



COMMERZBANK

API Banking White Paper

Data Strategy

in Connected Business Models

Executive Summary

In our contemporary environment, data and inherent data strategies constitute vital sources in pursuing and developing customer-centric business models while supporting collaboration between different organizations in creating customer value. As the amount of data has been steadily increasing in the last decades, corporations can utilize internal and external data sources using APIs (Application Programming Interfaces), but they are facing challenges that they first need to address. Particularly the emergence of platforms and ecosystems is driving the significance of data as a vast amount of it is generated in such organizational settings [1] that participating corporations can leverage to ensure the viability of their future business models. This White Paper outlines two essential and established data strategies: defensive and offensive strategies. Both strategies are presented along with selected use cases from several industries. Additionally, the paper emphasizes Commerzbank's data & API journey concerning

present opportunities and inherent challenges many corporations face. Corporations need to establish adequate data strategies with state-of-the-art data management, based on internal and external data sources, that serve their long-term corporate strategy. In this context, aspects of standardized data management and interfaces are becoming vital to guarantee necessary collaborative readiness and enhanced customer-centric business models.

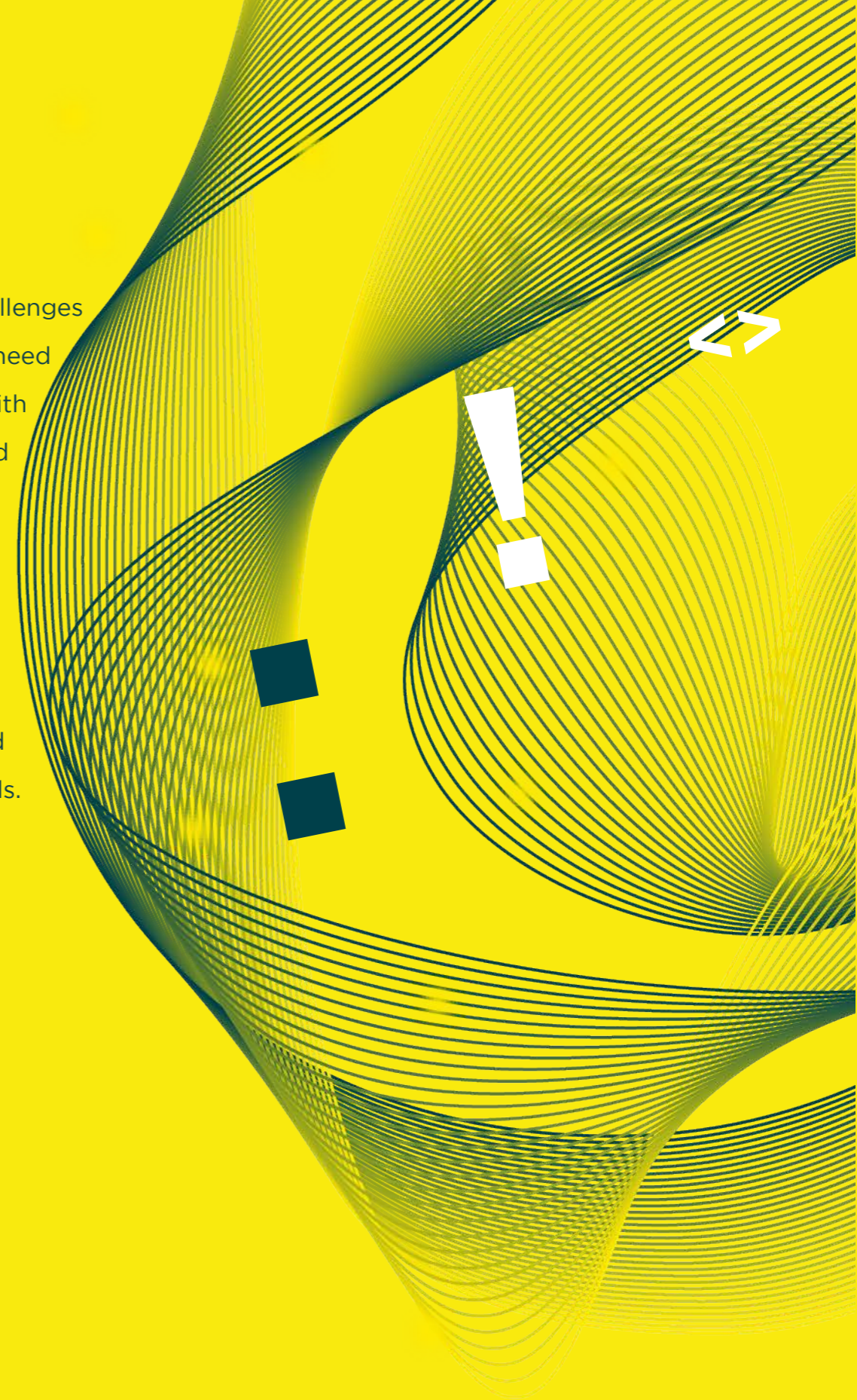


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Why a data strategy is essential for digital companies

The amount of data processed globally increased by 5000 percent between 2010 and 2020, and further projections indicate that this trend will continue to grow [2]. To a significant extent, this originates from an unprecedented multitude of devices and contact points, which generate various data, including novel data formats. Additionally, companies can nowadays leverage open data sources in complement to their internal data, which are becoming increasingly available [7]. Furthermore, new technologies are enabling organizations to analyze large amounts of data with ease and speed, which, in turn, drives data collection. Commercial organizations are collecting data, as the accumulation and analysis of this data has enormous potential for value creation: (1) the utilization of additional information to sell products to customers, (2) to better understand the customer to derive future needs, (3) to save costs, (4) to increase security (reduce fraud), (5) to improve the customer experience, (6) to increase customer loyalty, or (7)

to build data potential for unknown future use cases. The key to exploiting the full potential of data is data strategy. The overarching objective is to create value from data for internal and external stakeholders [3] by extracting, standardizing, storing, organizing, governing, analyzing, and deploying information assets [4]. Standardization and organization of data are essential success factors for driving data strategies. Further, clear objectives on the functional and the corporate level [5] and the alignment of the corporate and data strategy are key [6]. Therefore, data strategy constitutes a way of thought and leadership in organizations, with data as the core of corporate activities. One of the possible building blocks to drive and utilize from established data management is the implementation of an adequate API strategy that would allow to make use of data in a secure and flexible way to provide ultimate customer experience. APIs (Application Programming Interfaces) can shape the future of data management and may strongly influence the

Between 2010 and 2020 the amount of data processed globally increased by 5000%^[2]

way various businesses can interact with each other and provide value creating services based on the information that can be already accessed. However, the growth in data poses a main challenge for organizations as new data sources (e.g, sensor data) are creating mostly unstructured data. The combination of ever-increasing data and varying formats is a mixed blessing for organizations: on the one hand, integrating this data requires a sophisticated data management approach, and on the other hand, mastering this situation inevitably lays the foundation for data-driven value creation [4]. An increase in sales, a better customer experience, or the emergence of new business models and use cases are just a few examples of further value creation. Another challenge is that, in many corporations, the management lacks an understanding of the interdisciplinary possibilities for using data. Neither do they fully understand the value proposition of associated data-based business models, nor are they able to develop a vision. Moreover, corporations are facing the challenge of being incapable of identifying eligible use cases while also being unsuccessful in scaling them. In addition, the data-driven transformation of corporations is impeded by a lack of methodological

understanding, appropriate data strategies, and their implications. Cultural hurdles are also evident, resulting from the fact that traditional companies have been successful over the past few decades, and the shift to data-driven processes requires a cultural change that is proving difficult. As a result, the need to take strategic initiatives related to data is only marginally perceived. Also, complying with data protection laws is another challenge for companies, as additional resources are required to ensure compliance. Finally, technical barriers need attention, as some companies are in an unfavorable technical state because their IT systems have evolved over the past decades, leading to data silos [8].

Data challenges for banks

Undoubtedly, the challenges identified also affect the banking sector, characterized by customer relationships built upon high trust fundamentals. To a great extent, the enormous quantity of available data consists of sensitive customer data not yet utilized by the majority of banks to its full potential. Banks comprise a historically grown and defragmented IT landscape that combines various IT systems, several technologies, such as AI or Blockchain, and inherent data silos. To encounter the

resulting risks, Commerzbank established the new corporate division “Big Data & Advanced Analytics” (BDAA), to forge ahead with its data business. One example of the data business is moving AI-driven services to the cloud to meet future computing needs. The responsibilities here range from the migration of services to a modern automatized infrastructure in the cloud up to compliance with General Data Protection Regulations (GDPR). The implementation of GDPR is of utmost importance for Commerzbank concerning its customers as their data is extremely sensitive.



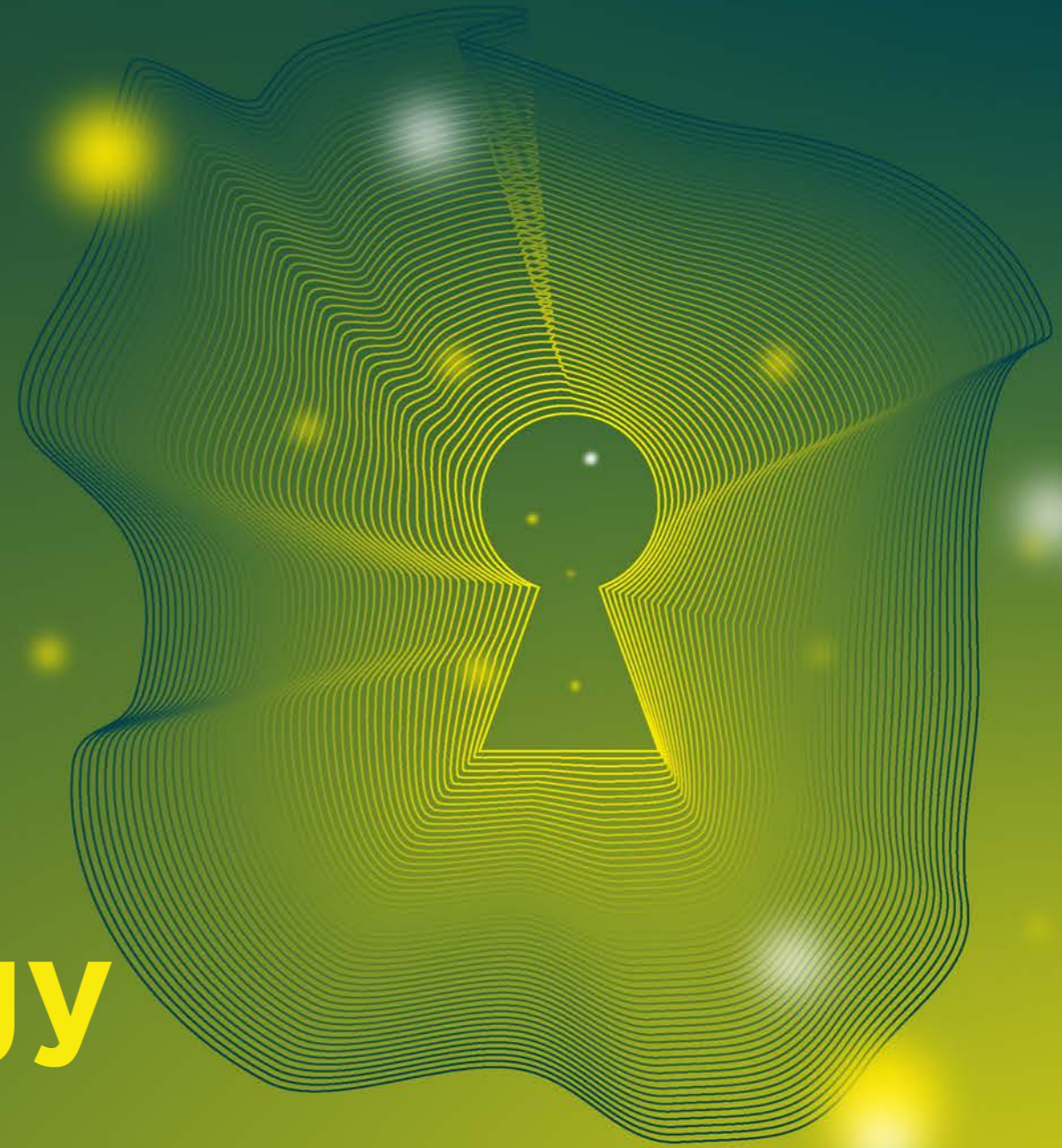
Banks are well-positioned concerning access to data which could lead to new business models or products to intensify the relationship with existing customers or to attract new customer groups. In addition, banks possess the necessary IT competence to leverage existing data appropriately.



Oliver Dörler

Head of Big Data at Commerzbank

The key to
exploiting
the full
potential
of data
is **data strategy**



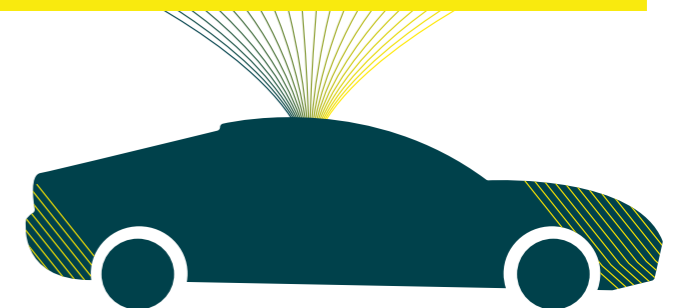
Implementation of a data strategy

Two types of companies are noticeable in our modern business world. First, companies that consider themselves to be data-driven and which increasingly tend to develop entire business models based on data monetization, deviating from solely data processing and analysis. Second, companies that are not yet data-driven but eminently eligible for generating value from data that they can already access. Thinking of data-driven companies, we generally tend to consider big-techs such as Google, Apple, Microsoft or Amazon first, not only as they rank among the world's most valuable corporations measured by market capitalization but also as their business models are heavily IT-driven [8]. These corporations unite commonalities such as innovative and customer-centric business models or participation in increasingly emerging business ecosystems. However, also long-established corporations, such as Bloomberg and Reuters, have based their entire business model on the extraction and analysis of data, indicating that data was always present in the past. Also, Companies in traditional

industries, such as aviation, have always used data and are increasingly seeking data monetization, which increases the importance of data use. Airlines are increasingly using data, for example, from customer loyalty programs, to drive their business models [9]. Such business models, along with the emergence of increasingly collaborative environments which require interfaces for data management, could be enabled by APIs to provide and distribute data in a secure and efficient way. A remarkable example of a corporation operating in an increasingly data-driven business is Tesla. Their vehicles are a noteworthy example of such a device that generates and consumes data. More specifically, while driving, a Tesla collects tons of data (e.g., road conditions) that are eventually processed, analyzed, and directly deployed to improve autonomous driving. At first, the valuable data serves internal purposes. However, once the conditions for autonomous driving are compliant with the law and thus ready for the market, this road condition data will be of the greatest value to any vehicle manufacturer to train their vehicles'

decision-making for autonomous driving [10]. Additionally, data enables features such as the adjustment of engine power, range, or the braking system by updates over the air [11]. Another data-driven service is the use of location data to determine the optimal position for the placement of charging stations.

“Tesla claims that the sensor data collected from its cars let it design a map that is 10 times as accurate as those offered by its competitors.”



Source: Harvard Business Review [28]

Although there exist numerous examples of corporations that already discovered how to benefit from data, the majority of organizations are currently located in the middle of upheaval to become more digital and eventually data-driven. Among them is a wide variety of organizations, from SMEs to established corporations. Incumbents such as Audi AG have adopted a similarly flexible, data-driven initiative like Tesla by offering features on-demand, allowing customers to activate, for example, more powerful headlights or a parking assistant, by subscribing to an equivalent package [12]. Interestingly, many product-based business models are evolving toward service models that generate further data to optimize and expand the future product offering. Corporations that are yet not data-driven need to accept the new data-driven world and must build up the required expertise to make internal data utilizable and generate new business opportunities. However, not all organizations can and should finally operate data-driven, monetizing data for business purposes. Consequently, appropriate business opportunities, resulting from data utilization, require identification along organizational dimensions. But how can companies finally achieve being

data-driven? The theoretical conceptualization of a data strategy builds on the approach of DalleMule & Davenport (2017). According to them, data strategy separates into two elements: defensive data strategies and offensive data strategies (see Figure 1). Defensive data strategies should serve to mitigate risk from data. Precisely, by maximizing control over data, defensive data strategies comprise the reliable storage of data, an adherence to regulations, such as GDPR, and an assurance of a free flow of data throughout the entire corporation. Offensive data strategies support attaining and retaining a firm's competitive advantage by pursuing business objectives such as improving its competitive position and profitability by applying more advanced data techniques such as analytics, modeling, transformation, and enrichment of data.

73% of the executives struggle to turn banking data into useful insights. [26]

“Cross-industry studies show that on average, less than half of an organization’s structured data is actively used in making decisions – and less than 1% of its unstructured data is analyzed or used at all. More than 70% of employees have access to data they should not, and 80% of analysts’ time is spent simply discovering and preparing data.” [4]

Defensive & Offensive data strategy



Key Objectives

Core Activities

Defensive

Offensive

Ensure data security, privacy, integrity, quality, regulatory compliance and governance

Improve competitive position and profitability

Optimize data extraction, standardization, storage and access

Optimize data analytics, modeling, visualization, transformation and enrichment

Figure 1
Following: DalleMule and Davenport (2017)

“ Banks have to start doing their homework and gradually implement their data strategy. It is essential to start by identifying the available data sources, while ensuring key objectives such as quality or data security, before new business opportunities are identified. ”

Martin Kraus

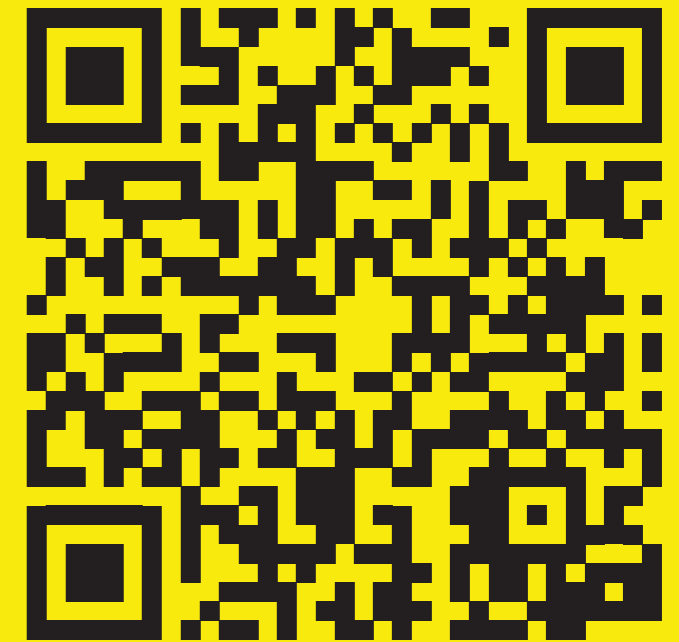
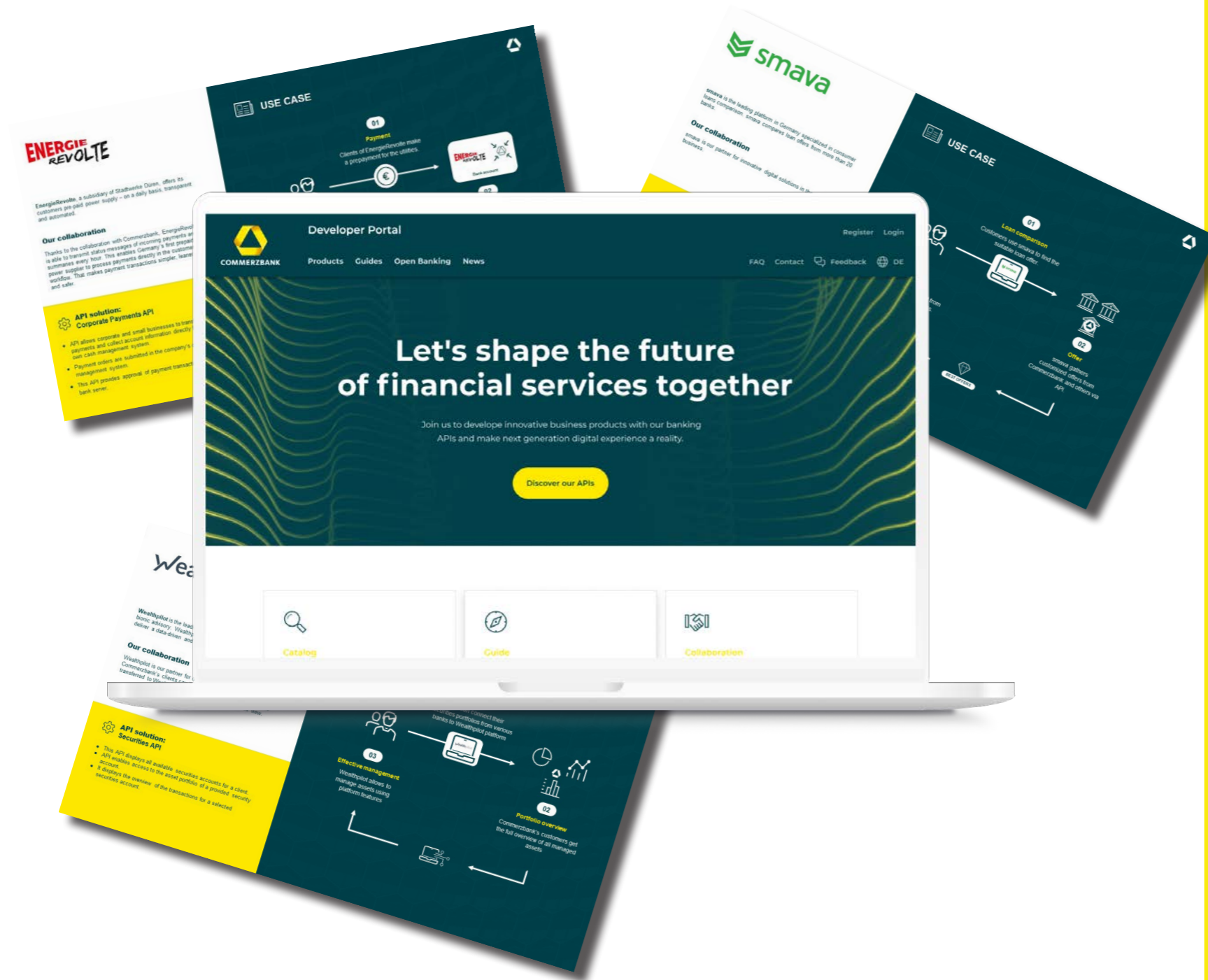
Head of Data Governance at Commerzbank

Commerzbank’s data strategy journey

In practice, Commerzbank is incrementally establishing a solid defensive data strategy by upgrading their data management while pursuing and gradually expanding the offensive data strategy for value creation. As a bank with a long history, Commerzbank has encountered and succeeded in managing various challenges over the past 150 years and adapted to an increasingly dynamic and globalized market environment. Particularly, the effects of digitalization were (and are) changing the way people see and interact with financial institutions. This led to new requirements concerning technology-driven services, which required an improved IT landscape. Since Commerzbank aspired to go one step beyond simply avoiding data problems, it has sustainably future-proofed its data strategy. Before the introduction of a defensive data strategy, it was first necessary to establish a solid understanding and description of the structure and the meaning of the corporation’s data assets. Subsequently, the development of a resilient defensive data

strategy was key to establishing effective control over available data while guaranteeing the ability to integrate and process complementary data. To this end, the active management of inherent data quality is of utmost importance as defined by data being “fit for purpose” for respective use cases. Further, the establishment of a defensive data strategy enabled Commerzbank to fulfill its obligations concerning regulatory compliance which opens opportunities for offensive data strategies. To implement its defensive data strategy, Commerzbank developed application programming interfaces (APIs) to enhance the flexibility and resilience of its data management. An API allows the standardized exchange of data between different systems. Thus, it enables developers to integrate existing services (such as payment services) into new applications. The first step was to analyze data structures to create standardized APIs within the bank, leveraging their usage for internal platforms and the internal exchange of data. In addition, a central API catalog manages approximately 180 APIs and enables to gain insight into the technical specifications of the API components. Additionally, API monitoring ensures low project costs and efficient execution of challenges.

Subsequently, the offensive data strategy started by offering reusable APIs, providing its roughly 200 APIs to internal and several of them to external customers [13].



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The value of a data strategy in business networks

Growing competitiveness and crowded markets, fueled by diminishing transaction costs, hamper the ability of corporations to establish a presence in the market. With the rise of digital technologies, emerging platforms offer new opportunities for value creation by connecting individuals and businesses in a non-intrusive way that represents a divergence from the traditional business organization [14]. Beneficially, assets and resources for the comprehensive offering of products and services thus no longer need to be provided solely: They can be supplemented remotely by other organizations participating within the ecosystem or platform [1]. With the progression towards greater digital spheres, value is increasingly created and captured within new organizational forms [1]. To a significant extent, demand is shifting towards comprehensive rather than stand-alone products and services, requiring companies to expand operations and link with other organizations in ecosystems to capture consumers' attention. The

increasing shift from a single product to product-as-a-service offerings and digital ecosystems drives the relevancy of data even further.

“Continuous innovation in digital technologies enables the information aspect of the physical world to be captured, processed, and shared effectively and efficiently, leading to the emergence of business ecosystems.” [15]

With the emergence of ecosystems and platforms, data strategies are becoming increasingly vital, as interactions between individuals and companies generate vast volumes of data that organizations can leverage [1]. A notable use case highlighting the joint relevance of data and emerging organizational structures is the ecosystem Catena-X, which builds on data sharing among its participants, for example BMW, Mercedes, or Volkswagen, enabling a more resilient and flexible supply chain management [17]. The ultimate goal is to establish an ecosystem primarily based on data in the automotive industry, which entails initial use cases like the enablement of traceability following the Supply Chain Act or the

end-to-end documentation of supply chains [17]. Further, companies have the opportunity to access additional inter-organizational data, eventually leading to new business models [17]. Hence, the ecosystem promotes not only collaboration among its participants, along with industry standard-setting, but also competition using open system architecture. The continued evolution of interconnected architectures and technological advancements, such as new types of devices, are enabling organizations to foster data sharing and collaboration. Hence, this potentially results in more collaborative relationships between businesses and customers

(B2B2C). A present example of this phenomenon in industrial manufacturing is the adoption and usage of internet of things (IoT) enabled devices. These devices ceaselessly collect and exchange data in real-time [18]. Primarily, IoT enabled the execution of internal company processes, particularly in the supply chain management of tangible goods [19]. Meanwhile, IoT applies to inter-organizational processes which entail data exchange between companies. In the following, a use case from predictive maintenance, a subset of IoT, explains the concept of data-driven collaboration before applying it to the financial industry.

Global spendings on IoT are expected to reach \$1 trillion in 2022

Source: Statista 2022 [27]

IoT in predictive maintenance for automotive industry

Bosch is accelerating the development of digital mobility solutions in the automotive sector with the benefit of (IoT) sensors, data, and software to establish an ecosystem. Historically, the business model of Bosch focused on selling and maintaining automotive parts. Through years of experience in those areas with many different partners, Bosch now can offer various value-added services to their customers resulting in different intelligent services (personalized, automated, connected, and electronic mobility services) around automotive parts [20]. Sensors, analysis software, and shared data from different partners constitute these services' core. For instance, Bosch offers a range of sensors for car brakes. These sensors measure brake deterioration, inform the onboard computer and subsequently the driver before the brakes wear out. This procedure enhances the monitoring of brake conditions and the customers' safety. Bosch's B2B automotive customers can purchase sensors and corresponding software from Bosch as a service. Thus, this enriches the quality of Bosch's end products and enables them to create added value for

their customers and end-users by sharing the data. Considering Bosch's predictive maintenance use case as a service provider for automotive companies, the role as a service provider likewise applies to the financial services sector. Prospectively, banks will have to anticipate the future needs of their private and corporate customers on a data-driven and event-driven basis while offering relevant services in real-time. One great example is Apache Kafka, which, for instance, enables banks to provide real-time and event-driven banking apps, enhancing the customer experience and communication. Commerzbank expands the nucleus of its business by providing innovative solutions which enable clients to focus entirely on their core business. By automizing their internal processes, integrating bank data, and/or embedding finance services, they can provide a seamless customer journey.



Commerzbank's use cases

Seamlessly integrated Corporate Payments

The Corporate Payments API allows corporate and small businesses to explore various potentials regarding payments in their day-to-day work. Usually, SEPA payments need a manual export from the cash management/ERP system to a payment transaction software (e.g., EBICS). However, using a direct transfer from a cash management/ERP system, the communication of payments functions seamlessly to Commerzbank without additional programs or required intermediate steps. Hence, this process improves efficiency and security while being unrestricted for payment orders in various formats. Another benefit of the Corporate Payments API is the possibility to collect electronic account information. Corporate and small businesses can analyze incoming and outgoing payments straight from the cash management/ERP system. This feature is available for account statements in multiple formats and the initiation of services is performed automatically based on incoming

invoices in the ERP system, leading to fast and secure provision of services. Additionally, it enables the release of payment orders on the bank's server. However, to illustrate the reusability of APIs, the following second use case outlines how the usage of the Corporate Payments API enabled a Blockchain-based payment system.

Blockchain-based payment system "Atila Pay" and Corporate Payments API [21]

Together with its research and development entity "main incubator", Commerzbank is the first German bank that has developed a blockchain-based payment solution for machine-to-machine (M2M) payments. The information exchange required to connect the blockchain-based solution with the Commerzbank systems takes place via Commerzbank's Corporate Payments API. The pilot project, together with Daimler Truck, covers the handling of all-automatic payment transactions between a tank charging station

for electricity and a truck system. As part of the transaction, Commerzbank first placed euros on the blockchain ("E-Euros") and then made the so-called „cash on ledger," (i.e., the money on the blockchain). In fact, current payment systems are not yet capable of mapping such a fully automated payment process. Two insights are important:

1. Compared to classic payments (e.g., SEPA-based payments), the blockchain solution offers the possibility of automated, immediate, worldwide, and irrevocable transactions upon the occurrence of certain conditions (e.g., the delivery of a product or the provision of a service, such as the charging process at a charging station in the present case, so-called „delivery vs. payment").
2. In contrast to conventional cryptocurrencies, the electronic money used represents a legally enforceable claim on Commerzbank that is subject to comparatively low fluctuations in value and is therefore suitable for payments

in the first place. In contrast to open („public, un-permissioned”) blockchain networks (e.g., the Bitcoin blockchain), the confidentiality of transactions was also maintained in this pilot.

Digitalized and cloud-based installment lending ^[22]

Commerzbank enables its customers to obtain an installment loan digitally by integrating it into the Commerzbank banking app, which operates on Android or iOS. The application for the loan in the app takes only a few minutes, and the payout of the loan is usually possible within one banking day. In addition, this digital and paperless alternative substitutes manual processes and protects the environment at the same time. Before running it entirely on Commerzbank’s servers, the digital installment loan was shifted in May 2022 entirely into the cloud of the strategic partner Microsoft. Further, the Consumer Loans API operates as a supplementary enabler: This standardized interface allows internal and external systems, including those of Commerzbank’s partners, such as the comparison platforms Smava and Finanzcheck, to be connected easily. The digitalization and

standardization, in line with Commerzbank’s digital strategy and target architecture of its credit key area, enable a fully automated customer journey in which data is ready to be utilized for additional purposes. For example, data generated through the integration in Commerzbank’s banking app can enhance the customer journey or provide tailored offers for its customers. Connections to external platforms provide additional data sources which may build the basis for new products and services. The examples illustrate how technological advancements promote collaboration between companies which facilitates further value creation, positively favoring its end customers. In the future, collaborations will become increasingly prevalent, resulting in a blurring of organizational boundaries. This change will affect a significant number of processes that will move from purely organizational to inter-organizational handling. However, to share data across organizations, companies will have to master their internal data management in order to connect with other organizations. Applying more data-related cross-industrial standards would be beneficial to promote inter-organizational data exchange. While Commerzbank has successfully initiated

its internal data management and achieved initial successes in implementing data-driven products internally in the form of APIs, the subsequent step is to expand its data strategy further and beyond the bank. For Commerzbank, digitalization implies more than just the automation of internal processes. It also involves connecting partners externally by deploying the possibilities of information and communication technology (ICT) to foster customer-centricity by creating meaningful value for them. Eventually, further data-driven products will emerge from the interconnection of business processes with partners. Hence, Commerzbank is dedicated to the creation of the utmost added value for its customers.

“

Data strategies are becoming increasingly relevant to leverage new business opportunities. Standardization and collaboration among corporations is vital to provide customer centric products and services.

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Christoph Berentzen

Head of API & Open Banking at Commerzbank

Lessons learned and call to action

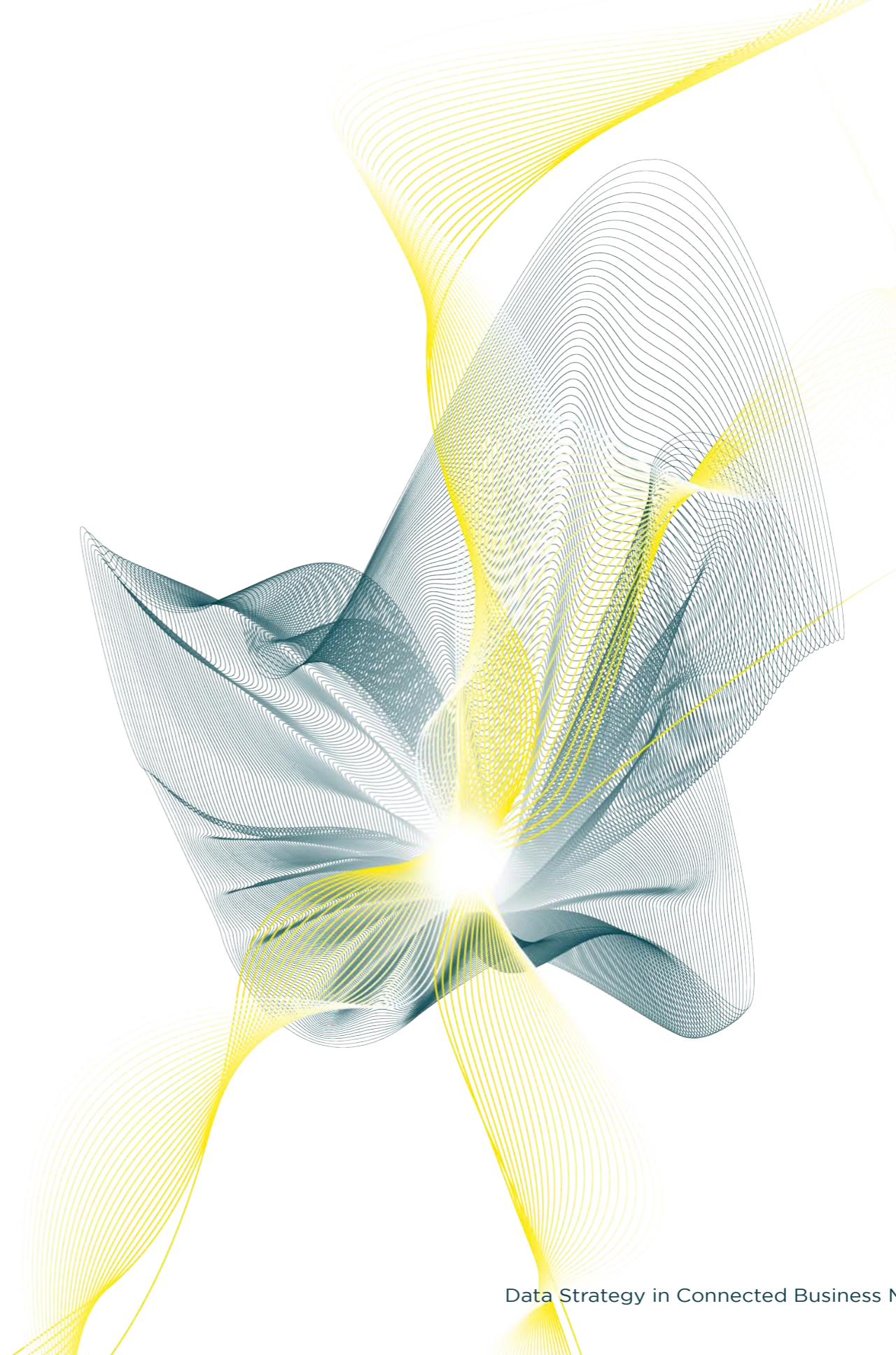
Ecosystems, IoT, and as-a-service products determine the growing markets. To participate in novel business models and collaborative setups, appropriate data management within the company and even beyond is essential. The represented use cases elucidate how companies, focusing on a data-driven strategy, were able to establish new business models, leading to further value creation for ecosystem participants and ultimately for their customers. In the short term, however, companies need to initiate the allocation of resources timely to data management initiatives to react to diverging market conditions. The digital-based service delivery in networks entails a strategic reflection on data management. First, defensive data strategies are based upon clearly defined objectives concerning quality and efficiency aspects associated with data management in companies and networks. Second, offensive data strategies allow the incorporation of revenue-generating components in business models by leveraging data. A service-oriented network necessitates the integration of these two

strategic concepts. Integrating services in a digital environment within networks and customer journeys, or providing them already, implies mastering aspects of efficiency, high quality, and data-based revenue drivers. In addition, companies' data-driven strategies and business models within ecosystems and platforms and inherent value creation can solely succeed if standardized interfaces are in place. Within the financial services industry, standardized interfaces constitute a crucial driver in establishing ecosystems successfully [23]. Initiatives by the Berlin Group, a European standards initiative within the Single Euro Payments Area (SEPA) to foster standardization in compliance with the ambitions of ECB¹, EC², and EPC³ in the interbanking domain, highlights this urgency [24]. A particular focus is on API standardization, enabling functioning open business ecosystems [25]. Financial institutions have the power and abilities to enable ecosystems by using their data strategy in combination

with standardized APIs focusing on their core competencies: providing essential payment services “behind the scenes” to assure frictionless operation within the ecosystem. That said, banks can also operate as providers of vital technical and financial solutions within ecosystems. However, according to the European Central Bank, European banks are currently using six to seven API standards to enable, for example, PSD2 initiatives [25]. In conclusion, corporations need to address the urgency of state-of-the-art data management, utilizing an adequate data strategy that is embedded in their long-term corporate strategy. Further, internal and external data sources are vital in developing new business models and added value creation considering increasing customer-centricity. Standardized data management and interfaces, such as APIs, will especially help corporations be positioned sustainably in the long term and support the emergence of ecosystems. Importantly, as outlined concerning current initiatives in line with PSD2 regulations, corporations need to align on

1 European Central Bank
2 European Commission
3 European Payments Council

existing standards to ensure collaborative readiness. Additionally, the aspects of standardizations in the interbanking context are, in turn, transferable to corporations from other sectors and industries since they can participate in ecosystems and thus need to establish data strategies, using APIs. As outlined in provided use cases, Commerzbank offers standardized solutions to expand customer service beyond our traditional business model as a conventional bank. For Commerzbank, it is essential to provide solutions that are utilizable in rapidly evolving environments. To be one step ahead, it is of utmost importance to ensure the future readiness of Commerzbank's current and future clients by offering innovative solutions that enable optimizations or the emergence of current and new business models within collaborative settings. Commerzbank is ready to collaborate with organizations from different industries to explore new ways of data usage.



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