



What can proper Data Management do for you?

Sofy Data Management Whitepaper



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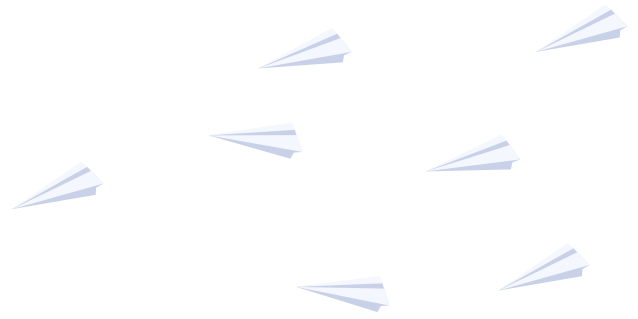
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What can proper Data Management do for you?



In today's world data has transformed from a buzzword to a strategic asset. Research has shown (e.g. Nam, Lee & Lee, 2019) that good data management plays a key role in creating value for businesses. In addition, one [recent survey](#) showed that 83% of all businesses participating in the survey see data as an essential part of their strategy. Despite these high numbers, 69% of the respondents indicate that inaccurate data is hindering their efforts (Rosenstein, 2019).

Thomas Redman wrote an article about the cost of bad data in Harvard Business Review 2016. According to this article, bad data might have cost the U.S. economy USD 3.1 trillion in 2016 alone. Following Moore's and Butter's law, it is concluded that the amount of data in businesses has exponentially increased over the last four years. This means that the cost of bad data has increased in more or less the same way. Although perceptions about the economic costs of bad data differ per organization and case, perceptions published in a recent Gartner study, state that on average bad data quality is expected to cost each organization approximately USD 15 million per year.

As there are such significant costs associated with using bad data, there are also certain solutions to help businesses tackle these costs. Although these solutions might differ in nature, most of them aim to properly manage data. The purpose of this whitepaper is therefore to elaborate on the effects of proper data management on business. To illustrate these effects, we will apply KPMG's Sofy Data Management Suite and the Advanced Data Management (ADM) framework.

But first, let us explain a little bit of the context of data management, what are common types of data, appropriate data categories, and the roles needed for effective data management.

Different Types of Data

To start off we need to identify the different types of data. In general there are three main types of data: structured data, unstructured data and semi-structured data.

Structured data is data that is most convenient to organize and search. The reason for this is that it is contained usually in columns and rows and its elements can be mapped into pre-defined fixed fields (Marr, 2019). An example of structured data is an Excel sheet or records in a database. Here the data is ready-to-analyze and stored in a clear, comprehensible manner.

Second, Marr (2019) talks about unstructured data. Unstructured data is the complete opposite of structured data. Although harder to analyse, [90%](#) of the data in the world is characterized as unstructured. Examples of unstructured data are open-ended survey responses, images or PDF files.

The last data type is semi-structured data. As the name implies it can be seen as a mix of structured and unstructured data. This is the case in for example an e-mail. In an e-mail, there are elements of both structured and unstructured data. It is partially structured data in the form of the time sent or the e-mail address of the sender. However, the actual content of an e-mail is unstructured.



Data Categories

Within these three main types of data there are also certain data categories (McGilvray & Thomas, 2008). These are master data, metadata, reference data and transactional data.

How your organization deals with master data is an important aspect of a good data management strategy (we will talk more about this further in this white paper). Master data is data that typically describes the places, things and people that are involved in an organization's business. As these data is often utilized by many actors in an organization's IT systems and business processes, it is best to standardize the format of these master data and to synchronize values that are critical for successful system integration (McGilvray & Thomas, 2008). Furthermore, master data is almost always structured data.

A second data category is metadata. As described by McGilvray & Thomas (2008), metadata is actually "data about data". It characterizes or describes other data and facilitates the process to retrieve, interpret or use information. There are multiple types of metadata such as metadata describing business context (in which process is this data used, or who is its business responsible owner) or aspects in relation to aspects of compliance (is this data personal identifiable information, or do we use this data for financial

reporting). More specifically; a data's metadata describes, irrespective if this data is a spreadsheet, a web page, a photograph, or a video, its context.

The third category is reference data. These are sets of classification schemas or values that are referred to by reports, processes, applications, data stores, and systems as well as by master and transactional records (McGilvray & Thomas, 2008). This data is typically much more static (unchanging) compared to master data. Examples include country names, postcodes and language abbreviations.

The last data category is transactional data. Transactional data is described as "data that describes an internal or external event or transaction that takes place as an organization conducts its business" (McGilvray & Thomas, 2008). Examples of this are credit card payments, invoices and sales orders. These are then grouped into transactional records that include and link associated reference data and master data. As for example a sales order contains both structured and unstructured topics. Transactional data can be perceived as semi-structured data.

Data Management

Data management is the development, execution and supervision of plans, policies, programs and practices that control, protect, deliver and enhance the value of data and information assets (KPMG, 2020). It is one of the most complex and expensive challenges facing organizations today. Businesses that are able to manage their information most effectively, to shift the institutional consciousness, and to begin to view data as an asset may gain a competitive advantage. Businesses that are unable to manage their information effectively may not only miss out on critical insights but may spend more than their competitors on data cleansing efforts and issues arising from bad data.

Many organizations are becoming increasingly frustrated with the overhead and inaccuracy associated with manually assembling inconsistent, redundant, and outdated data sets. As a result, they are demanding a new generation of data management solutions. These new and innovative solutions convert hundreds of structured, unstructured, and semi-structured data sources into an organizational data asset that can be shared across the enterprise and with third parties. KPMG has developed the [Sofy Data Management](#) solution to address organization's data management issues across three different topics:

- ▶ Data Governance
- ▶ Data Quality
- ▶ Master Data Management

Sofy offers solutions in line with the reasoning of the ADM framework. This framework contains 11 topics which are all set to serve our clients best and increase their effective data management, of which four topics we cover with our Sofy Data Management solution.

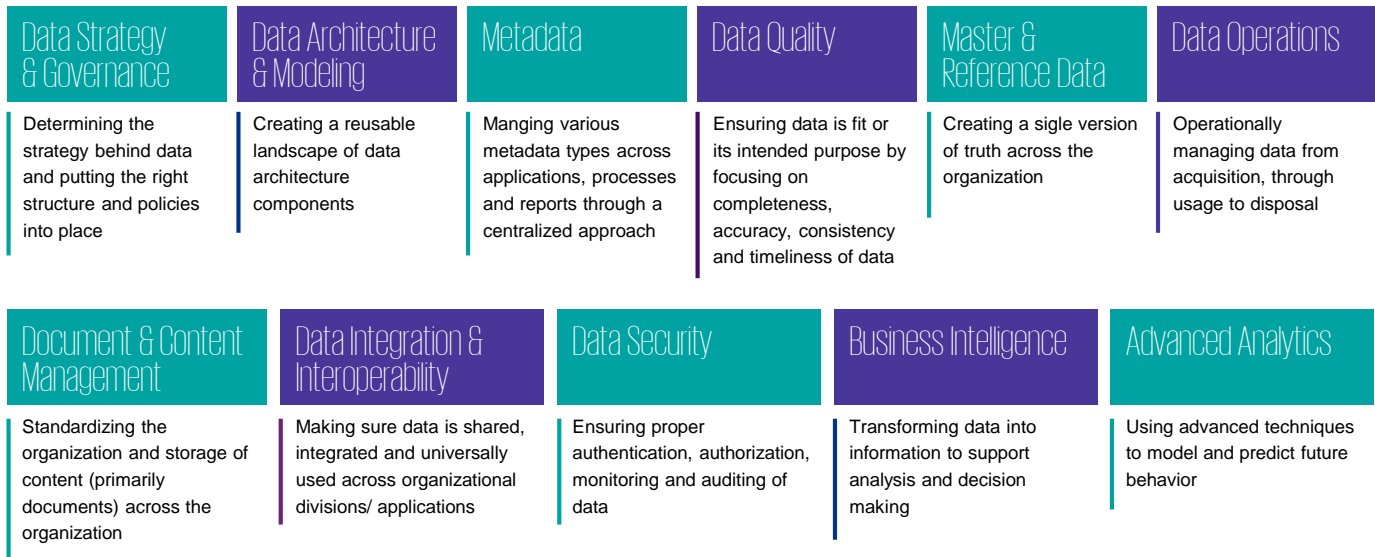
Within this framework, the first topic that requires attention is determining your data strategy and putting the right governance and organizational structures and policies into place. The second topic is metadata management, which includes the identification of data and documenting definitions, classifications, owners, stewards and data quality standards. For these two topics Sofy Data Governance comes in handy. By using Sofy Data Governance we can set the norm for your data and create a guideline for all your data practices.

As we have set the norm for the data, we can check how the real-world data behaves. There is always a difference between how you want your data to behave and what actually happens. The third topic in the ADM framework is therefore data quality. This is about ensuring that data is fit for its intended purpose by focussing on completeness, accuracy, consistency and timeliness of data. Sofy Data Quality does this for example with the data profiler, which creates insights in your data by means of statistical information such as number of attributes, data types and null/dummy variables. In combination with the Data Governance solution it is then possible to redefine your data and set (additional) data quality rules.

Lastly, we look at the Master Data and Reference Data topic in the ADM framework. These types of data are among the most important within your organization. In addition to Data Governance and Data Quality, Sofy Master Data Management controls and organizes the processes surrounding your master and reference data records. Moreover, Master Data Management provides you with one clear flow of your data to create a competitive advantage based on better practices.



Figure 1 – ADM Framework



Source: [Hoffman \(2020\)](#)

The importance of proper Data Management

In order to best understand why data management is needed, we need to talk about its value-adding capabilities. With proper data management in place, a company for example improves the quality of their data from any source, tracks where the data is stored and to what extent it is coherent, and centralizes and streamlines data processes to increase efficiency and lower burdens. Furthermore, data management offers the tools to deal with and improve bad data.

Bad data is an inaccurate set of data (Bhatt, 2018). It includes wrong information, inappropriate data (e.g. data entered in a wrong column, missing data, duplicate data, non-conforming data, and poor entry). As mentioned in the introduction of this whitepaper, there are significant costs associated with bad data. The numbers mentioned are based on hidden data factories (further in this white paper) and cost-driving activities such as data cleansing processes. To make this a little more concrete we illustrate this with an example.

A delivery service works with three warehouses. As certain products are stored in one of the three warehouses, depending on your order, you receive products from one of the three warehouses. Say that warehouse A has received an address change from a consumer but due to bad data management does not communicate this well to their shared source system. This means warehouse B and C (depending on the order) deliver the product to the wrong address. Let's assume that a wrong delivery and therefore the costs of reverse logistics are EUR 5 per delivery. If this happens 1,000 times your company already loses EUR 5,000. To prevent these unnecessary expenses from happening, companies use [proper Data Management tools](#) (among other things) to be ahead of bad data at all times.

Data as an accelerator for businesses

Data can also be used as an accelerator for your business. More specifically, data can be a strategic asset used to drive smarter decisions, improved customer service and power new operational efficiencies. In our experience, proper data also has its impact on compliance-related topics and processes. The volume of data present throughout organizations today presents a vast amount of challenges and new opportunities to support business growth to new heights.

The way a company manages its data is a reflection on what the company values, even more relevant when multiple source systems are used to maintain data that is or can be combined. For instance, if the company always puts the customer first, this will likely mean that the data surrounding the customer is of better quality. The end result is the customer's orders are delivered to the right location because the sales and shipping department both have accurate addresses. The customer can be contacted more quickly in the event of questions or problems because the phone numbers and e-mail address are up-to-date. As a result, marketing campaigns can be more effective and less bothersome to the customer because information is shared across the business units and efforts are coordinated.

Moreover, organizations with mature data management focus also tend to run more efficiently. They spend more time making well-informed decisions and less time cleaning bad information. A study conducted by the Massachusetts Institute of Technology and IBM has shown a strong correlation between firm performance and data-driven management, significantly increasing measures such as productivity, return on equity and market value (Brynjolfsson, Hitt, & Kim, 2011). Companies that integrated data in their business operations clearly outperformed their less adapted competitors, overcoming hurdles and seizing opportunities with more ease (LaValle, Lesser, Shockley, Hopkins, & Kruschwitz, 2011).

Data Management challenges

Proper data management also faces several challenges. One example of such a challenge is that data comes in a variety of forms all across the organization. Finding a single data source that contains all the information required for reporting in a (large) business is extremely rare, so combining different source systems is required to obtain valuable information. According to Brynjolfsson et al. (2011) a clear positive relationship exists between data-driven management and the overall performance of organizations. It is important to first recognize the types of information that are needed to meet organizational needs followed by a discussion about how to properly manage this data.

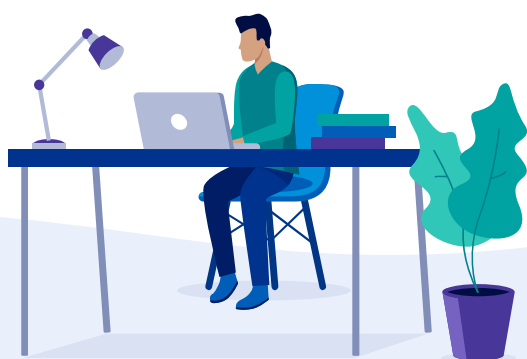
A second example is data integration. Companies that integrated data in their business operations clearly outperformed their less adapted competitors, overcoming hurdles and seizing opportunities with more ease (LaValle et al., 2011). This is one of the most critical and expensive aspects of any data management solution. To effectively use data different purposes it should be integrated at an enterprise level from a variety of internal and external sources. These sources include both structured and unstructured data. The integration processes typically present a wide range of data integration challenges that can result in high development costs, extended project timelines and high maintenance costs once the solution becomes operational. To work through these challenges in a cost-effective manner, the business and IT groups need to cooperate effectively. The business should develop a set of global requirements that the data management solution is tasked to fulfil. As a result, the technical organization should build a flexible data integration architecture based on those requirements that offers a broad set of technologies and tools to create customized fully integrated solutions.

Implementing effective Data Management

With this being said, how do you begin to strategically plan your data management practices? Like any other major new initiative, you want to begin with an assessment of your existing measures.

Data management suites/programs are not a one-size-fits-all idea; data management is specific for your organization and processes. You may have different offerings based on your business niche and the size/type of data that you need organized. Take a look and see how you currently organize and store your data, and what types of issues your team is currently facing. Make sure you reach out to all relevant teams as well, from sales to marketing and from IT to leadership. They may all see different issues that data management can help address.

After you have done that, you can begin to put together a vision of what you exactly want to accomplish with your data management strategy. It is easy to say 'I want better data', however that is not a true vision. A true vision in business is an ideal that you create a concrete path for. A more adequate response in this case would be saying that you want the data to be better connected to daily operations. When you go to a data software provider, this is something clear that you can substantiate. If you cannot do this, how can you expect them to help you? Try and think back to your original business goal and figure out how data can help to accomplish that goal. That is a good way to create a data [vision](#) that aligns with your general company vision.



Data Governance

Data governance is the process of managing the security, integrity, availability and usability of data across a company's system landscape. It is based on internal data policies and standards that control data usage (Rouse, 2020). It is about executing the strategy behind the data which is executed by putting the right organizational structure and policies into place. But why is it such a crucial part of the data management equation and so important for creating above-average performance?

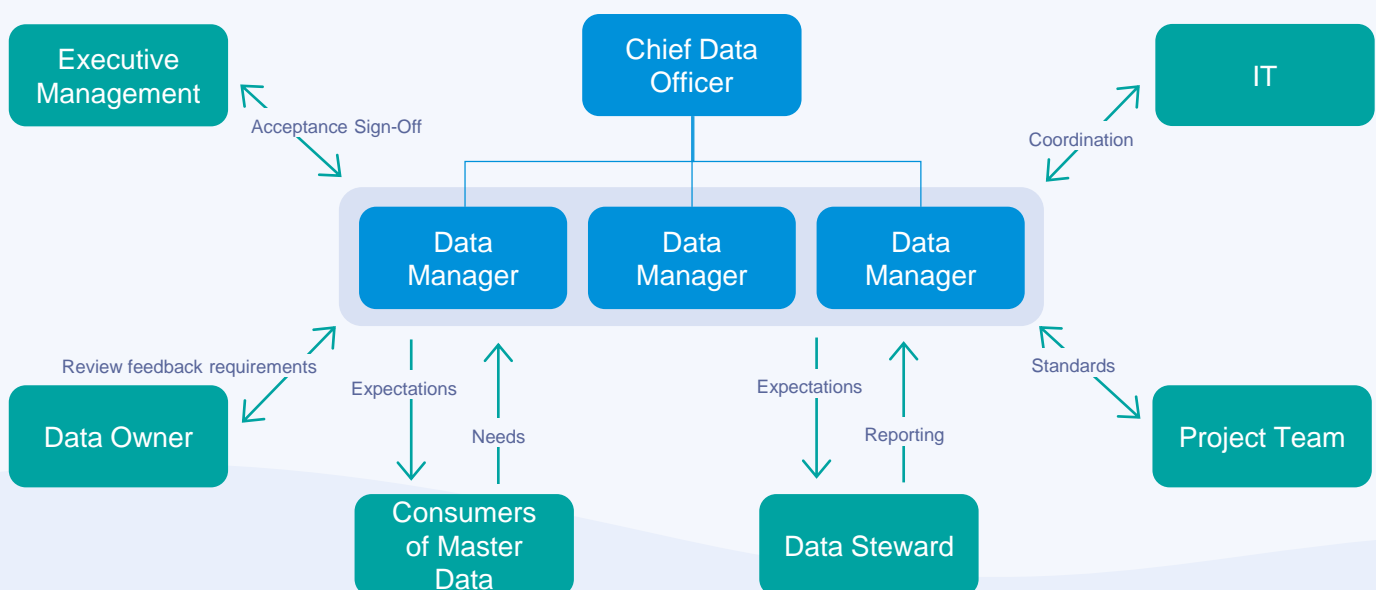
According to the ADM, data strategy and governance is the first step in attaining successful Data Management. This is backed up by Verhoeven (2020) who stated "good data management starts with good data governance". The reason for this is that one important goal of data governance is to break down data silos within a business. As these silos build up when there is no centralized coordination or enterprise data architecture, data governance aims to harmonize the data in those systems through a collaborative process (Rouse, 2020). Moreover, the benefits of data governance include increased access to needed data for analysts, lower data management costs, and improved data quality (more on this in the next section).

To achieve proper data governance it is important to think about the governance structure. Ideally, the governance structure is created within the business (figure 3). In larger organizations where information is viewed as an asset this is typically an executive level role. Although not quite common yet for mid-size & small corporations, larger corporations have created the role of the Chief Data Officer (CDO). This role has the responsibility for managing the enterprise data asset. This requires a mix of business, strategic, technical, and entrepreneurial skills. All ownership and accountability for the enterprise data set rolls up to the CDO but not the responsibility as this resides in the business. Note that data quality does not fall under this roll-up. This is because the quality of the data sometimes resides with the owners of the source systems from which the data originates (DalleMule & Davenport, 2017).

But how does it work when there is no data governance in place? With no data governance (or bad data governance) in place, certain issues can arise. An example of this is that in customer service, sales and logistics systems supplier names might be listed differently. Such an inconsistency could create a data integrity issue that affects the accuracy of analytics applications, business intelligence (BI) and enterprise reporting. Also, this could complicate data integration efforts (Rouse, 2020).

With a proper data governance tool in place, such as Sofy, such issues are none of your business. It allows you to view data as a strategic asset instead of a reactionary liability. Sofy Data Governance improves and maintains data governance standards and policies. It ensures that clear policies are set, which define how data should be handled, so that it can be provided to the end-user in high quality, with consistency and accuracy. For example, with the use of the data lineage editor it is possible to follow your data to the source. By doing so, you can track potential mistakes or look what the impact of a change will be. Moreover, good data governance sets the norm for a solid data quality assessment.

The model depicted in this section is illustrative and should be tailored to meet the needs of each organisation. In some cases, virtual data governance is necessary (as is the case when outsourcing). In these cases, it may be necessary to implement a dual governance model that relies on local management which reports to a central function that meets regularly to refine and propagate standards.



Data Management roles

To address these challenges and to create an effective data management strategy there are several functions in a successful data management organization. These functions are a mix of business and information systems roles and responsibilities (DalleMule & Davenport, 2017). Key functions include:



CHIEF DATA OFFICER

A Chief Data Officer (CDO) has the overall responsibility for the data environment; seeks new ways to leverage data as a source of competitive advantage; interfaces with executive management on data management issues and initiatives.



DATA OWNER

A Data Owner authorises access to the data under his/her control; is responsible for its accuracy and integrity, validates changes to their information, signs off on proposed updates that impact his/her data.



DATA MANAGER

A Data Manager is responsible for leading the execution of data maintenance processes and adhering to / reporting on data maintenance key performance indicators (KPIs) and service-level agreements (SLAs); managing day-to-day activities in one or more functional areas; works with the Chief Data Officer on initiatives to leverage data as a source of competitive advantage.



DATA STEWARD

A Data Steward performs data maintenance activities (e.g., add, update, remove) and monitors the environment for potential data issues.

These role descriptions may be used as a starting point when developing roles and responsibilities. A greater level of detail should be documented when developing the full Data Management Plan; any critical touch points that exist between the people and the processes should be clearly documented and accountability should be assigned to promote follow through and compliance. The roles within the data management organization and all supporting business functions should directly support and further the entity's mission, goals and objectives (Rothwell et al., 2017). The maturity of the data management organization is directly related to its effectiveness in doing this.

Data Management processes

After the business processes models have been developed the data management processes leveraged by these business processes can be developed (Staaïj & Tegelaar, 2017). There are at least four elements relevant to data management processes:

1. Data Migration and Integration

The data migration and integration process is where data from legacy and/or external systems is collected, cleansed, mapped, transformed, loaded and integrated into the information architecture. For this process to run successfully, the data cleansing routine should be documented in detail and be operational. The cleansing process removes duplicate and obsolete data, documents and in many cases even corrects errors in the data. The mapping task within this process identifies and remedies any gaps in the incoming data. Finally, the conversion and loading process performs the translation and verification routine before the data is loaded into the system.

2. Data Maintenance

Data maintenance is the ongoing addition, synchronization, updating, and removal of the data definitions with the company's business processes, roles, service-level agreements (SLAs) and automated processes. A company's change control process is often where these elements are documented.

3. Data Quality Assurance and Control

Data quality focuses on managing and reducing the errors in the enterprise data set. In a broader sense, data quality may be viewed as the level of correctness, consistency, completeness and integrity of the data. This process focuses on the control and reduction of errors while data move through information systems. A good data quality process should have strict control measures in place, not only to assess and correct errant information, but also to continuously improve the quality of the entity's data.

4. Data Archiving

Data archiving is easy to understand conceptually, but it is difficult to come up with a single enterprise-wide policy for archiving, especially for multinational companies. Many archiving requirements are driven by legal, tax, and audit regulations, not business need. Before adopting a data archiving process, clearly defined functional and technical specifications are needed to make the stored data easy to find and retrieve when necessary. Additionally, consultation with legal counsel may be prudent about the proposed policy before it is placed into operation.

Listed above are four of the several relevant elements to a data management strategy. However, a data management strategy only provides value for a business when there are proper tools in place to support the vision. Such tools offer a great piece of the value created as they ensure proper data governance, data quality, and master data management.

Data Quality

As stated by Merino et al. (2016) in their research about data quality and big data: data quality is essential to decide about the suitability of data for intended uses. This refers to the garbage-in-garbage-out (GIGO) principle. This states that every piece of garbage input you use also results in a piece of garbage output. The business implications of this are that whenever your data quality is not sufficient, you will lose out on business opportunities and face higher business costs. Gartner (2018) researched for example that poor data quality is on average responsible for USD 15 million per year in losses for the average business.

The costs of doing business increase as data quality is not on point. The reason that bad data increases your business costs is that many people working in a company's value chain must accommodate it in their everyday work (Redman, 2016). As these employees incorporate for example bad data cleansing in their everyday work, it is both time-consuming and expensive for a company. In general, most people solve the bad data issue themselves rather than look for the root cause of the bad data generation. This ensures that the bad data process will keep happening over and over again.

Redman (2016) talks in this case about 'hidden data factories'. These are added steps in the value adding process where people in the next stage of the process do not only have to do their own work, but also deal with the consequences of errors based on bad data from the previous stage (e.g. packages sent to the wrong address or angry customers). More specifically, issues arising from hidden data factories are that data scientists spend a lot of their time on cleaning data or that C-suite executives hedge their plans because they cannot rely on the numbers received from their finance department.

Given the negative effect of bad data on business performance, several solutions and frameworks have been developed over the last few years to improve data quality. As mentioned before [KPMG's Sofy Data Quality](#) solution based on [the Advanced Data Management](#) framework (ADM) is there to guide companies in managing their data. Here is a little preview of how this works:

After governing the data (as explained in the previous paragraph) it is time to assess the quality of the data. Using a data profiler Sofy creates insights in your data by means of statistical information such as number of attributes, data types and null/dummy variables. With this knowledge of for example a supplier data set Sofy assesses and measures your data quality. Then, it is time to identify business rules based on all the knowledge gained from the data profiler and data quality assessment. This process links back to the previously explained data governance solution as it is time to alter for example definitions or assigning new stewards.

In conclusion, by increasing company data quality companies will engage less in unnecessary expenses and improve the efficiency of their value chain which will result in an overall increased performance.



Master Data Management

Master data management (MDM) is the set of processes, procedures, and tools that collect, define, manage, and distribute the key pieces of business information that comprise the master data lists. It works to help promote that the business does not use multiple and potentially inconsistent versions of the same master data in different branches of its operations. The goal is for maximum consistency and control in the ongoing preservation and use of this information.

Master data elements may be found throughout an organization. Some of the more commonly seen ones are: Item Master, Vendor Master, Customer Master, Material Master, Employee Master, GL Master, Catalog Master, Contracts Master, and Counterparty Master. These elements span several functions of the organization from procurement to human resources, to finance. Some sample elements of a customer master record would include the customer's first and last name (or name of the business), address, phone number, and e-mail. A counterparty master record would include such things as the counterparty's name and credit terms.

Master data is not the most voluminous source of data, but it is one of the most critical for BI. Nearly all BI output relies at least in part on master data. As such, the management of this data is critical for the success of an organization. This is not to say that you should have formal master data management in place to have effective reporting insights, but you may not realize the full value from master data management if master data is not synchronized across the enterprise and managed by a set of globally accepted principles.

To illustrate this we sketch an example. As your company grows, your IT landscape becomes more complicated. Through market expansions for example it might be necessary to move from one to two ERP systems. Such a fragmented IT structure poses challenges to maintain structured and consistent master data. With a proper master data management solution such as Sofy you keep your data united and you improve your data quality. Therefore, you are able to achieve a competitive advantage and achieve your business goals.

Master data management tooling supports you in addressing these issues, not only from a technical perspective but also from a governing / process perspective as well. Some benefits of having master data management tooling in place are:

Organizational Alignment

- ▶ Alignment of operational metrics to goals
- ▶ Faster resolution of competing BI priorities
- ▶ Encourages use and adoption of BI investments
- ▶ Consistent data taxonomy throughout the organization

Return on Investment

- ▶ Better use of skills and information to speed up BI projects
- ▶ Higher levels of insight and impact

Coordination

- ▶ Facilitates coordination of diverse applications, technology and data
- ▶ Fewer data silos
- ▶ Fewer BI and analytical tools
- ▶ One 'version of the truth'

Enhanced decision making

- ▶ Better data available for reporting and analysis
- ▶ Improved business agility

Conclusion

Data management can be seen as the development, execution and supervision of plans, policies, programs and practices that control, protect, deliver and enhance the value of data and information assets (KPMG, 2020). In this whitepaper the importance of proper data management is stressed. It is important to identify the type of data you use to increase your BI and business importance. In addition, guiding your company in setting clear and effective data management processes is now more important than ever. Whereas the amount of data per company increases the danger of engaging with bad data increases as well. Therefore, it is important to be ahead of bad data and optimize your data quality to realize this.

Moreover, by enhancing your data governance and master data management you can create a potential competitive advantage. To achieve effective data management it is important to know the data that you are dealing with and to be open to innovations in the field. Do not be afraid to look for help in managing your data and always be open to solutions designed to help you achieve a competitive advantage. By doing so, you are already one step ahead of your competitors.



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About KPMG Sofy Suite

KPMG is a leading professional services firm, providing audit, tax and advisory services to organizations in many different industries for over 100 years. To help clients even faster and better, in 2014 KPMG launched the Sofy Suite. With Sofy we embed KPMG knowledge and better practices in ready-to-use software running in the cloud. Powered by an intelligent technology platform we can deploy these solutions rapidly to help you improve your business. Together with our clients we are continuously working on improving and expanding our solutions portfolio. Combining our knowledge with your business data and specific requirements, allow you to run your business smarter using ready-to-use data-driven solutions. Through our cloud platform you can access these solutions anywhere and at any time.

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