RESEARCH NOTE

Data Marketplaces: A Promising Gateway to a World of Data

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Contents

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Data marketplaces as enablers for modern data use

According to a forecast, the amount of data worldwide will be about 175 zettabytes in 2025.[1] To store this amount, it would take about one billion computers with a storage capacity of one terabyte each. If you also consider that the amount of data in 2018 was estimated at „only" 33 zettabytes, you get an impression of the speed at which the overall volume of data is multiplying.

In view of these figures, the commonly heard statement that „we don't have enough data" seems bizarre. Nevertheless, the problem is real. The market for data is largely opaque, unstructured and does not offer much relevant data. This often leads to a waste of resources, as data that is already available is collected several times because it cannot be found or its quality cannot be assessed.

There is more than enough data. Finding it and being able to use it represents the biggest challenge for data and analytics.

Data marketplaces start precisely here by pursuing the following fundamental goals:

- They create a trustworthy and secure environment for data exchange between data producers and data consumers.
- To this end, marketplaces structure the data supply and offer functions to increase transparency in data and usability. They simplify data access, for example, in obtaining external data.
- They promote data collaboration for data exchange.

1 https://de.statista.com/statistik/daten/studie/267974/umfrage/prognose-zum-weltweit-generierten-datenvolumen/#professional

Intuitive operation, practicality and transparency regarding the supply and demand for data are among the most important requirements of such solutions. Thus, data marketplaces could play a significant role within modern concepts such as data mesh and data fabric. These do not attempt to collect distributed data in a central location, but establish connections to the data at the point of origin. They attempt to create holistic access to data. Also, in the context of democratizing data and building a data culture, such technologies can improve the availability of data and reduce complexity.

Data marketplaces can make a valuable contribution to the implementation of modern concepts such as data mesh and data fabric.

The importance of external data for decision support

Data is increasingly seen as a differentiating factor that can be used to gain competitive advantage. If data or applications based on data are specifically offered for analytics, we also speak of data products. Data or data products are indispensable for the operational and strategic management of companies. They enable better decisions and promote innovative business ideas.

No company operates in a vacuum. External influences described by external data cannot be ignored by data-driven companies. For example, supply chain management cannot function if the data of the individual elements of the supply chain (suppliers, logistics companies, etc.) and relevant external factors (market situation, traffic volume, weather events) are not taken into account. Such data is obtained either from partner companies, external data providers or from publicly accessible data sources because it cannot be generated internally for the most part.

Calling data a product indicates an appreciation of data and implies a more conscious approach to data as an asset.

Figure 1: Data products can come in different forms. We distinguish five types: Raw data, data prepared for the consumer, BI artefacts such as dashboards or reports, analytics models and applications for decision automation.

In other cases, access to external data can bring speed, cost and even quality benefits, as the internal personnel and time required for data collection exceeds the cost simply purchasing it. This often applies to large amounts of data in special formats that are needed for training machine learning models.

External data can provide valuable contextual information that can be used to enable new use cases or increase the quality of analytics.

Key players in the use of data

According to the BARC Data Culture Survey, access to data is the most challenging issue for companies. However, this has the highest priority when building a data culture (Figure 2).

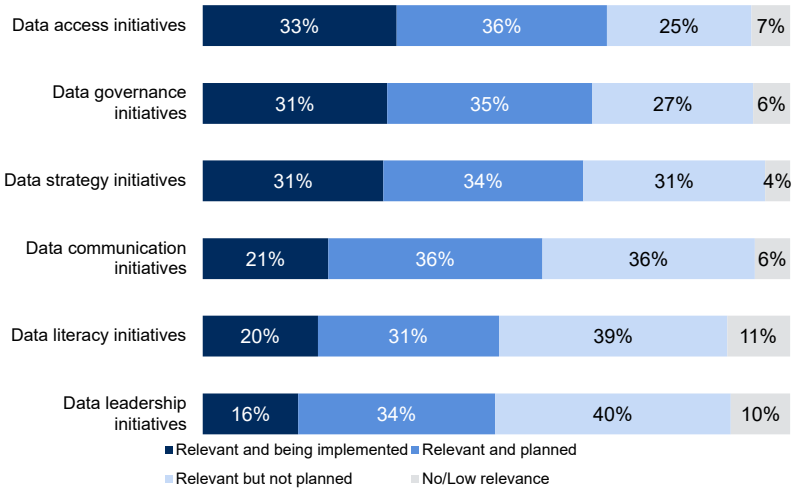

Figure 2: Data access is the most relevant measure to establish a data culture. The Data Culture Survey (2021), n=400

Data access is the biggest challenge in developing a data culture.

Data access is not a purely technological task, but rather an organizational one. In order to meet this challenge, the perspectives of the data consumers, data producers and data stewards must be taken into account. A technological solution that supports data access to external or internal data must meet these requirement profiles.

The perspective of data consumers

Data consumers include all persons who are dependent on data in order to accomplish specific tasks, such as BI or analytics. This includes business analysts, data scientists, power users, controllers and many other types of business users. Data consumers primarily want to be able to access data quickly and easily. They want to know which data products are available and how they can be accessed. They need information or metadata with which they can quickly and easily assess the relevance, validity and accuracy of data. Sometimes it is important for them to have direct dialogue with the data providers and those responsible for the data.

The perspective of data producers and commercial data providers

Since much data is generated in operational systems, process owners of ERP systems can be considered data producers just as much as data consumers who generate results in the form of data (dashboards, visualizations etc.). Data producers should have an interest in ensuring that their data product reaches the appropriate target groups of data consumers. In addition, they should be provided with all the necessary information to use the data product. On the one hand, this interest can be monetarily driven (sale of data products), but it can also be attributed to the fulfillment of a function within an organization. Data producers are also dependent on the exchange with the data consumers of their product in order to receive suggestions for optimizations and to be able to conduct quality management. In the following, we call companies that are dedicated to the commercial distribution of data ‚data providers'.

The perspective of data stewards

Data stewards regulate the complete life cycle of corporate data and for this they need a company-wide overview of existing data stocks and the information they contain. They need to know who is responsible for creating and maintaining data sets and which data consumers rely on which data sets. Data stewards monitor data consistency and, in some cases, quality and provide valuable input to data producers on this. In addition, they monitor established company-wide guidelines for data security, data protection and the internal handling of data.

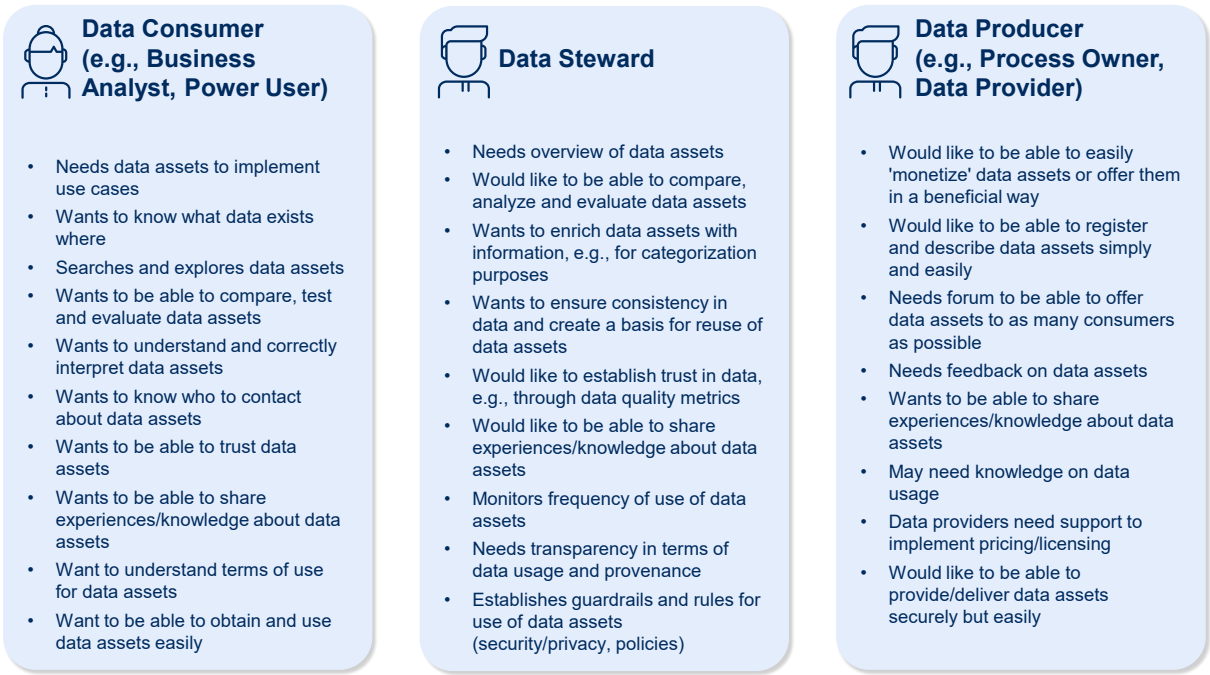

Figure 3: Requirements of data consumers, data stewards and data producers

Organization and data culture as cornerstones for creating value from data

To maximize value creation from data, the actions, goals and responsibilities of data providers, data consumers and data stewards must be aligned and work hand in hand. This coordination is often very complex and represents an organizational challenge above all else.

A suitable data culture provides the framework for data collaboration.

A living data culture simplifies the availability and use of data in many ways and ensures greater efficiency in data-driven corporate management. Within a data culture, all members of an organization regard the exchange of data and the information it contains as a matter of course and not as an imposed duty or burden. They are aware of the value of data and want to share their data-based insights with the widest possible audience. For them, knowledge can only contribute to value creation if it is shared and reaches as many people as possible who can do something useful with it.

The current ‚data mesh' trend has brought about a reorientation towards the development and marketing of data products. Incentives are being offered for data producers to create high-quality data products and to take responsibility for their success. A key success factor here is the intensity of use of a data product and the demand generated.

A suitable organization is the prerequisite for proper technology use.

Technologies can provide a framework for this in the form of a technical platform, which companies must independently adapt to their own specific requirements.

No value creation from data without access to data

Data is becoming increasingly in demand and therefore needs to be available in more flexible ways. However, because data is often distributed across different internal and external sources, access to it is sometimes very difficult. The consequences of this problem are:

- Long product introduction times (time-to-market)
- Laborious coordination processes
- Questionable data preparation efforts
- Delays to implementation due to insufficient data quantity and quality
- Ultimately, frustrated employees

Data-driven corporate and process management cannot be achieved in this way because this favors the persistence of data and knowledge silos. These are considered the greatest challenge to the establishment of a data democracy, as shown in the BARC study „Data Black Holes - Are Data Silos Undermining Digital Transformation?“.

Data and knowledge silos are the biggest challenge for the democratisation of data.

Employees who want to drive their business forward and increase efficiency based on data are demanding democratization of data so they can access it more easily. They are seeking to replace the current restrictive need-to-know principle with the right-to-know principle, which allows access to all data insofar as there are no justified reasons for the special protection of certain data.

Data marketplaces can serve as a basis for data democratization by technologically enabling and simplifying data access for a wider audience.

Data marketplaces are a potential enabler for implementing data democracy.

Areas of use for a data marketplace

Data marketplaces can simplify the provision of – and access to – data and make it more intuitive. They can support the procurement of external data as external data marketplaces or the exchange of data within companies as internal data marketplaces.

Depending on the scenario, different groups of people and functional requirements are involved:

Data marketplaces for obtaining external data

Data marketplaces can be used to obtain external data. External data can be obtained directly by data consumers or via data stewards. The latter can usually better ensure the company-wide provision of data and avoid purchasing the same data multiple times. For example, it could be ensured that acquired demographic data for sales is also made available to the marketing department so that they can use it to target their campaigns more effectively.

The use of the data marketplace ranges from simply obtaining external data to promoting internal data exchange.

Data marketplaces for data exchange within the company

Data marketplaces support the data exchange of internal data products. They provide a platform for the data producer and consumer and promote collaboration and exchange of data. They also support the development of new data products and their monitoring.

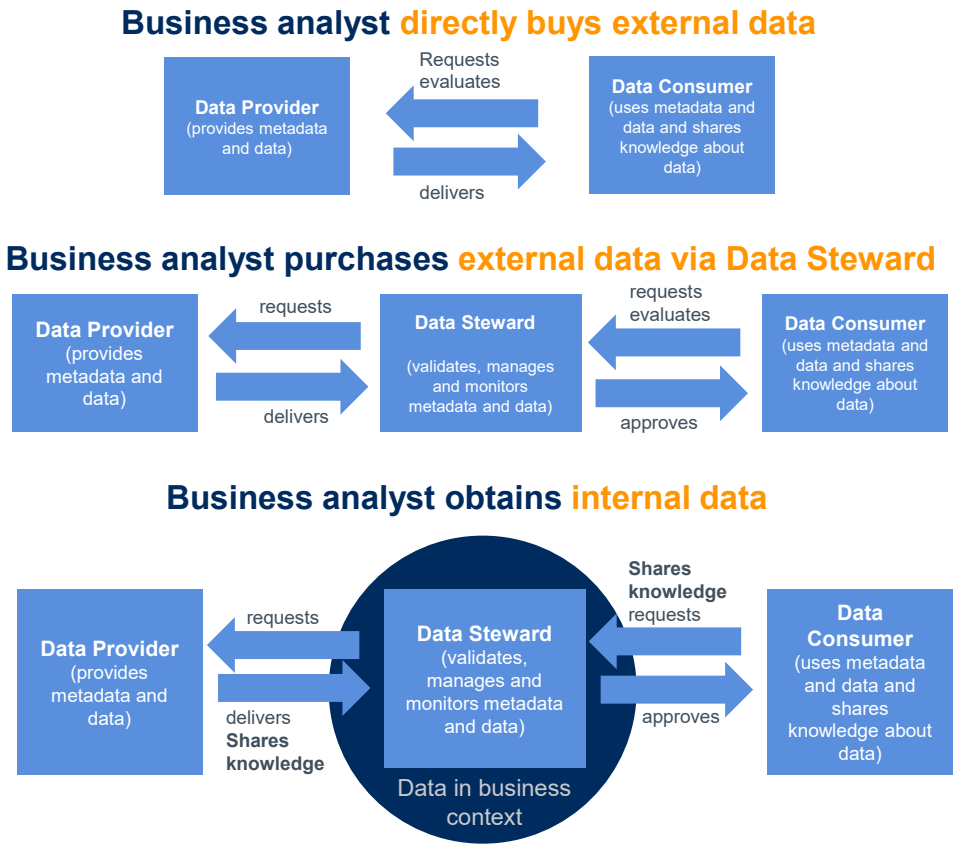

Figure 4: Interaction models for the provision of external and internal data via data marketplaces

Data marketplaces can also be used as central repositories for internal and external data. They help to reduce complexity and ensure a seamless provisioning process for data. In order to do this, they must fulfill the following requirements profile for the classification and functional evaluation of data marketplaces.

Data marketplaces can reduce complexity and simplify data access.

Functional requirements for a data marketplace

Data marketplaces serve the purpose of meeting information needs in a simple way by describing, mapping and making available a broad, well-structured range of high-quality data products. To do this, they need to offer attractive and user-friendly features to both data producers and data consumers. These include:

- Support/automate the inventory of new data products
- Simplification and scaling of data access and exchange between data consumers and data providers (easier access to more customers / more data products)
- Promotion of data exchange between users (data community)
- Systematic integration of open data

Metadata is an essential component that creates transparency for data products. It describes the data product and helps in the location, identification, comparison and evaluation of relevant data (products). The systematic maintenance of a flexibly expandable directory for metadata that contains knowledge and information about data (products) is therefore essential for data marketplaces.

Metadata on data products is an essential core component of a data marketplace.

Metadata

Metadata helps to describe data (products) technically and professionally. It provides information on data formats (dashboards, raw data, aggregated data, etc.), attribute types (KPI, postcode, phone number, etc.), timeliness, data scope, data quality and retrieval frequency. It can also provide valuable contextual information, such as contact persons or an indication of frequency of use.

Data marketplaces are not to be understood as a physical storage location of offered data, but rather as a directory for metadata that describes the data and makes it searchable. The actual data transfer is handled via other technologies (e.g., data pipelining tools). This leads to requirements for the following areas in particular:

A data marketplace contains metadata, not data. The actual transfer of data takes place via other technologies.

- Automated integration and generation of metadata
- Support for the enrichment and management of metadata
- User-friendliness in terms of data shopping and data shipping

Automated integration and generation of metadata

Already available technical metadata, such as table information from databases, should be extracted using suitable connectors and made available in the data marketplace. If insufficient metadata is available, it can be generated automatically with the help of intelligent crawlers. Functions for the creation of additional metadata offer added value. For example, automated data profiling can analyze additional characteristics of data products and provide further information on the quality and content of the data. Such functions minimize the manual effort required for checking data and allow it to be quickly classified and evaluated. The degree of integration of such functions as well as the automation achieved represents an important differentiating feature.

The key to successful metadata management lies in the simplest possible „automated“ integration of metadata.

Support for the management and use of metadata

Metadata serves as a basis for the aforementioned roles to exchange information about data (products) and to collaborate on the basis of data. For example, a business glossary can help to assign the correct business context to technical data products. Without a technical context, data products are difficult or impossible to find. Therefore, the support of technical metadata is key. Functions to create transparency regarding the origin of data (data lineage) and the use of data (data impact) are helpful. The integrated metadata must be enriched to make such analyses possible. A marketplace should therefore offer data provider companies additional functions, such as functional support in the description of data, pricing and licensing. Data consumers, on the other hand, should be functionally supported along the shopping experience to help them find, evaluate and consume data products faster and more easily. Such support includes advanced search capabilities, data navigation support, data comparison capabilities, user ratings and more. Data stewards are especially helped by functions for data monitoring, such as data quality monitoring, release processes and functions for auditing or checking compliance with rules.

Subject metadata forms the basis for discoverable data.

Data shopping and shipping

Data consumers want to use selected or purchased data products as immediately as possible. The twin functions of data shopping and data shipping should make this possible in a simple way. Data marketplaces should provide a secure environment for this and automate the processes of data exchange and/or acquisition as much as possible. At the same time, marketplaces should be as flexible as possible in terms of pricing options and support for various data transfer modes so that data can be delivered in the desired format.

Data shopping refers to the selection and acquisition of internal and external data analogous to a shopping cart that is brought to the checkout. For external data, issues around flexible licensing, purchasing and delivery modes play an additional role. Data shipping refers to the implementation of the delivery methods offered, such as direct download, direct transfer of data to the target environment, handing out digital access keys for the use of APIs or online databases, and many more. Especially in the case of recurring direct provision of data in the target system, the mode of transfer is relevant: Is the data transmitted in portions (batch) or continuously (real-time)?

Flexibility in licensing design and delivery options is a differentiating feature.

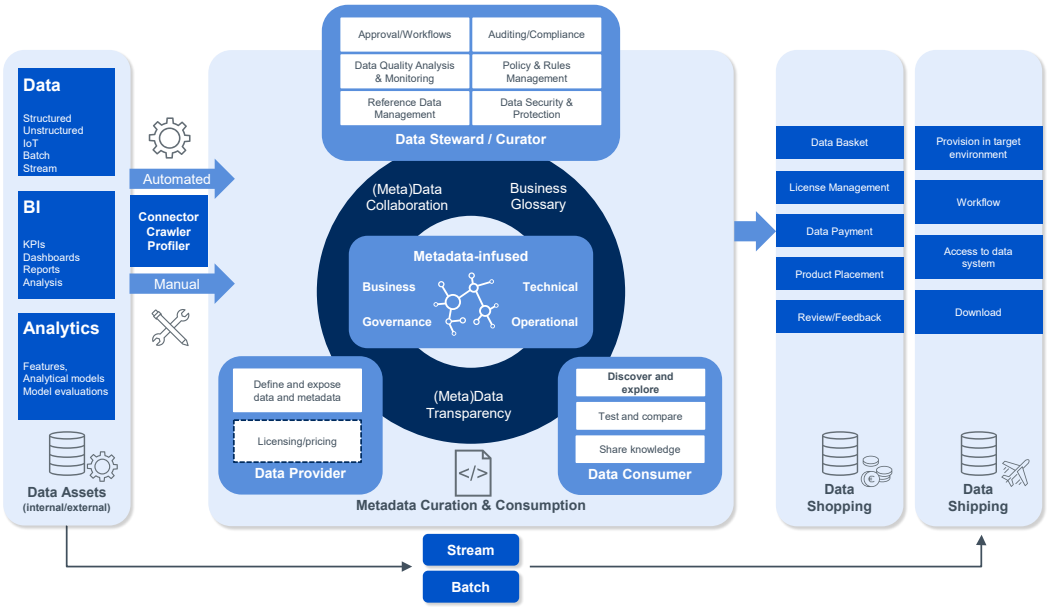

Figure 5: Overview of functional requirements for a data Marketplace marketplace

SAP Data Marketplace

As part of the SAP Business Technology Platform, SAP Data Warehouse Cloud is the environment in which relevant data for analyses, reporting and planning is brought together centrally. Internal organizational data, especially from SAP applications, can already be connected via connectors. In order to make the identification and integration of relevant external data more efficient, easier and more cost-effective, SAP is now also integrating a Data Marketplace.

The SAP Data Marketplace is an integral part of SAP Data Warehouse Cloud.

External data obtained via this can be harmonized with the customer's existing data and is then available for analysis in SAP Analytics Cloud, SAP Data Intelligence and other tools.

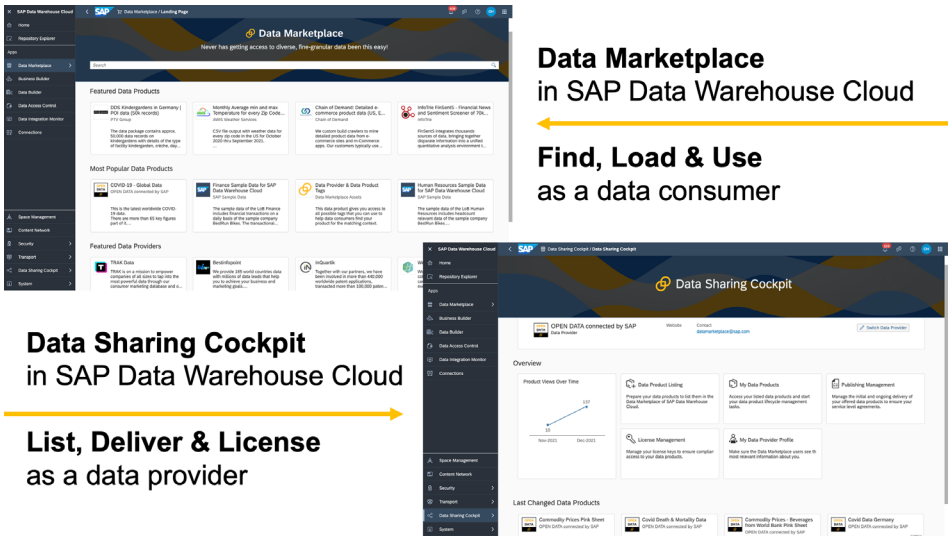

Figure 6: The Data Marketplace offers the possibility of integrated use in SAP Data Warehouse Cloud for data consumers and the Data Sharing Cockpit provides the processes for commercial data producers

The SAP Data Marketplace is an integral part of SAP Data Warehouse Cloud and is available to all users. It offers platform functionality for both data consumers and data producers.

The Data Marketplace is an integral part of SAP Data Warehouse Cloud and is available to all users.

Support for the identification, integration, management and use of data

Finding the right data products

Search functionality and the possibility to filter by numerous categories (e.g., industry, subject area, region, etc.) and properties (e.g., scope of data, price or type of provision) make it easier for data consumers to navigate through the data offering and help them to identify relevant data products. Each data product is described in more detail in a detailed view with additional information (including areas of application, data examples, terms of use, etc.), which is essential for an informed purchase decision. It is also possible to directly contact a representative of the providing company.

SAP Data Marketplaces offers platform functionality for both data consumers and data producers.

Support for purchasing data

The purchase is made either directly via the SAP Store or via the offering company's own sales channel. A license key is purchased to activate the content in SAP Data Warehouse Cloud. After activation and selection of the desired integration environment (Space), the integration of the data including the semantic information takes place automatically. Delivery tracking offers the possibility to transparently follow the data transfer and to choose between an automatic and manually triggered update. Currently, all acquired data is physically replicated in the target environment. In the course of 2022, the option of federated access will be added.

Provision of data in SAP Data Warehouse Cloud

Once the data has been successfully transferred, it can be made available for BI, planning or machine learning via SAP Data Warehouse Cloud's data management functions. For example, using the SAP Data Warehouse Cloud „Intelligent Lookup" operator, the purchased data can be combined with internal data in a rule-based manner in order to enrich the company's own SAP material master with additional external information. This can be done by business users and the result can subsequently be published in the SAP Data Warehouse Cloud internal data catalog in order to make the generated information available to as many users as possible throughout the company.

The integration of new external data no longer requires complex and cost-intensive IT projects. Freed-up resources can now be used for the analysis and harmonization of data.

Support for the distribution of data products

While SAP Data Warehouse Cloud's Data Marketplace facilitates the consumption of data, the Data Sharing Cockpit supports its distribution. Established and emerging data providers can use it to list their data products in the SAP Data Marketplace and thus monetize them directly or indirectly. These are the three most important steps along the way: listing, delivery and licensing.

Established and emerging data providers can use the Data Sharing Cockpit for the distribution of data.

Listing data products

In order to list data products, data providers must first register and create a profile. In this profile, they describe their competencies and select applicable categories. When listing, data products can be showcased by adding descriptions, images, sample data sets and information on price and provision conditions. There are two options regarding the provision of data products:

a. The data provider holds its data in its own SAP Data Warehouse Cloud Space and only needs to select the appropriate artifacts that will make up the data product.
b. The data products are made available outside the Data Warehouse Cloud infrastructure via interfaces, the transfer of files and data carriers or by other means.

Option a results in a deeply integrated data product whose distribution within SAP Data Warehouse Cloud is particularly easy to handle.

Flexibility in data delivery

The provision and updating of deeply integrated data products can be scalably managed and automated via publishing management. Data providers can define here when – and at what intervals – updates of the data are transmitted to all client companies. For example, it can be ensured that updates are only carried out at the subscribed client companies when the data provider itself has completely finished updating its data. This establishes a standardized update process that makes individual agreements regarding data transmission largely superfluous.

Support with the granting of licences to obtain data

Data providers are flexible with regard to the licensing of data products. Licences or generated licence keys can be time-limited and can also apply to several data products. Pricing can be defined for individual products as well as for product groups,

and it is possible to offer certain customers free trial periods and tailor-made contractual agreements.

Data providers always retain full control over their data and only publish their profile and product information in the Data Marketplace area. Data is only transferred between the contracting parties directly and without an intermediate instance after purchase and authentication through the licence key. On the basis of this decentralized architecture - which is particularly important for the European market - the focus is naturally on cross-company data collaboration, which will be expanded in future releases of the SAP Data Marketplace.

Data providers always retain full control over their data.

SAP Data Marketplace Use Cases

SAP Data Warehouse Cloud customer companies can now use the Data Marketplace to enrich their integrated data with information from external data sources. Three scenarios describe how SAP Data Marketplace can be used:

- In the area of supply chain management, linking externally collected risk assessment data from Ubermetrics, for example, can help to identify weak points in one's own supply chain at an early stage.
- Companies within a supply chain or an economic ecosystem can also exchange relevant data directly with each other via their SAP Data Warehouse Cloud instances (B2B data collaboration).
- For individual cooperation between companies, the Data Marketplace can also be used bi-directionally, so that a customer company first transmits its data to a data-producing service company in order to obtain new information or machine learning predictions based on its own data.

The above examples all involve data from external companies, but it is also possible to transfer data between environments (spaces) of an SAP Data Warehouse Cloud instance (tenant) via the Data Marketplace or between instances of a group and its subsidiaries. In these cases, the Data Marketplace can function both for the acquisition and integration of external data and for data exchange within a company or group structure - as an internal Data Marketplace, so to speak. Within the SAP ecosystem, the Data Marketplace can thus form a central technological interface for data access according to modern concepts such as Data Fabric.

Data Marketplaces can support a wide variety of use cases.

Who can distribute data via the Data Marketplace?

First of all, all companies with an SAP Data Warehouse Cloud instance can register as a data provider, enter a profile and list products. However, it is also possible to market data products in the SAP Data Marketplace without having an own instance. For this purpose, data providers can participate via the SAP Data Warehouse Cloud instance of a content aggregator. Content aggregators integrate the data of several data providers via interfaces and broker their data products via the SAP Data Marketplace. In this way, the largest data commerce platform ‚Datarade', for example, can offer its more than 2,000 listed data providers a listing in the SAP Data Marketplace.

In addition to data providers, content aggregators can also use the SAP Data Marketplace.

Functional categorization of the SAP Data Marketplace

The SAP Data Marketplace functionally supports the procurement and direct provision of external data within SAP Data Warehouse Cloud. The available data offering is growing continuously and currently already includes over 77 providers and more than 3,000 data products. The tool completes the SAP portfolio and joins the ranks of the existing SAP Catalog solutions, which focus primarily on the internal use of data. Under the working title „One Catalog", SAP plans to merge the various solutions into a comprehensive SAP Catalog in order to provide users with uniform access to data and the associated knowledge.

The SAP Data Marketplace offers data providers and data consumers a similar range of functions as solutions from competitors on the market. The most striking differentiating feature is the provisioning of data, as acquired external data can be automatically integrated into a SAP Data Warehouse Cloud instance and can be combined with other data in the data warehouse such as from Intelligent Suite or LoB applications immediately to enable new use cases. However, smooth data exchange is only possible if both data providers and customer companies have their own SAP Data Warehouse Cloud Instance. Data providers who do not wish to acquire their own instance can still offer their data via the SAP Data Marketplace without the facilitation of data integration. SAP does not focus on specific data types such as private, IoT or B2B data, but is open to all data.

The main advantage of the SAP Data Marketplace is the simple data access via SAP Data Warehouse Cloud.

The data providers listed in SAP Data Marketplace are largely certified commercial companies that can guarantee high data quality. Quality checks are not carried out by SAP before and during the process of publication, which will become important in the medium term for the evaluation of the large number of data products. The number of data providers is still small compared

to the competition today, but is building up very quickly. The danger of the SAP Data Marketplace quickly becoming a confusing place is addressed on the roadmap with the option of visibility control. This enables data providers to limit the visibility of their products to individual companies or groups and thus to use the Marketplace for dedicated data shipments. However, it would be desirable to facilitate the provision of instances for data providers to enable them to access the Marketplace more straightforwardly.

Differentiation between SAP Data Marketplace and data catalogs

A closer look at the software market reveals another promising technology approach for accessing external data: A data catalog with integrated shopping functionality. But how does the SAP Data Marketplace differ from a data catalog?

Data marketplaces and data catalogs have a good deal of functional overlap.

At first glance, the functional overlaps are significant. However, while data marketplaces mainly support search, acquisition and integration of external data, the functions of a data catalog focus more on the internal organization and management of data. Accordingly, data marketplaces tend to satisfy the need to acquire external data, while data catalogs are more focused on providing knowledge and information about existing data and enabling access to it.

Data marketplaces focus on the acquisition of data, whereas data catalogs primarily support the exchange of knowledge about data.

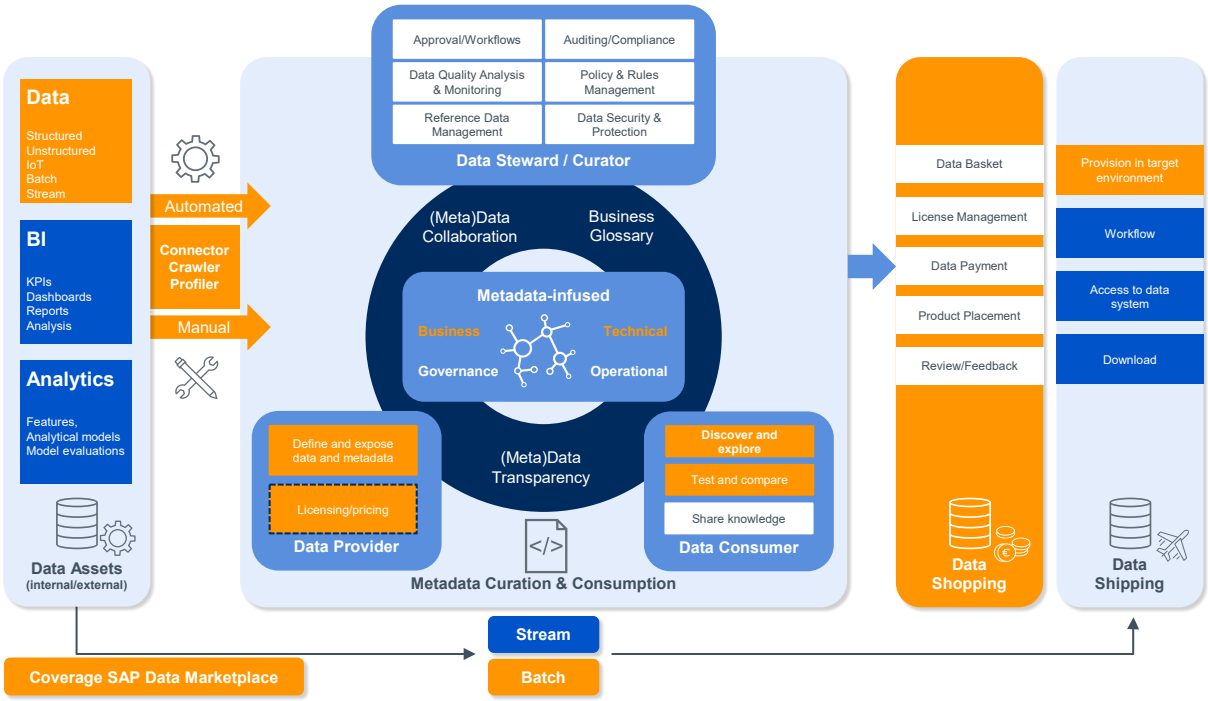

Figure 7: This figure shows the functional coverage of SAP Data Marketplace. The SAP Catalog tools mentioned in the context of SAP Data Intelligence, SAP Data Warehouse Cloud and SAP Analytics Cloud would clearly complement the maximum marketplace requirements shown.

Data shopping can be understood as a functional extension with which external data can also be made available. Data marketplaces are usually ahead in the transmission of data (data shipping), as data catalogs do not support the allocation and management of licenses or only in a rudimentary way. The strengths of data catalogs, on the other hand, clearly lie in the area of data collaboration and the enrichment of metadata.

Figure 7 shows the main differences between the two technological approaches.

	Data Marketplaces	**Data Catalog**
Target	Data product trading, data monetization	Inform about data, share knowledge about data, reduce data silos
Data	Focus on external data products, but can also be used for internal data	Focus on internal data objects, but external data can also be integrated
User	Buyer<>Provider	Data producers, data curators, data consumers
Content	Data as an isolated, finished, quality-assured product; Provider maintains metadata	Functional and technical description of data objects and their relationships in the enterprise context; central maintenance of metadata up to support for the inclusion of crowd wisdom
Metadata connectivity	Often upload, no direct connectivity to metadata source systems required	Connectors for (automated) extraction of metadata and analysis or metadata generation
Data exploration	Search in data products	Search in data and corporate knowledge, exploration thanks to data relationships
Collaboration	Communication support between buyers and suppliers	Collaboration between data users
Data transparency	Transparency with regard to data origin and nature	Transparency with regard to data origin, nature and use/relevance in the company (active metadata)
Data governance	Data governance functions are only rudimentary	Data governance functions, such as data stewardship support
Data delivery/ access	Protected data delivery, optionally via marketplace or direct buyer-provider relationship	To implement via workarounds
Purchasing	Payment transactions and license management	To implement via workarounds

Figure 8: A comparison of data marketplaces and data catalogs

Convergence between data marketplaces and data catalogs

It is becoming apparent that the demarcation between these two approaches will be further softened in the future in favor of a comprehensive central interface for the exchange of data. This development follows the guiding principle:

The next logical step is the integration of data marketplaces and data catalogs for comprehensive data access.

Data and information about it must be made available in such a way that it can be found and used intuitively and easily.

SAP and other providers of data catalogs have already created the necessary conditions for this by paving the way for cross-company data exchange through the step into the cloud. Some providers have already been able to establish data communities in which the exchange of and about data is the connecting element.

Such a holistic access level for all data products has not yet been fully realized by anyone and remains a vision for the time being. Data marketplaces are not a new phenomenon but are becoming increasingly relevant in the context of data democratization, data fabric and data mesh. The focus here is on functional requirements in relation to the acquisition and integration of external data. Numerous provider companies in the data and analytics world are driving the development of this area. However, it should be noted that no breakthrough has yet emerged that offers data consumers an adequate overview of the data on offer. Different data products are still spread across countless marketplaces and data sources that are not consolidated. It is still difficult for users to find suitable data and the ability to identify relevant data and use it quickly is increasingly becoming a key success factor for companies.

Data is distributed across many marketplaces, so it is challenging for users to find the data they need.

Application examples for the SAP Data Marketplace

Sales departments evaluate and address market potential holistically

Sales departments should align and prioritize their budgets and activities based on their target group's structures, opinions and expectations. The Data Marketplace in SAP Data Warehouse Cloud enables the linking of internal and external as well as quantitative and qualitative data. The following example describes this using a company looking to validate the attitude of its customer base towards e-mobility in order to derive insights into growth and change potential and to optimize sales management in a data-driven manner.

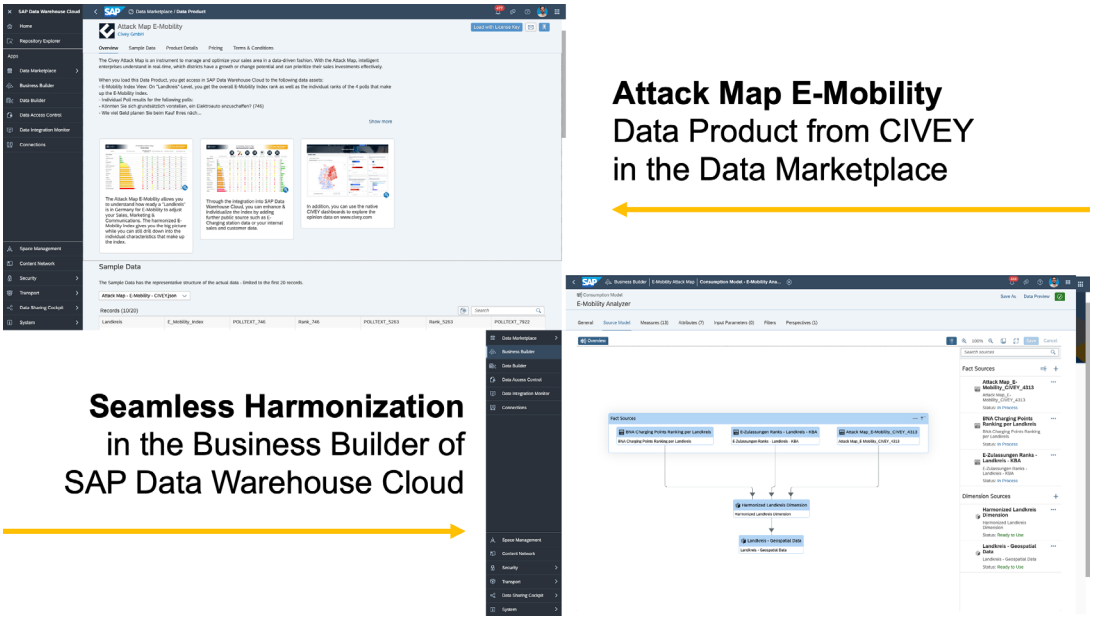

Figure 9: Data Marketplace in SAP Data Warehouse Cloud enables the linking of internal and external as well as quantitative and qualitative data.

The sales structures with the internal, quantitative sales information from connected SAP and non-SAP systems serve as the starting point. This includes, for example, sales regions, turnover and number of customers. For the external data, the data provider CIVEY now comes into play from the Data Marketplace. CIVEY is the German market and technology leader for opinion data. In this application example, CIVEY provides information on willingness to buy and innovation in the area of e-mobility at district level. An example of this would be data on customer satisfaction in relation to the local charging point infrastructure. In order to identify whether there is actually a poor infrastructure or simply a lack of information about it that leads to poor ratings, public data from the Federal Network Agency and the Federal Motor Transport Authority is also included in the application example.

In this way, internal data is linked and harmonized with quantitative and qualitative data. On this basis, a holistic index can ultimately be created that provides sales managers with a regional overview of potential and obstacles for sales growth. In the example, sales areas were identified whose local infrastructure was perceived to be worse than it actually was. Targeted information campaigns led to an increase in growth potential.

Supporting human resources departments with external data

The consulting firm PwC already offers its clients data products based on the SAP Data Marketplace. Saratoga, for example, supports HR decisions by providing external HR benchmark data.

The integration and provision of external data within internal processes is one of the most complex challenges in the discipline of data management. Only those companies that can use external data in a meaningful and beneficial way will benefit from it. The need for information increases in all areas, as it were, with the number of relevant data sources. Solutions that allow quick and easy integration and use of data are therefore in demand. This is precisely where the SAP Data Marketplace comes into its own and was therefore selected after evaluation for the implementation of Saratoga, the PwC data product.

HR departments often need to compare their performance with other (competing) companies by means of benchmarks. Such a comparison allows conclusions to be drawn about relevant factors for successful recruitment and increasing employee

satisfaction, which can help optimize HR management. The integration and use of such data was previously very cost-intensive and required the implementation of complex and lengthy process steps (data transfer, definition adjustment, data manipulation, data integration). With SAP Data Warehouse Cloud's Data Marketplace, benchmark data, such as PwC's Saratoga, can now be integrated into a customer's SAP Data Warehouse Cloud Space in just a few steps. In some cases, the enriched data can be integrated independently into company processes by the specialist departments, as its complexity has been sufficiently reduced. In this context, PwC clients greatly appreciate the „Graphical View" and „Intelligent Lookup" functions, as they can be used to harmonize and integrate data in a particularly user-friendly way.

A wide range of connection options for other data sources and the provision of standard content by SAP ensure that PwC's many years of experience and the broad knowledge base it has generated can be incorporated in the creation of data models and processes. But logic and models developed in-house can also be shared with ease. By enriching their own data with external data, companies can generate new insights and use them profitably.

Empower finance departments to do independent data work

While the previous application examples addressed the integration of external data, the following one focuses on the internal use of the SAP Data Marketplace. Due to SAP's strong market position in the finance and controlling sector, such an application example is particularly relevant. The aim here is to provide analysts with processed data from the internal systems of central units and enable them to individually supplement, calculate and evaluate this data in a decentralized manner.

Through the SAP Data Marketplace, the bottleneck of centrally organized provision can be circumvented and data consumers are given greater freedom for flexible data use. Data producers can benefit from all the functions for monetizing data in the Data Sharing Cockpit. For example, data products can be enriched with images, sample data and documentation and made transparently available to internal data consumers for further processing. If a company wants to subsidize the provision of data internally, SAP's license management functionality can be used and the release regulated by the respective data producers. In the example, analysts can enrich centrally provided planning data with their own decentralized data from Microsoft Excel within the SAP Data Warehouse Cloud Space. Data does not have to be exported, nor is a central IT project required to implement the departmental requirement.

Data marketplaces as a portal to the world of data

The competitive advantage for companies that have relevant data and can use it efficiently will continue to grow. Complex data landscapes and a lack of transparency are the main reasons why data access is one of the biggest challenges in gaining this competitive advantage. The increasing diversity of data products and their sources, as well as the need of business users for self-service and flexible access to data, further increase the requirements to be met.

In a perfect world, all data is easy to find, quick to obtain, easy to integrate and intuitive to use. Such a world remains a dream, but work is already underway to make it at least partially a reality. In particular, concepts such as data fabric and data mesh provide viable approaches to address the challenges of heterogeneous data landscapes and provide a central access layer for them. Such access layers are usually realized through technologies that support the finding, understanding and use of data. Therefore, technologies that facilitate and thereby promote the integration of external data and/or the internal exchange of data are particularly interesting in this context.

In a perfect world, all data is easy to find, quick to obtain, easy to integrate and intuitive to use.

Data access layers are usually realized through technologies that support the finding, understanding and use of data.

In addition to data catalogs, data marketplaces provide a promising technological approach. Data catalogs primarily support the exchange of knowledge about data, while the principal aim of data marketplaces is to make it easier to obtain internal and external data. These two approaches generally have significant functional overlaps and there is much to suggest that they will continue to merge into an overarching access layer for external and internal data in the future. As a portal to the world of data, such an access layer could enormously increase the speed and efficiency of data integration and use, as well as considerably simplify the implementation of new use cases.

Data Catalogs and marketplaces generally have significant functional overlaps and there is much to suggest that they will continue to merge into an overarching access layer for external and internal data in the future.

SAP is also pursuing this goal. The SAP Data Marketplace, as an integral part of its Business Technology Platform, complements and expands SAP's existing analytics portfolio. Its close integration with SAP Data Warehouse Cloud enables the direct and simple provision of data. This is particularly exciting in SAP S/4HANA transformation projects, in which SAP's cloud data warehouse already offers the possibility to draw analytical benefits from the data during the transformation. Through the option

of enriching SAP data with external data via the SAP Data Marketplace, transformation projects simultaneously offer an opportunity for the implementation of new application scenarios as well as for more extensive analyses.

In general, we see that the relevance of technologies for easy data access is increasing and generating demand. The main target group are professional users, such as business analysts or data scientists, who generate concrete added value on the basis of data. This requires a technological basis for collaboration with data that can realize the democratization of data. Technologies that can also guarantee this for external data open up new potential and competitive advantages. However, a confusing and non-transparent data supply and complex processes for accessing data are still real challenges for companies. The further development of data marketplaces and data catalogs and the increasing merging of their functions gives us hope that the portals to the world of data described above will soon become reality.

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