improvement (Kotter, 2009). Overall, change management provides a structured framework and tools to navigate the complexities of organizational change, mitigate risks, and maximize the chances of successful implementation and adoption of change initiatives (Bögel, et al., 2019; Jacobs et al., 2013).

In the context of change management, transformational leadership can positively influence organizational culture. Transformational leaders provide a clear vision for change, outlining the direction in which the organization is heading. Effective communication is crucial during times of change. Transformational leaders communicate openly and transparently about the reasons for change, the expected outcomes, and the role of employees in the process. This fosters trust and engagement, contributing to a culture of openness and collaboration. Additionally, transformational leaders empower employees to be active participants in the change process. By involving employees in decision-making, encouraging their input, and value their contributions, leaders can create a culture of empowerment and engagement (Belias & Koustelios, 2014). Promoting innovation and encouraging employees to embrace change as an opportunity for growth and improvement is another key aspect of transformational leadership. By fostering a culture of innovation and adaptability, leaders can help the organization navigate change more effectively. During times of change, transformational leaders provide support and guidance to employees. By demonstrating empathy, understanding, and resilience, leaders can create a culture that values employee well-being and teamwork (Bögel et al., 2019). Emphasizing the importance of continuous learning and development is also crucial. Top management is integral to governance and decision-making, establishing structures that clearly define the distribution of rights and responsibilities within the organization. They are responsible for making pivotal decisions related to strategy, resource allocation, and risk management, which are essential for driving successful strategy implementation (Hyväri, 2016). Top management formulates and implements major goals and initiatives. This involves

assessing internal and external environments to make informed strategic decisions that align with the competitive landscape of the organization. By encouraging a culture of learning and growth, leaders can help employees adapt to change, acquire new skills, and embrace new ways of working. Lastly, upholding high ethical standards and integrity throughout the change process is essential. By modelling ethical behaviour and decision-making, leaders can shape a culture of trust, respect, and accountability within the organization. Leveraging these aspects of transformational leadership in change management positively influences organizational culture, fostering resilience, innovation, and employee engagement during times of change (Belias & Koustelios, 2014; Hyväri, 2016; Jacobs et al., 2013).

2.3 Leadership

Leadership is pivotal in driving the success of organizational change initiatives. Effective leaders guide their organizations through change by inspiring employees and ensuring that the vision for change is clearly communicated and understood (Jacobs et al., 2013; Kotter, 2009). A clear and compelling vision outlines the desired future state of the organization and explains why the change is necessary, helping employees grasp the purpose and benefits of the transformation. Strategic planning, which details the necessary steps, resources, and timelines, is crucial for the coordinated execution of change initiatives (Al-Ali et al., 2017). Leaders who embody and promote the core values underpinning the change can build trust and credibility, fostering a supportive environment for change. Empowering employees to take ownership of the change process increases their engagement and commitment. By delegating authority and providing resources, leaders encourage innovation and meaningful contributions from their teams. Motivation is also a key aspect, where recognizing and rewarding progress helps sustain momentum and reinforces positive behaviors. Effective communication is essential during times of change; leaders inspire employees by sharing compelling stories, role modeling desired behaviors, and conveying a sense of purpose and urgency. Transparent communication about the reasons for change and expected outcomes fosters a culture of openness and collaboration. Adaptability is another critical quality for leaders in change management. Being responsive to feedback and willing to adjust strategies ensures that the organization can navigate uncertainties while maintaining focus on change objectives. Adaptable leaders can openly address challenges and adjust their approaches as needed, which is essential for the ongoing success of the change initiative (Errida & Lotfi, 2021). Overall, strong leadership that embodies these qualities sets the tone for the organization, guiding employees through the complexities of change and driving successful transformation efforts. This understanding of leadership's impact on change management provides valuable insights into how leaders can effectively steer their organizations through complex change processes. It emphasizes the critical role of leaders in articulating vision, planning strategically, embodying values, empowering teams, motivating employees, communicating effectively, and remaining adaptable. By mastering these elements, leaders can enhance their organizations' change management strategies and significantly increase the likelihood of successful implementation of change initiatives (Errida & Lotfi, 2021; Al-Ali, et al., 2017; Smeds & Haho, 2003).

Belias & Koustelios (2014) also discusses that top-down leadership in organizational change management offers significant benefits. It begins with providing clear direction, articulating a vision, and aligning stakeholders toward shared goals. Leaders drive change by making pivotal decisions, allocating resources effectively, and overcoming obstacles that arise during implementation. They play a crucial role in inspiring and motivating employees, fostering enthusiasm and momentum for the change initiative. Moreover, leaders' integrity and transparency cultivate trust among employees, facilitating collaboration and commitment to the change effort. By effectively managing resistance, they address

concerns and communicate the benefits of change, encouraging active participation. Additionally, leaders shape the organizational culture to embrace innovation and adaptability, creating an environment conducive to change. Overall, top-down leadership ensures alignment, minimizes confusion, and enables organizations to navigate change effectively, ultimately thriving in dynamic environments (Al-Ali, et al., 2017; Smeds & Haho, 2003).

Digital transformation is an imperative for organizations aiming to thrive in today's rapidly evolving business landscape. A top-down strategy is essential in this process for several reasons. Firstly, it ensures alignment with organizational goals, ensuring that digital initiatives are strategically prioritized to contribute effectively to the organization's mission and vision. Moreover, a top-down approach provides clear direction and leadership, enabling effective decision-making, resource allocation, and consistent implementation across departments. Furthermore, digital transformation often involves significant changes in processes, systems, and culture, making change management crucial. A top-down strategy facilitates effective change management by providing strong leadership, communication, and support throughout the transformation journey. Additionally, it enables strategic resource allocation, allowing organizations to invest in digital technologies, talent, and infrastructure in a coordinated manner. Moreover, a top-down approach supports risk management by proactively identifying and mitigating risks associated with digital transformation, such as cybersecurity threats and data privacy concerns. By establishing clear governance structures and risk management processes, organizations can navigate these risks effectively. In conclusion, a top-down strategy is crucial for successful digital transformation, providing direction, leadership, alignment, consistency, and effective resource allocation to drive organizational change towards a digital future. By embracing digital transformation with a top-down approach, organizations can position themselves for long-term success in an increasingly digital world (Al-Khouri, 2011; Singh, 2023; Hyväri, 2016).

Elbanna and Newman (2022) discuss the importance of championing adoption in a top-down approach. Championing adoption stands as a cornerstone of top management's support in digital transformation effort. It encompasses actively advocating for and fostering the uptake of new technologies, processes, and digital tools within the organization. Top management takes the lead in illuminating the benefits of digital transformation and the significance of embracing novel technologies. They articulate the strategic rationale behind digital initiatives, elucidating how these changes can propel innovation, streamline operations, and enhance competitiveness. Setting a precedent, top management spearheads digital adoption by embodying the changes they advocate. When leaders demonstrate a willingness to engage with new technologies and processes, it inspires employees to follow suit. Through their utilization of digital tools and showcasing their advantages, top management ignites enthusiasm among staff. Ensuring the workforce is equipped with the requisite skills and resources is paramount. Top management invests in comprehensive training programs, workshops, and supportive resources to empower employees in navigating the digital landscape effectively. Identifying and addressing obstacles to adoption is crucial. Whether it's resistance to change, lack of awareness, or technical hurdles, top management proactively tackles these barriers. By fostering a conducive environment and offering necessary support, they cover the way for seamless integration of digital tools and processes.
Open channels for communication, feedback, and collaboration are essential throughout the adoption process. Top management fosters an environment where employees can freely express their experiences, ideas, and concerns, fostering a sense of ownership and collaboration in the digital transformation journey.

2.3.1 Chief Data Officer

As mentioned in the change management chapter, a top-down approach is very important. Due to this the role of the Chief Data Officer is also examined. This is the lead of the Central Data Office at the research company. The Chief Data Officer needs some core capabilities to be successful. The first one is that leadership and vision needs to remain paramount, emphasizing the need for strong leadership to provide vision, direction, and motivation for embracing digital change. But also, stakeholder engagement continues to be crucial, involving stakeholders at all levels to build support and address resistance. This goes hand in hand with that cultural and mindset shifts are essential, promoting a culture of innovation, collaboration, and continuous learning. Recent insights highlight the pivotal role of top management in digital transformation, articulating the strategic rationale behind digital initiatives, and leading the integration of new technologies and processes. Aligning IT with business goals ensures strategic alignment and maximizes the benefits of digital transformations (Bellantuono, et al., 2021; Al-Ali, et al., 2017).

The current C-level executives have challenges and limitations regarding their knowledge and expertise in data management. The issue is not necessarily a lack of knowledge but rather a focus and attention problem. They maybe know the importance of data but mat not prioritize it in their day-to-day operations. This misalignment of focus means that the strategic importance of data often gets less attention than other IT concerns. By introducing a Chief Data Officer there is focus on data and a direct report to the business. This dedicated focus allows organizations to better manage and utilize their data for strategic advantage (Aiken & Gorman, 2013; Nie, et al., 2019). The importance of the Chief Data Officer role is underscored by the increasing complexity and volume of data that organizations must manage to remain competitive and effective. The Chief Data Officer is essential for overseeing the strategic use of data, ensuring data quality, and governing data resources. This role is particularly crucial in environments where data is abundant and integral to the organization's operations, strategy, and decision-making processes. As modern digital interactions generate vast amounts of data from various sources, including suppliers, customers, and employees, organizations increasingly recognize the need for a dedicated leader to harness the value of this data and navigate its complexities (Early, 2017; Nie, et al., 2018). The Chief Data Officer is vital in developing and executing an enterprise data strategy that aligns with the firm's business intelligence processes, supports the creation of new products, and helps in acquiring new customers through innovative data-driven media. They play a key role in managing data analytics, business management, and data quality, which are essential for the operational and strategic functions of the organization (Nie, et al., 2018; Lee, et al., 2014).

Additionally, the Chief Data Officer's role is significant in guiding the organization through the landscape of big data and digital transformation, ensuring that data strategies are not only service-oriented but also strategically impactful. It is important for organizations to determine who should manage big data because the emergence of big data has led to the need for specialized roles, such as data scientists, to capitalize on the analytical opportunities presented by large and complex datasets. These specialists are crucial in extracting valuable insights from big data and turning them into actionable strategies for the organization. The Chief Data officer ensures that the organization effectively leverages big data to drive innovation, improve decision-making, and gain a competitive edge in the market. Operating within a framework that includes collaboration direction (inward or outward facing), the type of data managed (traditional vs. big data), and the value impact (service delivery or strategic influence), the Chief Data

Officer helps organizations understand and position this role within their specific context (Lee, et al., 2014; Nie, et al., 2019).

Overall, the increasing creation of the Chief Data Officer role each year reflects the growing need for leadership to manage complex data environments and capitalize on the analytical opportunities presented by big data (Early, 2017; Nie, et al., 2018).

3. Setting and Methodology

In this chapter the setting will be shortly described, it also outlines the strategies, techniques and tools that are used to achieve the research objectives.

For the methodology the book 'case study research and applications' of Yin (2018) is used.

3.1 Company

The company is a global leader in advanced semiconductor solutions, renowned for its cutting-edge technologies. Specializing in secure connectivity and embedded processing, diverse product portfolio spans microcontrollers, RF power amplifiers, and sensors, driving innovations across industries. The company boasts a rich legacy and continues to push the boundaries of technology. The company is committed to sustainability and ethical business practices, contributing to the development of smart, connected solutions while actively addressing global challenges. This dynamic combination of innovation, history, and responsibility underscores the companies' significant impact in shaping the future of semiconductor technology.

3.2 Case Study Research

Case study research methodology is a qualitative approach that involves an in-depth examination of a specific case or a small number of cases within their natural context. It aims to provide rich, detailed insights into complex phenomena by collection data through various sources such as interviews, observations, and documents. It is best fit for this study because it allows for an in-depth exploration of the complex digital transformation within its real-life context. It enables a detailed study of organizational, technical, and cultural changes to provide rich insights. It also strengthens validity due to the integration of multiple evidence sources (books, reports, interviews, etc.) to obtain a comprehensive understanding. Lastly, case studies are valuable for theory development. The subjects discussed are emerging trends, like the role of Chief Data Officer, big data, and digital transformations strategies. By providing insights in these topics, new theory will be developed.

The steps of case study research, as outlined in Yin (2018), involve several key stages. First the case study needs to be designed. In this stage the research questions need to be defined, the case study purpose needs to be defined, and there need to be considered whether to do a single-case or multiple-case study. After that the preparation for data collection, collect evidence, and maintain a chain of evidence take place. The following step is analyzing the case study evidence. Hereby an analysis strategy needs to be developed, all the evidence needs to be used, and all major rival interpretations need to be addressed. Lastly the conclusions, recommendations, and implications need to be developed. Reflect on the findings, make recommendations, and discuss the broader implications of the study. These steps ensure a systematic approach to conducting case study research, providing a comprehensive framework for researchers to follow.

3.2.1 Multiple Case study

The specific case study methodology for this research is multiple-case design because multiple aspects are examined. The aspects are why a more decentralized approach is a best fit, what the lessons learned are, study on different aspect related data mesh, and the added value linking the theory with practice will bring.

The research design employed in this study integrates elements of exploratory, descriptive, and explanatory research. Initially, the inquiry adopts an exploratory approach to understand the motivations behind the organization's transition to a more decentralized approach through the adoption of data mesh principles. This involves examining the lessons learned over the past two years, identifying key drivers, challenges, and outcomes associated with the adoption of data mesh principles, and determining the value gained. As the study progresses, it transitions into a descriptive phase, aiming to provide a comprehensive overview of the organization's journey towards decentralization. This includes documenting the structures, processes, and outcomes associated with the implementation of data mesh principles and identifying best practices. Additionally, the study involves analyzing reports and literature on data mesh and related topics to enrich the understanding of decentralized data management practices. Finally, the research evolves into an explanatory phase where causal mechanisms underlying the observed outcomes are explored. This involves comparing the findings from the analysis of the organization with the insights gathered from external sources, aiming to identify common patterns, challenges, and success factors associated with decentralized data management. The goal is to derive actionable recommendations and considerations for companies embarking on a similar journey towards decentralization through the adoption of data mesh principles.

3.2.2 Justification qualitative research

In this study, a qualitative approach is justified given the complex and evolving nature of digital transformation within the organizational context. As the research focuses on understanding organizational learnings and key focus areas among ongoing digital transformation efforts, a qualitative methodology offers the necessary flexibility to explore these dynamic phenomena in depth. The iterative nature of digital transformation initiatives involves a research approach that can adapt to emerging insights and evolving organizational dynamics, which qualitative methods fundamentally provide. Moreover, within a learning culture where change is frequent, qualitative research allows for a nuanced examination of how individuals perceive and navigate these changes within the organization. By prioritizing depth of understanding over generalizability, qualitative methods enable researchers to delve into the complexities of small sample sizes, capturing rich insights into organizational behaviors, attitudes, and responses to digital transformation initiatives. Additionally, given the sensitivity of topics related to organizational change and adaptation, qualitative methods offer a safe and supportive environment for participants to share their experiences individually, contributing to a comprehensive understanding of the complexities essential in digital transformation journeys. Overall, the qualitative approach adopted in this study aligns with the exploratory nature of the research, aiming to uncover valuable insights into the dynamics of digital transformation within the organizational context (Kalu & Bwalya, 2017; Galletta, 2013; Holloway & Todres, 2003).

3.3 Data collection

First the semi-structured interviews are conducted with the stakeholders from the company. Besides the interviews internal documents will also be analyzed. Document analysis is an in-depth analysis of internal documents, such as project reports, meeting minutes, and documentation related to the implementation of data mesh principles, will be conducted to supplement insights obtained from interviews. This will provide additional context and strengthen findings from primary data sources. Based on the findings out of these interviews gaps or key aspect are selected. Based on these gaps and key aspects a literature review is executed. This literature review is a thorough review of existing literature, including scholarly articles, books, and reports on data mesh principles, decentralized data

management, and related topics, will be conducted. This will help in contextualizing the findings within the broader theoretical framework and identifying relevant concepts, models, and best practices.

These data collection methods align with Yin (2018) case study research methodology, which emphasizes the use of multiple sources of evidence to ensure data triangulation and comprehensive understanding of the case under study. By combining interviews, document analysis, and literature review, this study aims to achieve depth, richness, and validity in the exploration of the organization's transition to decentralized data management through data mesh principles.

3.3.1 Semi-structured interview

In this research, a semi-structured interview approach is justified to delve into the complexities of digital transformation within the organizational context. Given the exploratory nature of the study, semi-structured interviews offer the flexibility needed to gather comprehensive insights and perspectives from participants. By allowing for open-ended questioning this approach enables the researcher to uncover diverse viewpoints and understand the nuances of individual experiences and opinions regarding the organization's digital transformation journey. Moreover, semi-structured interviews facilitate a contextual understanding of the factors shaping participants' perspectives, including social, cultural, and organizational dynamics. This methodology is particularly well-suited for exploring the learnings, challenges, and areas of focus within the company, as it provides a platform for interviewees to individually share their honest opinions and reflections on what went wrong and what could be improved. By embracing the semi-structured interview approach, this research aims to capture the richness and complexity of the organizational context, ultimately contributing to a deeper understanding of digital transformation processes and outcomes.

The participants in this study consist of members from the central data office team within the company, as well as stakeholders from various domains across the organization. This diverse group of interviewees offers a comprehensive perspective on the organization's digital transformation journey, providing insights from both the central data office perspective and the viewpoints of end-users or customers within different domains. By including stakeholders beyond the central data office team, the research aims to capture a comprehensive understanding of the learnings, added value, and important aspects related to the organization's digital transformation efforts. This inclusive approach ensures that the findings reflect the perspectives and experiences of key stakeholders involved in or affected by the digital transformation process. The recruitment process for participants in this study involved a careful selection based on specific roles and expertise required for a comprehensive understanding of the digital transformation journey within the organization. Criteria such as having a minimum number of architects, engineers, and management members were considered to ensure diverse perspectives were represented. Invitations were sent well in advance to accommodate the busy schedules of participants.

Before the interviews started, participants were assured of the anonymity of their responses, and consent was asked for recording the session to ensure accurate documentation. It was emphasized that recordings would be securely stored during the study and deleted promptly after the research process, including the original transcripts, to maintain confidentiality and data privacy. The interview protocol remained consistent across all participants, but with some modified follow-up questions aimed at retrieving insights on key themes such as learnings, added value, key focus areas, improvements, and recommendations for the central data office. Only individuals with longer involvement in the central data

office were asked about the necessity of the digital transformation, while all other questions were standardized to ensure comparability and depth of analysis across interviews.

The transcribe function of Microsoft Teams was used to transcribe the interviews. Key insights per topic are documented in the appendices as discussed before. ChatGPT reviewed the transcriptions to ensure all relevant aspects were captured. However, each detail was validated by listening to the original recordings.

3.3.1.1 Sampling strategy

In Yin (2018), the sampling strategy in case study research is described as purposive or theoretical rather than random. This means that cases are chosen based on their potential to provide insight into the phenomenon being studied, rather than aiming for a statistically representative sample of a broader population. The selection is guided by the desire to illuminate and extend relationships and logic among theoretical constructs. The cases might be typical of a broader group, extreme or unique in some way, revelatory where an observer may have access to a phenomenon previously inaccessible, or representative of a cross-case comparison. This approach allows researchers to focus on depth and detail, facilitating a richer understanding of complex.

3.4 Data analysis techniques

In Yin (2018), several data analysis techniques are discussed for case study research, along with key aspects to keep in mind. The first one is pattern matching; this involves comparing empirically based patterns with predicted patterns. It is useful for testing theoretical propositions and strengthening internal validity. Explanation Building is another opportunity, this iterative technique involves developing a causal explanation during the data collection and analysis phase. It requires a careful consideration of how the data aligns with and supports a theoretical explanation. Time-Series Analysis is another method that examines data points collected over time to identify consistent trends or causal relationships. Logical models help in clarifying the causal pathways from inputs to outcomes. They are particularly useful in complex case studies where multiple variables interact. And the last one is Cross-Case Synthesis, this is used in multiple-case studies. This technique compares findings across cases to draw conclusions about similarities and differences.

For this research the Cross-Case Synthesis is the best data analysis technique. In Yin (2018), the Cross-Case Synthesis technique is described as an analytical method used in multiple-case studies. Each case is treated as a separate study, and the researcher conducts an analysis for each individual case. The findings from each case are then compared. This approach allows the researcher to identify patterns and explore variations across the cases. Given this study aims to understand the transition to a decentralized approach through data mesh principles within an organization and compare findings with existing reports, multiple techniques may be applicable. However, Cross-Case Synthesis is most suitable. It helps in understanding the nuances of different implementations and their outcomes. There is also an analysis of existing reports and documentation, Cross-Case Synthesis allows for integrating findings from interviews within the organization with insights from external sources. This integration enhances the depth and breadth of the analysis. This technique supports theory development by drawing conclusions about similarities and differences across cases, contributing to the formulation of broader theoretical frameworks or insights about the adoption of data mesh principles. By employing Cross-Case Synthesis, you can effectively explore the complexities of the transition to decentralized data management within

the organization, compare findings with existing reports, and derive actionable insights for theory and practice.

In Yin (2018), the aspects of conducting case study research are detailed to ensure the integrity and robustness of the study. In this study three aspects are used. The first one is the triangulation. This involves using multiple sources of evidence, such as documents, interviews, observations, and artifacts, to corroborate the same fact or phenomenon. This approach enhances the study's reliability and validity by cross-verifying data, which helps to confirm the findings and reduces the impact of potential biases that might arise from a single source. Another one is maintaining a Chain of Evidence. This aspect requires that each piece of evidence can be traced back to its source, ensuring that the data collection and analysis process is transparent and replicable. The chain of evidence involves documenting the method and circumstances of data collection, the analysis and assembly of data, and the conclusions drawn from the data. This traceability allows other researchers to follow the derivation of evidence from the research questions to the conclusions, enhancing the study's reliability. Also, because there are interviews adopted with stakeholder's participant perspectives are important. It is crucial to accurately represent the perspectives of those participating in the study. This means being attentive to and reflecting the views and experiences of participants in the data collection and reporting phases. Ensuring that participant perspectives are respected and accurately documented helps to enhance the authenticity and ethical integrity of the study. Lastly, Reliability and Validity throughout the data collection and analysis process, it is important to consistently check for the reliability (the degree to which the findings are consistent and replicable) and validity (the degree to which the findings accurately reflect the phenomenon being studied) of the findings. This involves using robust data collection and analysis methods, adhering to the chain of evidence, and addressing potential biases and rival explanations.

4. Research results

Main findings of the data collection.

4.1 Primary data collection

The findings of the interviews are divided over different topics. In the interviews these were also the topics. The main topics are the motivation behind the digital transformation, key areas to focus on as soon as possible, lessons learned from the past two years, and the added value this transition brought or will bring. All answers of the interviews can be found in the appendices.

4.1.1 Motivation behind the digital transformation

The interview with employees within the company sheds light on their organizational journey towards digital transformation, particularly in redefining their approach to data management. One significant revelation is the shift from a traditional, siloed structure towards a more decentralized model. This shift was necessitated by the challenges inherent in their previous setup, where accessing and integrating data across different organizational domains was unmanageable and often resulted in inefficiencies.

An important catalyst for change was the realization that prioritizing data over systems was crucial for meeting evolving market demands and internal needs. This realization corresponds with the growing importance of data analytics and predictive modeling, which required timely access to accurate data. Consequently, the company embarked on a digital transformation program aimed at addressing these challenges and improving their data management practices. Central to this transformation was the recognition of the need for standardization and empowerment within the organization. Standardization policies, ontology definitions, and technical frameworks were identified as essential components for streamlining data management processes. Moreover, empowering domain-driven teams to define and manage their data ensured greater efficiency and effectiveness in data-related tasks. The limitations of their centralized data warehouse solution also came to the forefront during this process. While initially relied upon heavily, it became evident that this approach hindered flexibility and limited the organization's ability to extract value from its data assets. Issues such as data ownership, master data management, and data accessibility emerged as areas requiring attention and improvement. Overall, the interview underscores the importance of agility, collaboration, and innovation in navigating the complexities of modern data management within large organizations like this company. By embracing a decentralized approach and prioritizing data-driven strategies, they aim to enhance its competitiveness and adaptability in today's dynamic business landscape.

4.1.2 Key focus areas

The interview highlights several key aspects to focus on as advice for a Central Data Office aiming to navigate the complexities of organizational change and foster a data-driven culture. Firstly, there's a clear emphasis on decentralization and empowerment within the organization. This involves granting local responsibilities for decision-making regarding data matters. However, the challenge lies in operationalizing this approach effectively, as decisions often undergo excessive review processes, hindering agility and trust-building efforts. Secondly, there's a notable gap in competence, particularly in transitioning from application-centric thinking to data-centric thinking. While applications have historically been the go-to solution for problem-solving, there's a growing recognition of the power of data in driving insights and innovation. Bridging this gap requires education and fostering a common language around data-related concepts and processes. Thirdly, ensuring data quality and establishing a

single source of truth are crucial for building trust and credibility within the organization. Emphasizing the importance of data quality and ownership encourages responsible data management practices and reduces the likelihood of conflicting or inaccurate information. Fourthly, effective change management is essential for driving adoption and realizing the desired outcomes of the Central Data Office's initiatives. This involves communicating the rationale behind changes, providing adequate training and support, and have a top-down support to ensure alignment with organizational goals. Lastly, collaboration and communication are highlighted as critical factors for success. Improving visibility of data products through marketplace platforms and facilitating knowledge-sharing among teams promote cross-functional collaboration and maximize the value derived from data assets.

In summary, a successful Central Data Office should prioritize decentralization, competency development, data quality assurance, change management, and collaboration to foster a data-driven culture and drive organizational transformation effectively.

4.1.3 Lessons learned

Over the past two years, several key learnings have emerged in the journey towards building a data-driven organization. One of the primary challenges has been governance, particularly in implementing data products technically while neglecting proper governance structures. This realization underscores the importance of making data understandable, interpretable, and consumable across the organization. There has been a significant improvement in data literacy across the organization. This has led to a better understanding of data principles and reduced reliance on undocumented reports or individual knowledge, thereby promoting more informed decision-making. Despite feeling responsible for certain processes, the Central Data Office faces challenges in providing the necessary materials and measures on how to execute these processes effectively. There is a need for more comprehensive support in areas such as data literacy, governance, and change management, beyond just technical aspects. A key learning for the Central Data Office has been the importance of continuous investment in change management. Change is not a one-time event but rather a recurring process that requires ongoing dialogue, conflict resolution, and education to ensure sustained adoption and success. The scale of the organization presents challenges in aligning local initiatives cohesively. While there are local initiatives, they lack proper organization and alignment, highlighting the need for centralized guidance and education to ensure uniformity in definitions and approaches. The absence of strong top-down support for organizational change, particularly in the form of a Chief Data Officer with sufficient authority, hampers progress. There is a recognized need for a strong hand at the top to drive and steer the transformational journey effectively. In the absence of top-down directives, efforts are focused on creating voluntary onboarding and advocacy among employees. This involves introducing tools and initiatives that showcase the benefits of data-driven practices, encouraging voluntary participation, and spreading awareness within the organization.

In summary, key learnings include the need for robust governance structures, continuous investment in data literacy and change management, addressing process gaps, ensuring top-down support for organizational change, and fostering voluntary onboarding and advocacy among employees. These insights are critical for navigating the complexities of organizational transformation and building a successful data-driven culture.

4.1.4 Added value

The added value of the approach described lies in several key aspects. Shifting the focus from technical aspects to human behavior is crucial. This approach emphasizes empowering people to make decisions and drive change. By understanding the behaviors and needs of decision-makers, organizations can tailor their data strategies more effectively.

Embracing data mesh principles enables local organizations to make decisions autonomously. This decentralization allows for faster decision-making and innovation while reducing dependencies on central IT structures. By adopting a data mesh approach, organizations can address cross-domain difficulties and drive standardization and harmonization. This leads to streamlined processes, reduced duplication of efforts, and improved interoperability among different parts of the organization. Decentralization fosters flexibility and innovation by giving individuals and teams the freedom to explore and experiment with new ideas. This approach is particularly beneficial in organizations focused on innovation, where centralized control may hold back creativity. A data mesh approach promotes collaboration and visibility across domains by breaking down silos and encouraging information sharing. This enables individuals to access relevant data more easily and fosters a culture of transparency and collaboration.

Implementing governance practices and standards ensures data authenticity, quality, and lineage. This improves trust in the data and reduces the risk of errors or misinterpretation, ultimately leading to better decision-making and outcomes. By combining standardized core data foundations with flexibility and agility in data usage, organizations can quickly respond to market needs and changes. This allows them to extract valuable insights and gain a competitive edge in their respective industries.

Overall, the approach emphasizes the importance of aligning technical capabilities with human behavior, promoting autonomy and innovation, fostering collaboration and visibility, and ensuring governance and data quality to drive organizational success in a rapidly evolving digital landscape.

4.2 Secondary data collection

When comparing the literature review with the outcomes of the interviews, multiple gaps can be stated. However, there are two important aspects that are as well discussed in the literature review as in the interviews.

4.2.1 Top-down approach

The role of the Chief Data Officer and the establishment of a Central Data Office within organizations have emerged as critical components in navigating the complexities of modern data ecosystems. Although the importance of these positions is becoming more widely acknowledged, there is still a lack of thorough literature discussing how to arrange and operationalize these responsibilities in organizational structures. Also, these jobs' specific importance and strategic implications are sometimes misunderstood, or people are not aware yet. However, when also looking at the information around digital transformation and change management. The right role at a strategic strong position is critical.

It is essential to acknowledge the pivotal role of the Chief Data Officer and a Central Data Office in driving data-driven decision-making and fostering a culture of data-driven innovation within organizations. The role of the Chief Data Officer becomes pivotal in orchestrating this transition and ensuring that data strategies are not only service-oriented but also strategically impactful. However, while top-down leadership is essential in driving organizational change, it's equally important to foster a

culture of collaboration and shared responsibility, empowering domain teams to take ownership of their data. This approach not only enhances data reliability and usability but also promotes innovation and adaptability, ultimately driving organizational success in dynamic environments.

As mentioned before, the importance of the Chief Data Officer role is underscored by the increasing complexity and volume of data that organizations must manage to remain competitive and effective. The Chief Data Officer is essential for overseeing the strategic use of data, ensuring data quality, and governing data resources. This role is particularly crucial in environments where data is abundant and integral to the organization's operations, strategy, and decision-making processes.
This strategic alignment emphasizes the importance of keeping the Central Data Office within the business realm rather than moving it to the IT organization. By operating within the business, the Central Data Office can effectively guide the organization through the landscape of big data, digital transformation, and analytics, ensuring that data strategies are not only service-oriented but also strategically impactful. Therefore, positioning the Chief Data Officer as an executive role within the hierarchy is essential for driving organizational success in today's data-driven landscape. Nevertheless, should the IT organization play a critical role in this transformation. The focus area of a Chief Information Officer encompasses a range of managerial roles and responsibilities crucial for optimizing the value of IT within an organization. According to Grover et al. (1993) and Peppard (2010), the Chief Information officer's roles include acting as a representative, environmental monitor, and resource allocator, particularly as the information systems management matures. Chief Information Officers know the importance of data but may not prioritize it in their day-to-day operations. This misalignment of focus means that the strategic importance of data often gets less attention than other IT concerns.

In addition to the managerial roles and responsibilities outlined by Grover et al. (1993) and Peppard (2010), the role of the Chief Information Officer also necessitates the presence of IT-savvy individuals within the organization. These individuals possess a deep understanding of the applications and systems that underpin the organization's IT infrastructure. Their expertise allows them to develop robust data products that align with the strategic objectives of the company. IT-savvy personnel play a crucial role in leveraging technology to optimize business processes, enhance decision-making capabilities, and drive innovation. By harnessing their knowledge of IT systems and applications, they can contribute to the development of data-driven solutions that enable the organization to extract actionable insights from its data assets. Like an employee within the company said: "out of the 35,000 people, we roughly have 10/12 thousand engineers in here. You want to give those people freedom."
Furthermore, there was a consensus that data mesh principles were not solely an IT concern but rather an organizational imperative. Aligning different entities within the organization to work collaboratively with data was seen as essential for realizing the full potential of decentralized data management.

The relationship between the domains, Central Data Office and IT organization are visualized in figure 1: to be approach.

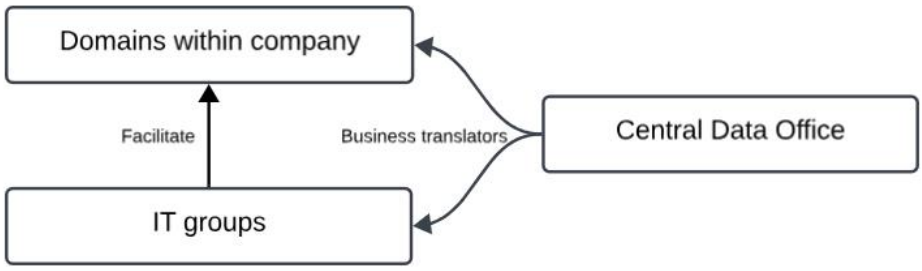

Figure 1 - To be approach

Building upon the existing insights, it's crucial to emphasize the pivotal role of top-down leadership in driving digital transformation within organizations. This leadership approach begins with providing clear direction, articulating a vision, and aligning stakeholders toward shared goals. Leaders drive change by making pivotal decisions, allocating resources effectively, and overcoming obstacles that arise during implementation. They inspire and motivate employees, fostering enthusiasm and momentum for the change initiative. Moreover, leaders shape the organizational culture to embrace innovation and adaptability, creating an environment conducive to change.

The increasing creation of the Chief Data Officer reflects the growing need for leadership to manage complex data environments and capitalize on the analytical opportunities presented by big data. This role is positioned within a framework that includes collaboration direction, the type of data managed, and the value impact, helping organizations understand and position the Chief Data Officer role within their specific context.

4.2.2 Transition guidance

Successful digital transformations require careful consideration of various aspects and key learnings. These include ensuring data privacy and security, regulatory compliance, and developing robust cybersecurity measures. Balancing costs and benefits, investing in personnel training for skill development, and fostering a culture of continuous improvement are also vital. By addressing these factors, organizations can navigate the complexities of digital transformation effectively, unlocking the full potential of digital technologies to drive innovation, efficiency, and sustainability. Organizations embarking on digital transformation should prioritize leadership commitment, define clear visions, adopt agile approaches, invest in talent and skills, and foster collaboration. Each organization’s journey is unique, but embracing digital possibilities is essential for long-term success. Digital transformation represents more than just adopting technology; it's a strategic journey involving the transformation of processes, culture, and customer experiences. In the context of this digital transformation, the concept of data mesh is particularly relevant. Data mesh is an emerging approach in data architecture that addresses the challenges of centralized, monolithic data architectures by adopting a decentralized model. It aims to create a scalable, flexible, and efficient data infrastructure.

The change management topic is in line with the top-down approach because this is needed to have a successful change management. When transitioning to a more decentralized approach, effective change management becomes crucial in harnessing the full potential of the Chief Data Officer role within the organization. As highlighted by the principles of Data Mesh, decentralization empowers domain teams to

take ownership of their data, fostering agility and innovation while avoiding bottlenecks. However, this shift requires careful navigation and change management to ensure successful implementation and value realization. From a sociological perspective, leveraging social influences and networks facilitates smoother transitions and creates a culture of continuous improvement. By addressing group dynamics early in the process, organizations can proactively manage resistance, ensuring the long-term success of their change initiatives. Change management involves embedding the change into the organizational culture and practices to ensure long-term sustainability. By reinforcing new behaviors, recognizing achievements, and celebrating successes, change management helps institutionalize change and create a culture that embraces continuous improvement.

Change management plays a pivotal role in facilitating this transition by providing structured approaches and strategies to effectively plan, implement, and sustain change within the organization. By developing comprehensive change management plans, organizations can outline objectives, engage stakeholders, and communicate the rationale for change, fostering trust and commitment among employees. Additionally, effective communication helps manage resistance, reduce uncertainty, and keep employees informed and engaged throughout the process. Moreover, change management ensures that employees have the necessary knowledge, skills, and resources to adapt to the change. Training programs and coaching sessions help employees understand the new decentralized approach, learn new processes, and develop capabilities required for successful implementation. Regular evaluation and monitoring of the change initiative allow organizations to assess progress, identify challenges, and adjust strategies as needed, maximizing the chances of successful adoption. In the context of change management, transformational leadership can positively influence organizational culture. Transformational leaders provide a clear vision for change, outlining the direction in which the organization is heading. Effective communication during times of change fosters trust and engagement, contributing to a culture of openness and collaboration. Additionally, transformational leaders empower employees to be active participants in the change process, promoting innovation and encouraging them to embrace change as an opportunity for growth and improvement. By fostering a culture of innovation and adaptability, leaders can help the organization navigate change more effectively. During times of change, transformational leaders provide support and guidance to employees, emphasizing continuous learning and development, and upholding high ethical standards. By modeling ethical behavior and decision-making, leaders can shape a culture of trust, respect, and accountability within the organization.

In the context of the Chief Data Officer role, change management becomes even more critical as organizations navigate the landscape of big data and digital transformation. The Chief Data Officer's strategic leadership is essential in guiding the organization through this transition, ensuring that data strategies are not only service-oriented but also strategically impactful. By improving change management principles, organizations can effectively position the Chief Data Officer within their specific context, empowering them to harness the value of data as a strategic asset and drive organizational success in today's data-driven world.

In the interviews change management was mentioned multiple times. The necessity of placing greater emphasis on marketplace exposure was one recurrent theme. There was agreement that more could be done to improve visibility and promote the value of data products throughout the organization, despite communications from the Central Data Office being sent out when the company launched its first data product. Realizing that a compelling story about the advantages of decentralized data management was insufficient on its own was another important lesson learned. It took more than just communication to

tell this story across the organization; an intentional effort was needed to match incentives, procedures, and behaviors with the overall goal. Participants also emphasized that change does not occur simply by following a checklist. Successful implementation of a decentralized data approach required a holistic approach to change management, including fostering a culture of adaptability, resilience, and continuous improvement.

Ultimately, participants recognized that transitioning to a data-driven organization would require a joined effort from all stakeholders. As one participant summarized it, "If we want to go data, it will be a program everybody needs to follow." This statement underscored the importance of collective commitment and alignment towards the shared goal of leveraging data for strategic advantage.

5. Discussion

The primary data collection through interview revealed critical insights into the organization's digital transformation journey. The main findings highlighted the motivation behind this transformation, key focus areas, lessons learned, and the added value of the new approach. The organization transitioned from a traditional, siloed structure to a more decentralized model to address inefficiencies in data access and integration. Prioritizing data over applications emerged as crucial for meeting market demands and internal needs, leading to a program focused on data management improvements. The interviews emphasized decentralization and empowerment within the organization as essential, despite challenges in operationalizing this approach. Lessons learned over the past two years included the importance of governance, continuous investment in change management, and the need for strong top-down support. The interviewees noted significant improvements in data literacy but also identified gaps in providing comprehensive support for data processes.

The added value of the new approach lay in emphasizing human behavior over technical aspects and adopting data mesh principles for decentralized decision-making. This shift enabled faster innovation and reduced dependencies on central IT structures. The research highlights several critical aspects for a Central Data Office aiming to navigate the complexities of organizational change and foster a data-driven culture. These include emphasizing decentralization and empowerment within the organization, bridging competency gaps in transitioning from application-centric to data-centric thinking, ensuring data quality and establishing a single source of truth, and promoting collaboration and communication among teams. The strategy behind this needs to be communicated to the organization by the Central Data Office led by the Chief Data Officer. Due to this effective change management is crucial in harnessing the full potential of the Chief Data Officer role and navigating the transition to a decentralized data management approach. Change management principles provide structured approaches and strategies to plan, implement, and sustain change within the organization. By engaging stakeholders, communicating the rationale for change, providing training and support, and monitoring progress, organizations can maximize the chances of successful adoption and value realization. However, while the importance of the Chief Data Officer and Central Data Office within organizations is acknowledged, there is still a lack of thorough literature discussing how to operationalize these responsibilities effectively. Additionally, the specific importance and strategic implications of these roles are sometimes misunderstood or not well-known.

The findings align with existing research on digital transformation and data management. The emphasis on decentralization and data mesh principles reflects current theories in data architecture, which promotes for scalable and flexible data infrastructures. The need for strong top-down leadership and continuous change management is consistent with literature emphasizing the role of leadership in driving digital transformation and fostering a data-driven culture. An unexpected result was the degree of difficulty in operationalizing decentralization and the significant gaps in competence development. While the benefits of a decentralized approach were clear, the practical challenges highlight the complexity of such a transformation. This finding is significant as it underscores the need for comprehensive training and support systems to facilitate the transition from application-centric to data-centric thinking. Alternative explanations for the challenges in operationalizing decentralization could include resistance to change or insufficient resources dedicated to training and support. However, the consistent emphasis on the need for change management and top-down support across interviews strengthens the argument that these factors are critical for successful digital transformation. The data

supports the position that while decentralization offers significant benefits, it requires careful planning, robust governance, and ongoing investment in change management to realize its full potential.

Overall, the findings underscore the importance of aligning technical strategies with human behavior, fostering a culture of continuous improvement, and ensuring strong leadership to navigate the complexities of digital transformation. By prioritizing data-centric approaches, empowering decentralized teams, and investing in governance and change management, organizations can enhance their competitiveness and adaptability in today's dynamic business landscape. This comprehensive approach not only addresses the technical challenges but also fosters a culture that embraces data-driven decision-making and innovation, ultimately driving organizational success.

5.1 Limitations

Focusing on a single company impacts the generalizability of the findings, as the unique organizational context, culture, and specific challenges faced by this company may not be representative for other organizations. Additionally, the limited literature on Central Data Offices may constrain the depth of analysis and comparison with existing research. However, despite these limitations, examining the case of this company provides valuable insights into the practical implications of transitioning to a decentralized data approach and the role of the Chief Data Officer in driving organizational change.

The findings from the primary data collection reveal the key drivers of the company's shift towards a decentralized data management approach and the specific challenges and opportunities encountered during this transition. The companies' journey towards digital transformation highlights the importance of addressing data management inefficiencies, enhancing data accessibility and integration, and fostering a data-driven culture to remain competitive in today's dynamic business landscape. The interview findings underscore the critical role of the Chief Data Officer in orchestrating this transition and driving data-driven decision-making within the organization. However, the limited literature on this topic presents a challenge in comparing the companies' experiences with existing research. While the importance of top-down leadership and effective change management is emphasized in both the interview findings and the literature, the specific strategies, and best practices for operationalizing these principles may vary based on organizational context and industry-specific factors. Despite the limitations of focusing on a single company and the lack of comprehensive literature on the Chief Data Officer and a Central Data Organization, the conclusion highlights several key implications for organizational practice and future research. Firstly, the case study emphasizes the need for organizations to adapt their data management strategies and initiatives to their unique organizational context and challenges. While the experiences of this company provide valuable insights, caution should be exercised in generalizing these findings to other organizations without considering their specific circumstances. Secondly, the limited literature on Chief Data Officer suggests a gap in research and highlights the need for further investigation into the role, responsibilities, and best practices of Chief Data Officers in driving organizational change and fostering a data-driven culture.

5.2 Recommendations

Organizations should prioritize embracing decentralized data governance models, operationalizing the Chief Data Officer role effectively, and investing in change management strategies to foster data-driven cultures and drive organizational success in today's digital landscape. This involves empowering domain-driven teams to take ownership of their data, fostering collaboration, and ensuring data quality. Additionally, leaders should communicate the strategic importance of digital transformation, champion adoption of new technologies, and provide necessary training and support for employees. By aligning technical capabilities with human behaviour, organizations can promote autonomy, innovation, and agility, ultimately enhancing competitiveness and adaptability in dynamic business environments.

6. Conclusion

What organizational and practical implications arise from the strategic shift to decentralized data approach by adopting data mesh principles as a federated company? And how does the implementation of a Central Data Office impact organizational agility, innovation, and data-driven decision-making within a semiconductor company?

The transition to a decentralized data management model has already fundamental changed how the company handles its data. The data ownership is moving to domain-specific teams, moving away from a central data management system. This shift reduces bottlenecks and accelerates the process of data delivery. This change enhances the findability, accessibility, interoperability, and reusability of data across the organization. The adoption of the data mesh principles has led to improvements of data quality and governance. Standardization policies, business terms, etc. have been established to ensure data quality, consistency, and regulatory compliance. This federated governance model allows data management practices to be tailored to the specific needs of each domain while adhering to organizational guidelines.

However, implementing a decentralized approach comes with challenges. The cultural shift towards using data as a critical data asset and integrating data-driven decision-making into daily operations is a significant aspect of this transformation. A robust change management strategy is essential to communicate the benefits of the new approach and will support employees through the transition. This strategy should promote a cultural and continuous improvement, where teams are encouraged to innovate and optimize their data practices regularly. The implementation of the Central Data Office has been crucial in this shift, to improve organizational agility and innovation. This office provides centralized support, training, and resources, guiding domain teams through the digital transformation process. They also play an important role in driving data-driven decision-making. Also, increasing data literacy across the organization through workshops, training programs, and continuous support ensures that employees at all levels understand the value of data and how to use it in the right way. However, this is still a subject what can be improved a lot more. Lastly, bridging the competency gap between application-centric and data-centric thinking is crucial, requiring significant education and training efforts. With this effective change management is needed, including clear communication, training, and strong top-down support, is essential for the successful adoption.

6.1 Contributions and implications

This study significantly contributes to the understanding of the impact of a digital transformation where the enterprise data will completely change. This is done by highlighting the practical experiences and lessons learned from employees within the organization, in this way it offers valuable insights into the benefits and challenges associated with this transition.

Due to the insights of the employees but also the case study research, the critical components necessary for the successful implementation of a decentralized data management approach are identified. Think about domain-specific ownership of teams, data quality, business terms, etc. These findings can serve as a blueprint for other organizations that wants to start a similar transformation. Besides this the crucial role of governance and change management can be from real value for other organizations. These findings emphasize the need for clear leadership and strategic direction, especially the important role of the Chief Data Officer in driving data-centric initiatives.

There are multiple implications of this study. It underscores the important of robust governance, effective change management strategies, and an ongoing investment in data literacy. Furthermore, such a digital transformation can lead to improved organizational responsiveness, culture of accountability and innovation, and improved decision-making processes. These insights are mostly relevant for organizations that want to improve their data assets more effectively in a dynamic business environment.

6.2 Future research

Future research should prioritize exploring the role of a Chief Data Officer within organizations, aiming to define specific responsibilities and competencies that maximize the Chief Data Officer's effectiveness in driving data-driven decision-making and innovation. Additionally, there is a need to investigate the practical implications of adopting decentralized data governance models, such as those promoted by the Data Mesh principles. This research should delve into strategies for empowering domain-driven teams, promoting collaboration, and ensuring data quality and governance in decentralized environments. Moreover, understanding effective change management strategies is critical for organizations embarking on data transformation journeys. Research should focus on leadership styles, communication strategies, and incentives that foster a culture of data literacy and adaptability. Lastly, future research could explore case studies of other companies implementing decentralized data management approaches, as well as conduct empirical studies to assess the effectiveness of different organizational structures and strategies in promoting data-driven decision-making.

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Appendices

Interviews

For reasons of confidentiality, the name and position of the interviewee are not mentioned.
The answers are divided per question, each box is a different interviewee.

Question: Digital transformation program: how was the company organized before (focussed on data sharing/management)? • What has led to this change? • What were the pain points/challenges within the company (with the employees)?
Our technical architecture is just kind of evolved over time where there's many hubs, many people that need to do something that's always different across, let's say, areas of data. So, if you want to get something done, even technically it's a lot of work. Second point is as we need a lot of people, if you would organize it to be effective, then you would still be able to get stuff done. But this is not the case. To get any new thing going, you need to cross many different architecture boards, many teams, and many different resource managers to get something. So it's sometimes you can discuss about what you want, but that's not the problem. I think lots of people understand this is the model, the report or whatever we want to get out. You can also put it in priority which is our discussion that's we're in a good space there. But then to work that back to OK that means we need to change this, we need often someone from IT. So and then within IT we have like different areas and we've R&D IT with three sub domains. We have CCOE with two sub domains. We have you know CDO, not really IT, but that's another party in the chain. There's Power BI and EBI. So if I would want to get one extra field in reports, just draw what I need to get done to get that one extra field which should be which is like 5 minutes work. For example: we know this is the system that has the truth, and we want to add the name of the customers that works on the project. - Then it needs to be added in sources by R&D IT - Then it needs to be transferred to a database, which would be the EBI team. - Then now also CDO has a role to play there. - Then there needs to be a Power BI report developer that needs to do something again in a different organization. - Then there is, I think when I describe this, there's probably 3 architecture boards that have a say. And then there's this whole thing in between. But that was the previous way working. So, we're trying to make that better, but we're not there yet, no.
So, this company had a traditional siloed approach where you have a business function and an IT counterpart. They are two separate organizations with their own management and steering committees. So, it's a very traditional approach which is one to one. You have responsibilities on the business side. For instance, if you take finance, they are responsible for the financial figures of the organization and then you have IT counterpart Enterprise Applications which was responsible for providing the IT infrastructure to be able to support the business processes. The challenge what comes with being a siloed organization is mainly in cross organizational. So, if you have a business function within your own business function, you are pretty much aware of what's going on and how to get your data. But when you have to cross the boundaries of an

organization and for instance you need supply chain information, then it already becomes very difficult.
Maybe if they're on one the same floor, you're good, but if you are not part of the organization that you need the data from, it comes pretty much impossible to get to the right person directly, let alone know where to ask the question what kind of IT architecture they have.
And that's also the incentive to move towards the decentral approach where you do not want to impact the current existing ecosystem as much, but you want to be able to foster the cross domain/cross organization benefits through standardization policies and also to bring together people.

So, this company, as you know, spun off from another semiconductor company in 2006.
The first decade was difficult for this company to stay alive. It was to survive. The acquiring company put a lot of the depth to buy a company on the balance sheet. So, we had to buy, pay a lot of interest basically to keep the company afloat. It works, but it was difficult at the time.
So, every die had to get flipped two or three times to make sure how do we get the most value out of it. And people did not spend a lot of time in innovation because there was not a lot of money.
Then in 2015, we did a big merger and acquisition. We bought another semiconductor company, which was the spun off from another semiconductor company.
That was a very, very big merger for the company and it took roughly 3-5 years. You could say that even till the start of COVID, this company was mainly busy with integration activities. Even at this point today, it is still not fully completed. We still have systems, we call them now 'company' 1 and 'company' 2, but they are the original systems from the merger company, and they are the original systems from this company. And we build a whole interface on top of that, so the systems could talk to each other.
But it's not a Greenfield solution. It's basically Brownfield, as we call it, because there's a lot of legacy systems in there. But it worked. We managed to integrate 2 big companies, which is a very difficult task, but we still had a lot of these legacy solutions.
Then 2020 started happening and we got into our COVID crisis where something happened in this company that did not happen before, which was that the market exploded. There was so much demand, and we could not fulfill it all the time. So, what you get when suddenly you went from a situation where oh, we have a customer, we can deliver it in 2-3 times and we deliver it and of course there are issues, but it was an OK running process. Then suddenly there are 10 customers asking for the same capacity. And they're all screaming and they're all yelling and they're all in high demand because there's so much pressure on the situation. We got into situations where our CEO had to be on customer calls like almost 24/7 to talk to people and say, listen, yeah, yeah, it is coming, it's coming.
And then there's a lot of pressure on the information solution, which was:

- How many chips are available?
- When will they be available?
- Are they allocated yet to customers?
- Do we have capacity available?
- What is the demand going to look like?
- How will it change?

So, there was a much more need to get better information and our information systems at the time and simply the way the company works. We could do it, but it took much, much, much, much, much more energy overall from the organization.
So given roughly a year, perhaps even more. I think the first year was crazy and it was everywhere in the world, especially in the semiconductor business. Then our leadership realized, listen, we cannot continue working this way. We need to change this and how do we do that? Well, every

organization nowadays does a digital transformation program.
What we started to do was we had three pillars in digital transformation.

- One was focused on a process redesign like how we really do business.
- The second one was an application renewal of our enterprise resource planning SAP that we did early renewal for that one.
- And the third one was the data track and that was in the broadest sense possible. What can we do better with data?

And that's how digital transformation started. In the beginning it was just figuring out where we are as a company because everybody sorts of did their own thing and it worked, but we did not really have a data strategy for the entire company.

So, for instance, there's this ontology definition of the main definition of whatever word you want to give. It is the way they say projects of resources. But they don't work with that data.
So, if I draw that drawing, it is way more complex than what it is. So, people are falsely assuming of what things are. And if you do not know what things mean you're not going to ask the right questions to whom who needs to do the job right.
You just need to give that authority to a domain to define it for themselves. Because in the past with IT, it always has been tried with a unified canonical model for all the data existing in this company. I've never seen a success story of that.
The thing is you will have multiple canonical models and then they have matching interface how you can communicate. But give that responsibility to those that need to need to do it.
But then you have a central function that is like data meshes, right? They have these domain driven people only work with project data, nothing else. So subject oriented.
But you could also then debate why do that centralized, why not give that ownership to the people that are closest because they are the ones asking questions. They can also help you filter down some of the requests because they are going to say, hey, I want to do this, I want to do that. They're closest to it, but they already know, yeah, now this is going to take a while.
Instead of going put it on the backlog onto central IT, everybody pushing the backlog, blah blah, it goes in and then it's like, you know, it's like a traffic jam.
Then people get disgruntled. What happens in this culture if I don't get what I need, I'm going to do it myself. They're going to do it anyhow. Why not accept and embrace that and just go for it and yeah push the problem we had to them and then they feel and then they understand and then they will manage their expectations because they know that certain things are going to take long and that's fine.
Also, the single source of truth and you have the metadata and the business terms. So, there's one understanding of the data.
But also, the implementation of it, because now we're doing this with another project where we're making a distinction between business definitions and technical definitions. And we want to embed the main definition in the platform. You can still get the other data and do your own analysis or whatever you want. But these are the main definition prescribers by some kind of framework or standard that we set for our data. So, metrics you want to report out on now anyone can consume that. And to do this, you need to give me a proper technical definition. Then you see people struggle and I call it the duct tape solutions. So, then business like I said the earlier example if this fit my pet's name in and put in license plate that this stuff is happening. So that's where the duct tapes that's happening, where people do not understand or don't recognize or just doing it for their own some kind of reason filling it in the wrong way. People still need to report out towards management and others. So, then the analysts, what they do is say, OK how do you use it? What do you fill in blah, blah, blah and then you get these exception clauses and how to do it. No, the data means one thing that's a whiteboard. That's not a car. That's happening currently and it has reasons

and let's just find it out and fix that. And I think when you push that responsibility towards the people there, then they also are empowered to say, hey, I really want to do this, but I'm facing this issue, but now I must put the duct tape and if you don't give enough responsibility, how do you then communicate to someone who doesn't understand this problem? They're not on the details here and this problem needs to be addressed towards the governance team that is also at the domain level saying hey, my source is not aligned, or people are filling in the wrong way or maybe they even did like oh I found this clever trick. If I do it in this way, it saves me 10 hours, but you do not know later on how much work you are causing for someone else. And those kinds of topics are happening, that it's not addressed. It's now being identified, but it doesn't mean it's solved. And the people working on it are the domain people because they are facing this. But that's not bringing me value yet for solving this issue on short term and getting it like people educated is going to bring me value. Because then if a data scientist needs to use the data as an example and he trusts what he's getting and doesn't have to go in this infinite reason mode. Because this, this is a very lengthy, very lengthy process. The devils in the details.
The merge had a huge impact on the company. So I know that they never looked to have let's say from the data as being an asset. They always discussed about system, and they had a lot. And this was visible because I found out a lot of integration and interfaces between the system all the time. When I was explained the environment, I was shown how the systems interact to each other and how many interfaces are built between systems, and nobody talked about the data and what data is where. So that was clear from the start that we are application or system centric at that point. Time turned into evolution towards the data thinking because people starting to realize that what is important is not the system that's producing the data, but the data itself when it's aggregated. At the same time on the worldwide market technologies the discoveries in data science and advanced analytics started to kick off. Building a model in data science and doing predictions was not something out of the ordinary. initially it was starting to become a rule and that means they need the correct data and fast obtained, very fast obtained data. You cannot do a prediction and wait three months to aggregate the data to do a prediction because those three months will be lost for the prediction for example and so from that point on what people started to realize. People in the big companies realize that system management and IT manager standard management is not enough. It's simply operation. But we need to change. And it started initially with master data because it was a quick win.
The history of this company is we are built out of two companies. We had this company at one point being carved out of another semiconductor company. And then we acquired another company, and we merged the two companies. Then we made choices, which platforms, and which applications we're going to use and trying to work in one way in many places. And we are working in one way, but also there are places like in factories and between different domains where we are still working in two ways. So, you end up with different analytic tools, you end up with different data platforms. And for the central data warehouse, we chose the former merger company solution, which was the Teradata data warehouse and lots of blow loans with self-service. And yeah, it was doing everything in there. So old, different functions, finance procurement supply chain had all their one contact person, and they were bringing all their requests there. And everything is being built into the data warehouse. And now looking from the hindsight, we should maybe not have built everything into data warehouse, because they had a different purpose. So, in the digital transformation, it became clear that we were kind of locking ourselves in and we could

not really get the value out of data, can we do what we need to do as a company? Go out in the world? Sell smart solutions, combination of products of different business lines.
So, two aspects, the need for digital transformation are getting more data from the management layer, because they want to enter the market. But on the other side, when we started that, we said we need this track to kind of help digital transformation (which became enterprise data track). And then we get the business intelligence community, to represent this from all those domains. So more on, the director level, and people working with data that work with our data warehouse team, bringing pain points forward in the way it works, what they were missing. And there are examples like, I don't know what this data means, or I cannot find the data. Or it's very hard to combine your data with my data. And out of the workshop, we did a report out. I think before we condensed 600 different pain points, items, things being brought forward that we of course could categorize and, and put in buckets, and then try to attack that. Things like data is not owned, the business owns the application, but not the data. There's not enough bandwidth to do things with data, they request something, they must wait too long. So, they just copy data and then make their own interpretation. So, you get two versions of the truth. Master Data issues, those kinds of things were all put forward.
So, if someone collect some data and just makes a file, he or she can put it into data warehouse. The data warehouse is being filled by data pipelines built on ETL tooling, right most of the time. And there is a part where we can call manual tables. so, people can bring in data themselves. But that's hard to edit. Let's say from a customer, you get a file, and then we want to combine it with our data. They ask and we put in data warehouse, but there are many tools where you can combine data warehouse data with a file and then still do your stuff. But then it's only for you.

Question: What is an aspect you should have as an advice to focus on as a central data office?
On top is architecture. So there are now taken many steps when requesting something, but I think the thinking was two years ago to go more data mesh that you have local responsibilities to decide stuff and get stuff done. And I see it's hard to really get that going. So every decision we take is reviewed 10 times. But yeah, we probably also need to earn a bit trust that it works. We're moving a bit quicker, but we're far from where we need to be. So this is the decentralized part of it. The second difficult thing is it's more on competence. So we're used to applications. We're not so used to data thinking; we think in applications. So, we often solve problems with making either a new application or we change something in the application. But often the solution is in the data. You can combine things or do something smart somewhere in the latest and we have the latter stages so that in that thinking that takes some time and the language we speak there is not common yet. And I face it quite often that people seem to not agree but they just don't understand each other. I would say the third one is indeed about data quality and the source of truth. Making sure that people understand why it's important, that if they put something in a system they need to drive for quality and ownership around it and all that. And the 4th is more about change management. It's for our VP's that once they get a report that they need to know what to understand and what not. The mindset should not be to prove the patterns but taking the message out of it. For example, this line is going up and I know not every data point is perfect but maybe I should do something with the message. However, what often happens is we put data in our systems, some analysis is done then the first go is always; oh but this project is not valid, I know that project is wrong. So then we go back to the source and speak to the guy that will fix it and then we do the 2nd iteration and then if we do our job right in the end we get the OK. Hereby the message of the report didn't change, but now we all believe the data and then we go and discuss what we can do with that trend or action. If we do it wrong, it also happens it dies at the first or second iteration. So then you would say not to focus too much on the specific data elements within the data, but more see like the trends that will change over time. It is really a mindset, we need the trust. So, you need to we need to earn that trust and getting comfortable with not perfect data. We're also a financially driven organization. We're used to that, especially in finance, everything needs to be consolidated to the right thing. However, the data cannot be perfect because of all that merges of the systems. And we need to take that in mind when moving forward the data. So if something really gives the wrong message, then it's about earning trust. But it's also being critical and do the best.
I think what I hinted towards is having that process in order or it's not really having the process perse, it's having the materials to be able to provide and spread the knowledge in an understandable way. You don't have to go as detailed, but you need to have something to be able to explain to people that haven't done it before that they can understand it. I think it can be done in maximum of a month. So, you need to be able to explain someone why to do it and how to do it and support with you know, whatever you need to have. It's a template or a process or a rocky or anything. But in general, if they're going to work with people that aren't familiar with the subject, you need to explain them what it is and how to do it. There are a lot of documents created in the past two years. So, I think we really built the right stuff, but we ended up not using it and now we still need the same stuff.

So, it's kind of a confirmation of that we did the right thing. But then the problem there was change management. The people that we're building it, we're not responsible for it. And we could have done a better job at tagging the people within the CDO alone because right now I'm doing that for the data product portfolio, which, you know, I already had ten months ago. But if I had brought the provision team along back then, things could have been smoother. So within the organization itself, I think change management as well as closer collaboration are the key factors. And within the CDO: If you want to be successful as a CDO, you need the shop to be filled with data products and the rest will follow. But that also means that I would organize around it a bit differently. I think the SQUAD approach is good, but the CDO is too small to organize ourselves as decentralized. So, I would bring the people back more centrally, take the responsibility and control more strongly instead of dividing over the domains already. So, taking ownership of developing the data products in the CDO. So I would suggest removing most of the data product people from the squads and put them into a singular team responsible for just delivering data products at the earliest convenience with literate, competent people as well as the architects. Instead of embedding this into the domain already where the domain isn't yet fully aware of how to properly do things. So, then the guidance also isn't as strong as it could have been if you organize it more centrally.
Focused on the CDO; it needs to be fed and organized as one entity. And what I mean with that is that even with an organization, we have different teams that focus on a certain element, but the sharing of information they're recalibrating or what we're trying to do as a team. So, with the full 28/29 people, that is something that we should do better. And that's one of the things that I want to focus on because the portfolio captures a lot of what we're working on, but that should be better. And what I mean if I go one level deeper is that I want their teams to the data, the platform team as well to fully understand what are the use cases we're working on right now. I want a team from governance as well to have that. But I also wanted to be built from governance once they have learned something that they can share it easily back and forth and finding that integration within the teams without all the one-on-one meetings. That's something that we should do better, it's better learning together and resonating as an organization that we all understand. That's the dot on the horizon where we're running towards. And these are the things that we're trying to achieve. And that again goes back to the point we discussed earlier that if pressure builds, people narrow their focus because there is oh, I have a deadline, I have pressure, I have a lot of deliverables that need to be accomplished. So what do you do by nature, when there's a lot of pressure? You focus on what you need to do. And if you focus on what you need to do, you don't focus on what your colleagues are doing. And if everybody does that, then you can have a team of individuals, and everybody does their own thing, and nobody talks to each other.
More focus on marketplace visibility. I know there were communications sent out from CDO when we were going live with our first data product, but that was about it. But you know as we are in our day-to-day operations and you know day-to-day work, we tend to kind of ignore or forget about. So, I think more frequently communication. If we see those kind of emails coming in on Yammer posts or something coming up with more data products getting added, I think that will get more traction towards the marketplace. And I just had a conversation with Governance and they also mentioned like maybe because I think a year ago there were the workshops of Informatica, but after that no training is provided and think

maybe sort of prefix training we can send to users to show them how to request the data products, and how to search within the marketplace.
I would say we should not limit these trainings to users, but probably just a mandatory course for everyone across this company who works with the data. Because anyone who works with data would want to request some other data every now and then. Maybe also in a sort of Yammer post or Confluence. Or maybe add it as a mandatory course on my workday.
It's like also bringing awareness to the employees, so a bit of a change management.

More a top-down approach. See if I go and reach out to any data streamer from any domain and I tell them that OK, you know let's get on with journey, it's not into their hands. They already have their deliverables. They have their goals defined by their managers. So, it must be top down so that we can get availability of resources from within domain because that is the key. Without availability and a helping hand from the domain, we cannot onboard them. We need that time; we need the resources. But that is then maybe more in the added value for the future because that's C level -1 or something like that. But it's better to have the demand from a higher level than someone within a team says yes.

We need to go tell everybody, let's go data, because then I can use your data product. I can give you my data products. We can do so much more, and we want them on boarded. So, we need to select cases with impact, not just doing the job. And really use the added value of the marketplace and develop data products that combine multiple data sets from different domains.

We are at the early beginning, and we don't have enough data products to have a foundational component to start playing with. So, people when they come to the marketplace, they never find anything they need because there are only three or four data products in domains that they are not maybe interested in and so on.
So they will say, OK, I want to join, but what can I use from here? And if I publish here, who will be using that? It's not so clear and we always need to say yeah, but just wait when there will be more in it. We need to paint the reality, but we cannot offer the reality. This is the difference.
So we could have an extra strategy that is building data products from the existing tables, existing deliveries. But we have resistance in finding the right owners. The governance we have, we missed let's say the support from the governance team to roll faster this kind of activities because it's very easy to scan Teradata or EBI tables. In there are already data products that are in use by different reports delivery. They were built because business requested them. So, these are already there.
We can very easily plug them, put some governance around it and sell them and put it into the data marketplace to be reused. But we also need business involvement. We cannot do it only because IT wants. So, we need their owners to realize OK the data that I'm producing is going there, it's impacting that part. We need also to involve the business and this part is technically we can very easily populate stuff, but we cannot put the governance on top which is mostly on the business side.
And this is what we are missing and why we are a bit delayed to convince people (some of them are convinced). But it will be good, but we are very slow because we cannot offer reality that we are painting. We are only telling yeah it will be nice but after a while we'll lose the trust. So, it's dangerous. So, we need to deliver it at some point and brings us again to the top-level support.

This kind of changes are big for a company. So definitely it's an organizational change and it needs to be treated as such with communication, with small steps, with education, with mandatory trainings, eventually in work day like we get for SOX and for security and for compliance and so on.
If we want to go data-driven, we should have mandatory data courses to everybody should know what is the difference between data management and data governance, etc.

The strategy will never reach the companywide level. So that is the difference right now it reaches the level for the people who understood the need which is at the program level.
So, it needs to reach the right level to be supported, otherwise it won't be successful.
And if only a part of the company is doing it again, it's not very productive because at the end the top management will still not have the right 360 views and timely view of the information we have.

Question: key learnings past two years
So, for the domains, I think the key challenges are still the governance. So they can implement technically the data products. However, governance hasn't been properly addressed yet and that's also the key learnings of the domain and doing the projects like the pilot has been done. How to properly do the implementation of a data product in a way, but also to make data available in a way that it is understandable, interpretable, multi consumable. When they started out, they weren't aware of these principles at all. So the data literacy of the organization very much went up. And I think they're very much better for it because lots of the reports that were built were either similar or based on exports or based on some person's knowledge somewhere which wasn't documented. So there's a lot that's going better than before, but it also requires a very steep learning curve. So, what I believe the most challenging part is that for some of the processes that the CDO feels responsible for, they don't have a way of working. So, there is a big process wise gap just because you're responsible for it and you feel responsible for it. Then also you need to be able to provide the measures on how to do it, not only state that you're responsible for it. So, I think the biggest challenges are there in providing materials on how to do it, including the data literacy, trainings and supporting the governance. I think we have plenty material on the technical part, I think we have plenty material on the portfolio, and I don't think we have plenty material on governance, data literacy and change management. I think the key learning of the CDO team is just because you have a good story, doesn't mean you'll be able to embed it in an organization.
I think change management is not a tick in the box. It is a recurring process that you need to keep investing in time and time and time again. And that's something that we know, we knew, and we had still forgotten from time to time. And it's the everybody is crazy busy. It counts for everybody in this company. It's no excuse. But sometimes when you plan a change management process, you think about, oh, what is my checklist of things I need to do and you have it done and you move on to your next assignment. Well, change does not happen by doing a checklist. Change happens by talking to people, resolving conflicts, helping them learn, educating them along the way. And the challenge that we had as a company or as a project and our organization is the task is very, very big. We try to improve the data and shareability to quality the use case delivery for the entire organization. But we are extremely big as a company. We have 35,000 people. We are in 30 countries. We have 10 different domains. We have, I don't know how many data elements and we have a ton of use cases. You want to get them all delivered, but you also want to make it sustainable. With sustainable, I mean is that if you try to deliver a new way of working, it's not you set them on the training after a week and then they will do it forever. No, it needs training, it needs follow up, it needs coaching, it needs checking points, it needs ability also from a central team to learn from new insights. Because it will be an illusion to say that we have the perfect approach, yet it has a good approach, but it also needs to improve with new insights. So, if you're looking for one nugget there with wisdom and for the rest of your career, you all, everybody will say change management is important, everybody will say training is important and despite it, everybody will say it. Everybody will always underestimate it.
Data mesh for me, it's not actually an IT thing, it's more an organizational thing. How do you align with working with data across the different entities you define? And I find it fantastic because in the end I perform a shadow IT function similarly as other colleagues of mine, because the step that we have doesn't deliver what we need, but we need to get the job done anyhow, so we will do it anyhow with any means. So, I like the concepts. But we never organized

properly. But in the beginning, lots of these topics were mentioned. So yeah, the data, it does much stuff with data, like data quality or the things taking too long because you must go to the central team and then you get something and then you don't get what you want. Because it's always like this miscommunication between business and IT. That's existing for 20 years now or longer. And this concept is about giving responsibility towards the people that are close to the data.
They only need to equip themselves and learn themselves of what they need to know, technical skills and other kinds of skill sets to stop doing the job.
But that's what I'll start in the beginning is that all these topics procedurally, things taking long or the content or the quality or not able to link data or having issues with different systems that have the similar data. So, in the end, even to this day now if you see people working with data, they spend so much time, so, so much hot trouble in about reasoning of the data because they don't trust it. So, they trust, they read, they try to reason everything they see and that's valid. But if the trust is high and we got our stuff in order, then it's easier to trust and you're more efficient to go into the next step to get the actual value. But now there is this very lengthy journey and trying to figure out what things means, and I think that should be basics, because that's something you build your business on.
You should know this stuff and you will find out. Or even I am finding out that sometimes people just don't understand the basic entities and then they fill it in with the wrong stuff.
You know it's like here's a column fill in your pet's name and then you put your license plate number in it. It doesn't represent what it means.

The digital transformation is slowly starting to get recognition because some people might find a little bit, I don't know annoying let's say but if you if you are part of the business purpose you start hearing terms and some terms are buzzwords or hide words, some terms are actual business entities that should be reflected in the model. Now the question is when someone uses burst word or hype word is that it's associated to this one thing or is it something else or even if we think it's the same thing or they or do we both agree because maybe your customer is a different definition of my customer right. And that that's slowly being recognized and aligned, and we have everywhere local initiatives that are good, but they're not aligned. And then if they're more aligned than we have 11 cohesive things. So, there's not nothing but it's just not organized properly. So, what needs to happen is that there's some kind of education, but we said this is what we need to do. And then you can say to a domain this is what you must participate in. Or I'm going to do it for you because somebody said centralized, decentralized, whatever, it doesn't matter to me. Like in the end it's all about having proper definitions. And the reason why I see the decentralized at the start of this conversation is to just push the problem to the people that want to do with it. Like this culture.

So main learning is for me it was just a confirmation that when working in a Federated way or in an organization that are heavily Federated with a lot of freedom between domains, it's a challenge to create everything across the company.
And also what I fear from the start and I kept claiming this needs to be initiated and driven at some point top to bottom, not from bottom to top and get approval from the top.
So it needs a strong hand at the top to steer and to have some tough decisions sometimes in order to make things happen and everybody to be on board this doesn't happen.
We hired very late the Chief Data Officer.
So it's only recent we have a CDO that just starting advertising in the company what we are doing and he still doesn't have let's say enough authority to work with other domains which have heads at his level or even higher.
So still we don't have enough top support for such an organizational change that this activity is.
So in this case what we can do is to advertise to educate as much as possible people through introduce tools that are forcing people to work in a good way.

We'll start feeling the advantages and we'll start requesting and raise it and we can, we need, we want to create an effect that people will want to voluntarily on board and advertise to others.
So because we don't have a strong voice on the top that's saying in this case this is we are going. If we want to go data, it will be a program everybody needs to follow. Only these words we need from the top at least we don't need exactly what to do but communicating the wheel to change it didn't happen. It is mentioned in the town halls; we have a digital transformation program we have some changes and digital transformation program is good. But is it's only a beginning, it's only like testing to see how we can do and what we can do on this one.

Question: What is the added value of this approach?
More focus on the human part and empower people to do the technical piece. The focus now is so much on the architecture and a lot of discussions around this. So, the focus is now on the technical stuff, but it should be on how to change human behavior. The behavior of the decision maker who needs the report. But how to do this is the art. We need to focus on the data mesh principles, to empower local organizations to make decisions (IT needs to let go). That it does not need to be validate by different domains and architecture boards, but that the source owner gets more ownership. In this way you enable local teams to make decisions to move quicker.
So, for me there's two primary reasons indeed, difficult cross domain topics and the ability to drive standardization and harmonization through a central office. If you have an ecosystem that consists of, let's say completely an own way of working, what you end up having is 10 applications that do the same, where it could have been maybe driven towards 1 standardized one and the ability to support the others. So, I think standardization, harmonization as well as the cross-domain difficulties are the most beneficial of the reason why to adopt the data mesh.
A decentralized approach gives you much more flexibility, but you have a lot of challenges because if everybody does their own thing, so to say how do you work with each other now. That means that we are, especially after the merger, you have the former ecosystem of this company, the former free skill ecosystem, but that even within those former ecosystems there were all these different groups of people that work with each other. And that's how innovation also gets done. You don't put innovation into a central organization and say bring me innovation now. It is giving people the freedom as well. Centralization works well if you have a standardized business model, banking, insurance, consumer electronics. But we do innovation. Out of the 35,000 people, we roughly have 10/12 thousand engineers in here. You want to give those people freedom. That means that a decentralized model by nature works better.
Thing what was lacking was we are an innovative company, but often within organizations, even within teams, it was not clear what they were working on exactly. You know people that were working on a data solution, but they were not talking to each other's neighbor, for instance, who was also investigating something, and they had no clue. Sometimes they run into each other when they were drinking coffee, which got less once we started working from home. But these hallway rumors to figure out what people were working on, it happens from time to time, but it does not happen if you're in supply chain and on the other side of the ocean. People in the quality department are working on something, so they were working sometimes on the same problem. That means that the organization is spending multiple teams, people, time, licenses, money, and then where does it come together? That was very challenging. So where it often came together was at the IT department previously, because suddenly, for instance, we had an IT department, they have the data warehouse solution called Teradata. Then suddenly there was a license there to say, oh, we also have an Oracle database. Why on earth do you need this? We have Teradata. And then you started bringing people together because they wanted to buy technology. And then the question was why? We have this already in place. Now instead of doing this where you're already far in the execution mode, you're trying to procure technology, why not bring it back sooner? Why not talk about the strategic part? What are you trying to solve. And if you have a good idea, perhaps you could already benefit from what other teams have built or you may produce something that will be very valuable for some other team in the company. So that's the idea of the CDO and mainly of the portfolio to start building a

funnel of where the company spends its resources on data and analytics. That's it from basically the use case perspective. Then there also is the methodology perspective. When we talk about systems and standards, the way that data flows through the company is the ability to share it with each other easily. That means that you need to have an organization in place that says this is the standard, this is how we organize it. If you have two people that use the same type of technology, it doesn't work. You cannot share it with each other. So, you need some kind of organ, and it doesn't mean it has to be the CDO or something else. But right now, the company decided this central data office that simply says this is how we set the standards and then according to the data mesh you give guardrails and within that area you have the freedom to operate. But this guardrail should connect to the other guardrail as well. So it's sometimes giving advice, sometimes helping with a problem, sometimes being a police agent and saying, no, your standard will not be OK.
If you push the ownership to the domains, then basically CDO becomes something similar as like the federated government in the US, you need to orchestrate the different domains to contribute to some common things. There needs to be some alignment between interfacing between domains. There needs to be also alignment in how can we interchange data? But you need to be very careful. Where do you give select set of options and where don't you give select set of options? Because if you give the autonomy to a domain itself, then they need to have the freedom to move in. Certain things like Texas will never be the same as California. You don't ask them to become the Texan, or you ask them to become California. You know, just leave it as is. And then as long as they know what they need to do, it's fine. So, the CDO becomes more of a governance function, more consultant function to align the different domains, the different interests. It's more of a less you're informed on the details but not impacting the details yourself. You should push that responsibility to them.
If I talk in general from data perspective, one of the main challenges that I understood so far is how domains were working in silos. They're still kind of working in silos. But there was no organization within the company which would bring all the domains and work towards a common principle. And say for example, I'm working in product creation or say I'm working with sales domain, and I want to access some data maybe from quality or from finance domain. It's difficult. I don't know where to get started from. Like marketplace is not there. I don't know who to contact. Maybe you know, if suppose I'm a new person in the company, I don't really have professional contacts even in organizations so far, where do I head to? So, with the marketplace coming into picture, CDO as an organization getting formed, data mesh coming into principle and you know if I want to have access to this data, where do I head to. And even after you get access to data for example fiscal calendar, if you talk about fiscal calendar, everyone is having their own version of fiscal calendar that they are having. No one is aware which is the ultimate source of truth with data lineage because now we are having governance into aspect so we can track that lineage. Now I know that OK Teradata is a source yeah and like you know that is the basically source of truth I need to follow. I understand data mesh is in place but then still I as an end user of any data, I would want to know where my data that I'm using is coming from. So that is now something that we can track. Also, governance was not in place. So that is really needed in today's time in any of the organizations. So, data governance coming into picture, we know that the data that we'll be using, how authentic it is, and you know the quality aspects also come into picture. But there is also resilience on this topic. Why we need governance, we always use that source, why we need to have business terms, why do we need to have quality scores? So, guidance on this topic were missing.

This digital transformation has for now the most added value that data becomes more visible, more governed.
So, to be data-driven it brings you to let's say main advantages that are usually conflicting each other. It's giving you both flex agility and flexibility and stability at the same time. So, you will have a set of core data foundations, governed with known quality. It will be white data, not black data. You'll know about it, where it is, how to access it, which quality and so on. And at the same time you'll have the flexibility at the end to pick up and combine this data and use it in the more most real time to extract information, knowledge, or wisdom. If we are using the DYKW pyramid logic. So, you'll be able to extract the wisdom from this data using advanced analytics tool modelling and some other stuff. This is the goal; it is the speed that you can access the information that it's in your own data that you have. It's like you have a lot of components in the table, if you mix them, they are a car, but you don't know how to mix them. We are just looking at them and you see a lot of components, but they'll have no meaning. But as you start combining them, suddenly oh, this is a steering wheel, this is a gearbox, this is the engine. And suddenly everything makes sense, and you know exactly what you should go for each component. If you see that separately, you have no clue what to do, how to govern, how to manage, where to be to care about them and so on. The speed that you are doing this is giving your market advantage. So, you'll have good components, you'll have stability, and known components. And the same time the flexibility, the agility to use them and combine them in new ways so you can produce new stuff. So, you'll be very fast in adjusting to the market needs.
There are a couple of things; we need to organize governance, because if people are copying data from sales into supply chain. And then make their own interpretation of the data, that might be the wrong one. Because they're not really the owner or do not know everything of the data. And that's one and then we need a platform, maybe we will ever, we called it at that point. And then we said, Let's go to Data Foundation. We know we have multiple platforms, but how we're going to make sure that we have these things work together properly. Then we cannot throw everything out and do big migration project because there's going to be too much cost or too difficult. And then we were also looking at change management. So, are the people literate? Do they know what data means? Because people really talked in applications and not so much in data there, which is interesting. So, then we said we need to go from application centric to data centric, then it doesn't matter anymore, which applications we have, if we know what we want with our data. But how do you get there? What kind of tools do I need? How do I make sure I make one version of the truth? Those kinds of things. And then we came up with the term FAIR.

Question: what should you have done differently with the knowledge you know have?
Well, we should have held our horses by making sure that you have the stuff needed to be able to do the job instead of just kick starting the job. I think there's a lot we did well. Also, I think very early on we already knew that we would not create value by just implementing a data product. So, you need to link it up to some business value, some use case. So, I think from a portfolio perspective, it's good that we did projects that we could embed the technology as a different way of working instead of stating that the technology on itself solves the problem because it doesn't. You still need to have a report, you need to have a business impact, you need to up the revenue or you need to be more cost effective in your implementation. So as long as you have a project that you can bring those principles with instead of just dictating what the principles are, I think is a is a good learning that we had. However, and that's the learning you need to follow it up as well. So, the problem that I saw is that they make statements where they have principles, but in the safeguarding those principles, they are lacking.
Yes, the first and foremost POC that we started when we were you know the CDO was getting established. That was probably a very difficult use case that we started with. We would have not started with the product creation. It was complex stuff. So, the decisions that are being made nowadays, like what kind of tool or technology you would want to go ahead with (Data Bricks or Vantage Cloud for data sharing). It would have been helpful if those decisions were made in initial days so that you know all the data product development, and everything would have been done in the final technology that we wanted to go ahead with. Also from a governance perspective would have helped if there was more guidance on this topic in an earlier stage. So, there would be more focus on governance, instead of only data quality. But by going for the way of working we have chosen I think we lost domains willingness to get onboarded on data from data governance suspect. I mean now we are we're having to reinvent the wheel if I would say from governance aspect.
Looking back, we should have prioritized establishing a solid foundation before diving into the execution phase. We were too eager to show quick wins and deliver results, which led us to overlook the importance of building a governance framework or a data infrastructure. If we had taken the time to ensure our data was standardized and our teams were ready for this. This would have helped us now because we had a lot of reworks to do. Another thing is also the education and the training that comes with that. We were thinking that when we have a plan or a direction to go to, everyone would be on the same page. Unfortunately, this is not how it works. Looking back, we needed more time to invest in education programs/trainings. Also change management is an important aspect to this, because training and getting people along is a huge topic in this. Lastly, we were really focused on the technology at the beginning and not necessary a clear understanding of the business impact that we want to deliver. I would now say to come up with a business impact of a use case/data product. I mean with this that we need to identify specific use cases where data products could improve efficiency, improve customer satisfaction, reduce cost, or increase revenue. We need to work more closely with business people to ensure that the need is aligned with the technology.