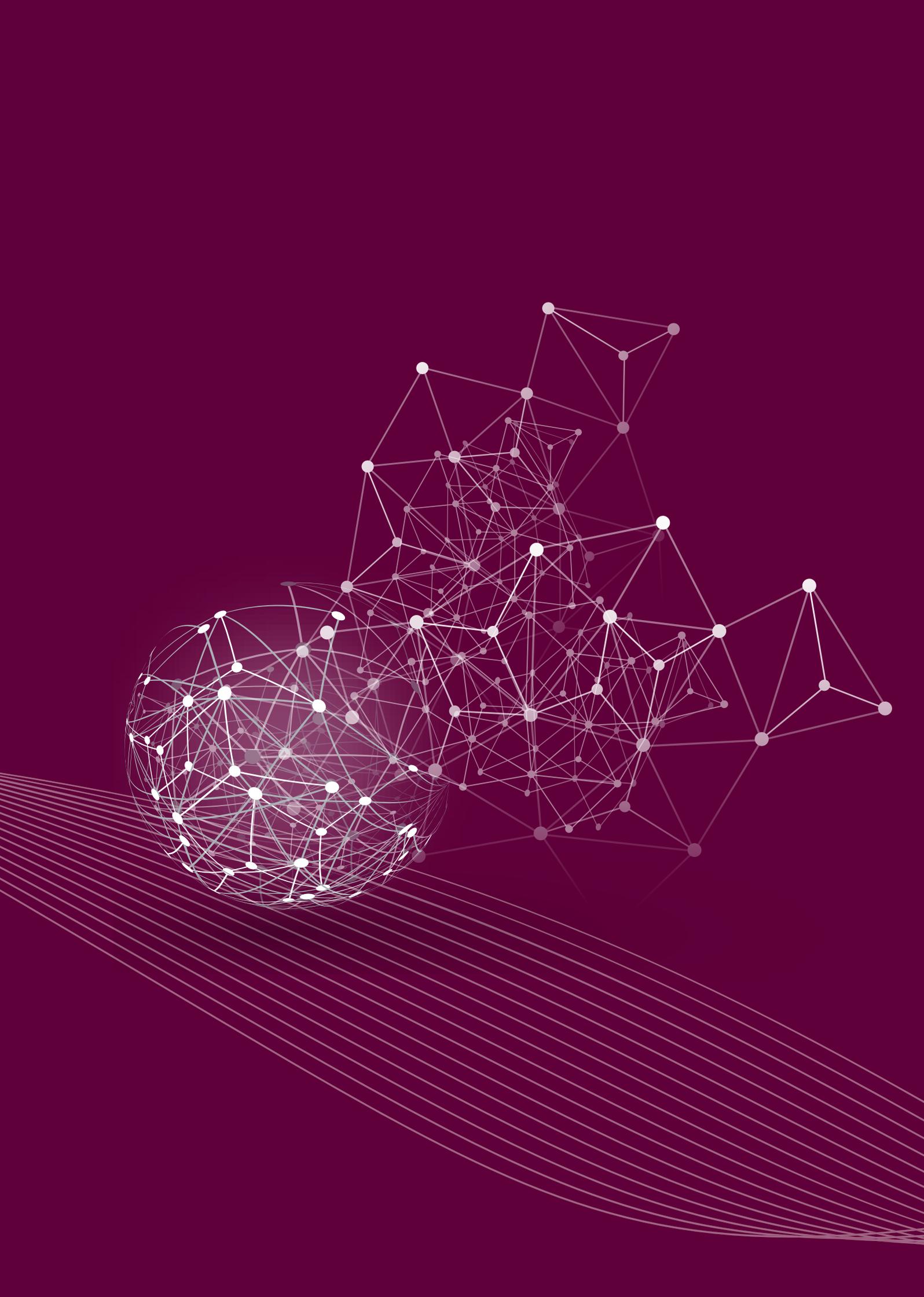




## **How the Data Management Flywheel accelerates proper data sourcing in the Digital Era**

Driving Momentum into Data Sourcing with the Data Management Flywheel



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# 1. Management summary

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Financial institutions are increasingly confronted with new challenges in the area of data management. Data is considered by many as the “new oil.” Due to further emerging regulatory requirements and exponentially growing amounts of data, financial institutions are obliged to restructure their data governance organizations in a way to best comply with internal and external requirements as well as to best compete with their peers through data driven innovations and performance optimizations.

To overcome functional and technical challenges, a financial institution has to achieve a decentralized data collection process in line with central requirements. This data collection process has to create a single source of truth for data definitions and data delivery requirements and ensure effective communication, an agile way of working, global standardized data and high data quality.



*Data Management processes and procedures are well known since more than 20 years, but Data Sourcing is still a highly time consuming and often ineffective challenge.”*

The Data Management Flywheel (DMF) is a methodology, which consists of nine building blocks. Each building block represents one requirement, which has to be fulfilled in order to streamline and harmonize data sourcing processes, rules, interface formats and transformation logics. The DMF supports financial institutions in adapting to the new data environment, driving data based innovations and optimizing data management processes.

While the DMF methodology is used as a guideline, which can be repeatedly applied when data sourcing requirements

change, the data dictionary represents the central repository where the result of the data sourcing and information collection of the nine building blocks is stored and prepared for common use. Additionally, the concept of critical data items in combination with the data tree approach ensures a proper prioritisation of data requirements, helping to find the right focus at the beginning of the data journey.

Our use case within a leading European financial institution demonstrates how the DMF methodology in combination with the implementation of a central data dictionary enables financial institutions to facilitate an efficient and effective data sourcing process. Internally, data quality and regulatory challenges are overcome and a lean finance and IT organization within an agile-environment is subsequently supported.



## 2. Financial institutions' daily data struggles imply major value adding opportunities

### Excuse me, have you seen my data?

The financial crisis in 2008 left financial institutions confronted with multiple developments in the area of social, competitive, economic and regulatory challenges, to which they were forced to respond. To compound these challenges, new competitors, such as peer-to-peer lending and crowdfunding, are emerging in the field of financial technology, leading to new offerings such as internet-based service models supported by innovative technologies (e.g. blockchain). Economically, financial institutions are faced with zero interest rates, constraints on growth and higher

capital requirements. Additionally, customers have changing demands and diminished trust in the financial system.

Focusing on the regulatory changes, the financial institutions of today deal with single supervisory mechanisms, supervisor's requests for granular data instead of reports, stricter finance and risk reporting requirements and ad-hoc on-demand reporting requests. These growing pressures have increased financial institutions' awareness of the importance of data and technology necessary to comply with the new regulatory rules and demands.



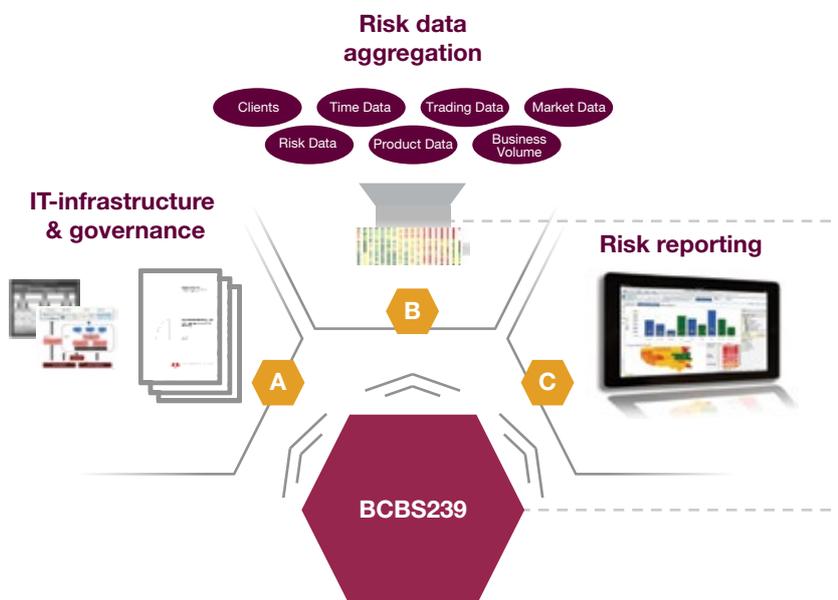
*Currently, data is not accurate and is stored in a scattered application landscape, while being managed in organizational silos"*

However, to be able to deal with the growing external and internal requirements, financial institutions need to improve the quality and harmonization of their data and need to be able to reconcile these data seamlessly and efficiently.

Another challenge is the current technology and often historically grown, legacy IT infrastructure. Financial institutions need to improve risk management, reduce costs and improve technology to deliver effective and efficient data management. This includes central data warehousing, an efficient and robust reporting engine, proper aggregation approaches and finally, effective testing procedures as well as purpose-oriented reports. However, the main challenge is to identify the right data and to provide them to the data consumers.

The main reason for such challenges is that source data is very fragmented and scattered throughout the organization while responsibilities are not always clear. Additionally, the data requirements come from data consumers, who do not know the necessary sources and which data are currently available.

**Figure 1: Compliance with BCBS239 implies the most prominent example of a challenge for financial institutions**



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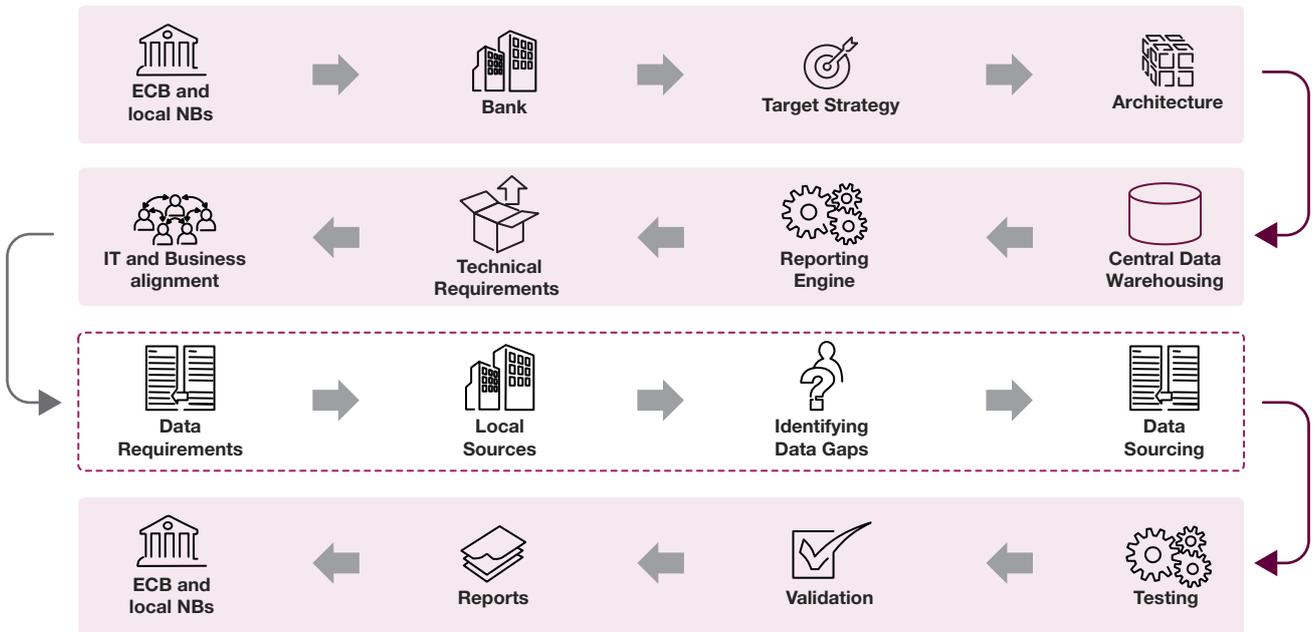
The most prominent example of a challenge for financial institutions is compliance with BCBS 239. The regulation defines 14 principles for an effective risk data aggregation and risk reporting and therefore requires for example up-to-date and timely risk data, accurate and precise risk data reflection as well as proper data governance and data quality management processes. (see figure 1)

In our projects we have noted that data sourcing (see figure 2) itself implies the following challenges for corporate and financial institutions:

- 1. Communication:** An organization requires an effective communication between the group and sources in order to ensure a common understanding about data assets, sourcing processes and thus accurate data delivery.
- 2. Agile way of working:** New challenges arise with working in multidisciplinary teams, and continuous delivery without compromising productivity through prior processes and standards is required.
- 3. Global data standardization:** The main challenges are alignment of data and understanding the relationships between data.
- 4. Data granularity:** New regulatory requirements force financial institutions to process and share more granular data.
- 5. Data quality:** Ensuring consistent data quality is a challenge with sources from across countries and business units delivering data.



**Figure 2: Data sourcing still proves to be a highly time consuming and fragmented workflow process**



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## Help, what should we do with all these scattered data?

At first sight, the values of proper data management might seem obvious to any employee or data governance officer facing data issues within daily business. However, different methodologies, practices and solutions imply different focuses and values. This exactly is the case in which the DMF enters the game. Before looking into the details of this methodology, the potential value which can be added shall be discussed.

One major asset and value represents the establishment of a central, need-driven and consistent source, which

serves as the only primary reference point for both functional and technical requirements, the transformation logic, interface formats, reference data and communication lines, also known as the single source of truth concept. Such single source of truth allows for consistent data collection and a common understanding of the data collection process among heterogeneous divisions, such as local versus global business or IT departments.



*The single source of truth concept enables a common understanding of the information contained."*

In summary, the DMF aims to

- Enable a consistent data collection process in line with central requirements
- Harmonize interpretations of data definitions
- Harmonize "unique" products and features not yet aligned to group-defined common definitions
- Eliminate a potential conflict between 'general' data attributes defined by the group and 'unique' data in local systems

By applying the DMF methodology the following benefits are realized:

**1. Transparency:** A clear and uniform data sourcing process, controlled data flows. A transparent route, from source to central data store. By applying a uniform data governance methodology such as the DMF transparency of data sourcing and data flows can be ensured. The DMF aims at introducing group-wide valid data governance rules by the establishment of a single source of truth as well as a series of instructions for standardized workflows.

**2. Compliance and risk reduction:** Group-wide data quality standards, transparent data workflow processes and ownership strengthens accountability and regulatory compliance, thus reducing risks significantly. Additionally, the DMF approach mitigates the risk of fines by ensuring that all granular atomic data necessary to meet regulatory demands is sourced to the central data warehouse.

**3. Agility and interoperability:** Group-wide standardized processes and an established DQ Framework applicable for all units and departments allow to respond quickly to changes in corporate strategy and regulatory requirements. Bringing together technical and functional requirements by aligning Business and IT, the DMF approach strengthens collaboration and interoperability of various divisions.

**4. Information accuracy:** Information accuracy will be achieved through the rationalization of redundant data such as duplicates and incorrect data as well as the provision of data quality rules by the single source of truth.

**5. Efficiency and cost reduction:** Logically structured and centralized workflow processes ensure a standardized and harmonized data governance organization eliminating redundant works through double data processing of various departments by which efficiency is increased and costs are reduced.

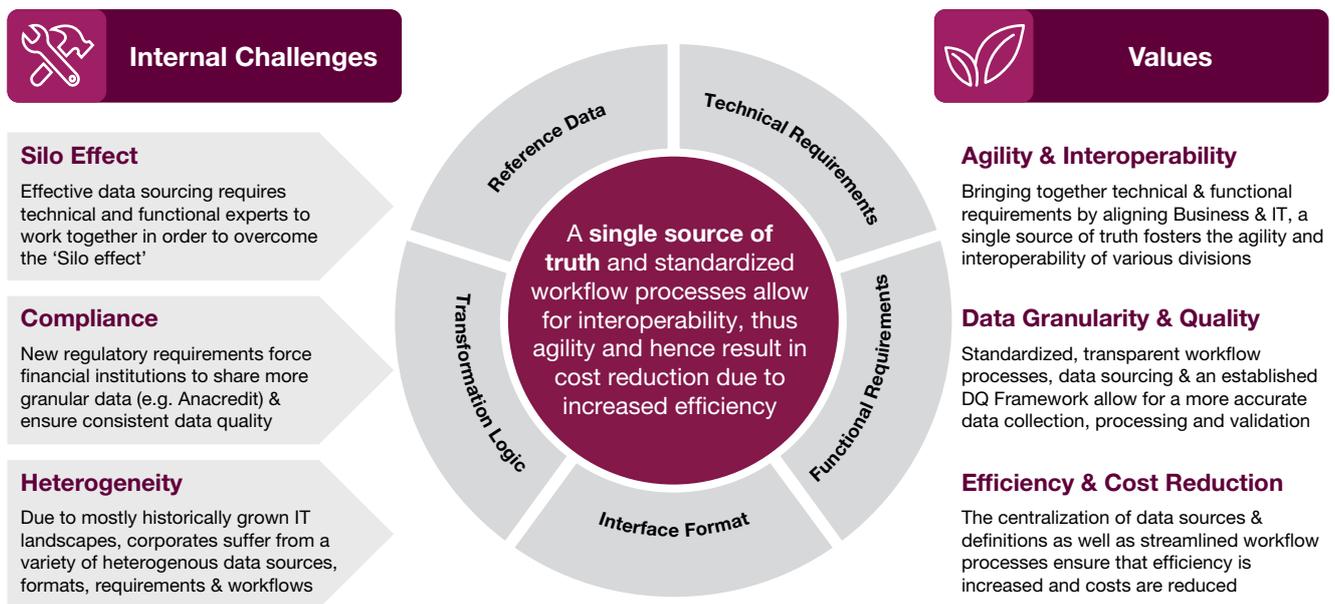
**6. Innovation empowerment:** By streamlining and centralizing all data flows in a single data warehouse, intelligent data analytics can provide predictive insights allowing for additional innovative initiatives to be triggered. In addition, through the reduction of data maintenance efforts resources can now be reallocated to higher-value tasks within innovative projects.

**7. Traceability and auditability:** Clearly defined data quality rules, workflow processes, interface formats and communication lines enable traceability and auditability of sourced and processed data by tracing back atomic level sourced attributes which are used to derive additional data. In completion the auditability of the data governance is furthermore strengthened by the definition of roles and responsibilities and thus identification of accountable ownership.



Taking beforementioned challenges and potential benefits into consideration, we have found that the Data Management Flywheel approach enables any financial institution to mitigate its data related challenges into value adding opportunities by the establishment of a single source of truth and harmonized workflow processes (see figure 3)

**Figure 3: How the DMF approach helps to transform challenges into values**



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# 3. How to tackle challenges – the Data Management Flywheel approach

Imagine all your sourcing parties delivering data in the same format. You could gather data for reporting in a single source of truth without complicated translations. This would allow measuring the data quality with a single set of rules, and should reporting requirements change, your organization would have processes in place to collect what is needed.

This can be your organization. Capgemini helps your organization achieve this with its Data Management Flywheel.



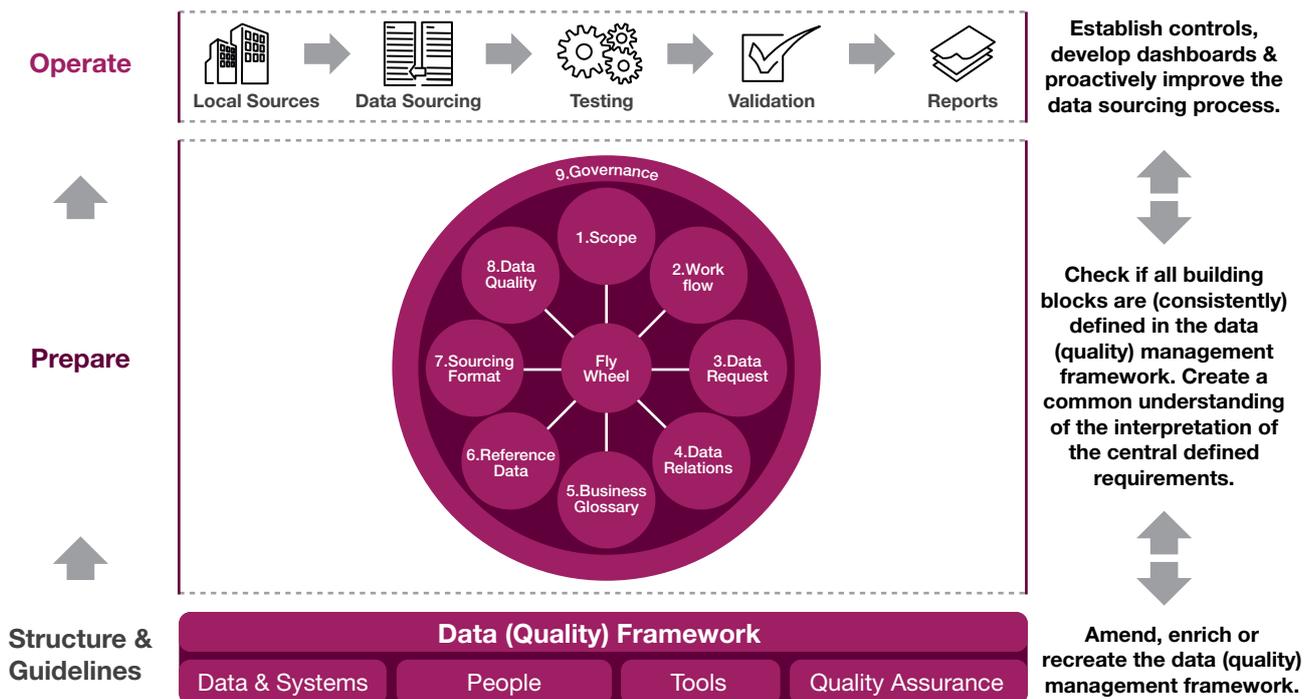
*Applying the Data Management Flywheel means creating a global factory that processes regulatory reporting requirements into data requirements.”*

The factory delivers a template that lists the global data definitions and data attributes needed. It also describes the sourcing process to guarantee that all parties deliver their data in a uniform way. A single language is used to ensure a common treatment of product based information and related reference data. The template is communicated to all sourcing parties to identify their capacity to meet the request and gaps are identified to optimize future data deliveries.

The Data Management Flywheel approach consists of nine building blocks (see figure 4) and is a reusable methodology to communicate regulatory reporting standards that enables sourcing of data to the central data warehouse. It helps data requirement collection in an agile environment. In a nutshell the Data Management Flywheel:

- Provides a governance, organizational, cultural and methodological foundation.
- Provides an approach to facilitate multidisciplinary teams and to create a common understanding of the interpretation of the central defined requirements.
- Supports continuous delivery by frequent releases of new versions.
- Defines a workflow process and ensures that technical, functional, reference data, interface design and data quality teams work together to produce a clear and comprehensive description of atomic data requirements understandable for all parties involved in data sourcing.
- Supports data quality by collecting and communicating data quality rules.

**Figure 4: The nine building blocks of the DMF**



## What is the Data Management Flywheel methodology about?

Generally speaking the DMF is a reusable methodology to list, map, and communicate regulatory reporting requirements that help corporate and financial institutions in facilitating an efficient and effective data sourcing process to overcome internal, data quality, and regulatory challenges.

The underlying basis of the DMF, as seen in Figure 4 is a set of nine building blocks, which represent one requirement; each which must be fulfilled. As a result, data sourcing processes, rules, interface formats, and transformation logics are streamlined and harmonized. A centralized data governance office is required to control and steer these processes.

 **1. Scope:** The DMF approach generally starts with setting the reporting scope to define the boundaries for the subject matter. The scope mainly consists of reports with detailed information for each of them. For validation reasons data quality rules will be defined. For the actual data sourcing a transformation logic and the data elements will be determined. Finally all data sources are considered as part of the overall scope.

 **2. Workflow:** The DMF approach is run by a standard workflow process that provides a series of instructions for the Data Management Flywheel creation (see figure 5). The Data Management workflow secures that the DMF is conducted in a consistent way, executed according to a project schedule, and that all DMF building blocks as defined in Figure 4 are enriched by the respective information needed.

 **3. Data Request:** The data request is a list of the data requirements, including global data definitions and the data attributes needed as well

as physical columns that are to be delivered in the interface.

 **4. Data Relations:** The data relations provide the logic of how to derive additional data based on the sourced data.

 **5. Business Glossary:** The translation of “technical” requirements into business terms is captured in the business glossary. This creates a common understanding between the business and IT specialists regarding the information that should be delivered to the head office. A common understanding by the business experts of the required data will ensure that the correct data items will be selected from the local systems and delivered to the head office.

 **6. Reference Data:** The reference data is a list of columns for which a specific domain has been created and their associated conformed values.

 **7. Sourcing Format:** The sourcing format shows how the data format should look like.

 **8. Data Quality:** The data quality is represented by a list of both business and technical validations.

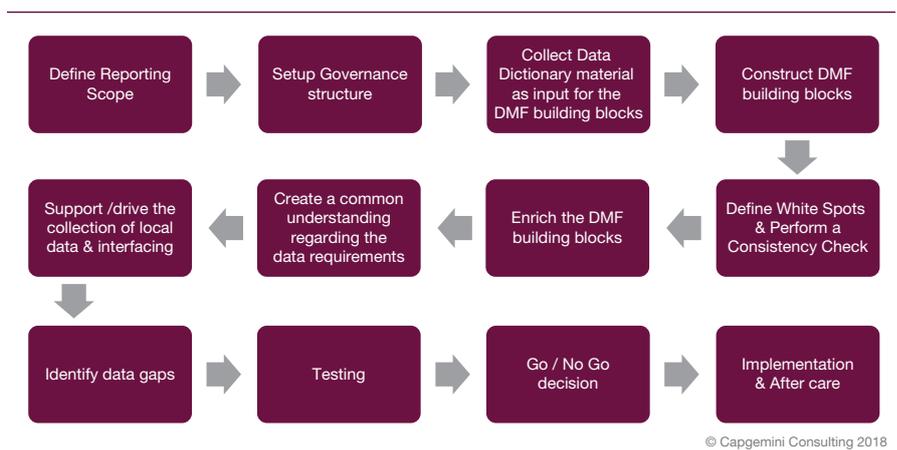
 **9. Governance:** Finally the DMF approach is supported by a governance structure in which Business & IT is represented on all organizational levels. The DMF governance structure is composed of the following 5 stakeholder groups:

- **Content experts**
- **Capgemini support team** – FRC consultancy and driving the approach
- **Operational management** – operational decision making
- **Middle management** – alignment & planning reporting chain
- **Senior management** – support the change; alignment and planning

Based on the “playing field,” the DMF approach creates five reporting instructions (data request, data relations, reference data, sourcing format & data quality) that make clear which data should be delivered. These reporting instructions are communicated to all sourcing parties to identify their capacity to meet the request, and gaps are identified to optimize future data deliveries.

Following and realizing these nine building blocks are the precondition to tackle all the challenges described

**Figure 5: Workflow process**



in Chapter 2. The holistic approach combined with strongly connected building blocks ensures not only a physical single source of truth but a clear and unbroken chain between requirement, source, format and quality. The governance is providing a communication flow. It can readily be adapted to agile organizations. The business glossary ensures a close alignment with the business and global data standardization. The five reporting instructions cover each objective and element even in very granular data.

Finally, data quality is an essential part of the whole DMF approach and workflow. The close connection of all building blocks ensures data consistency.

**Why the establishment of a central data dictionary is key**



*The DMF provides a structured approach to the facilitation of data sourcing.”*

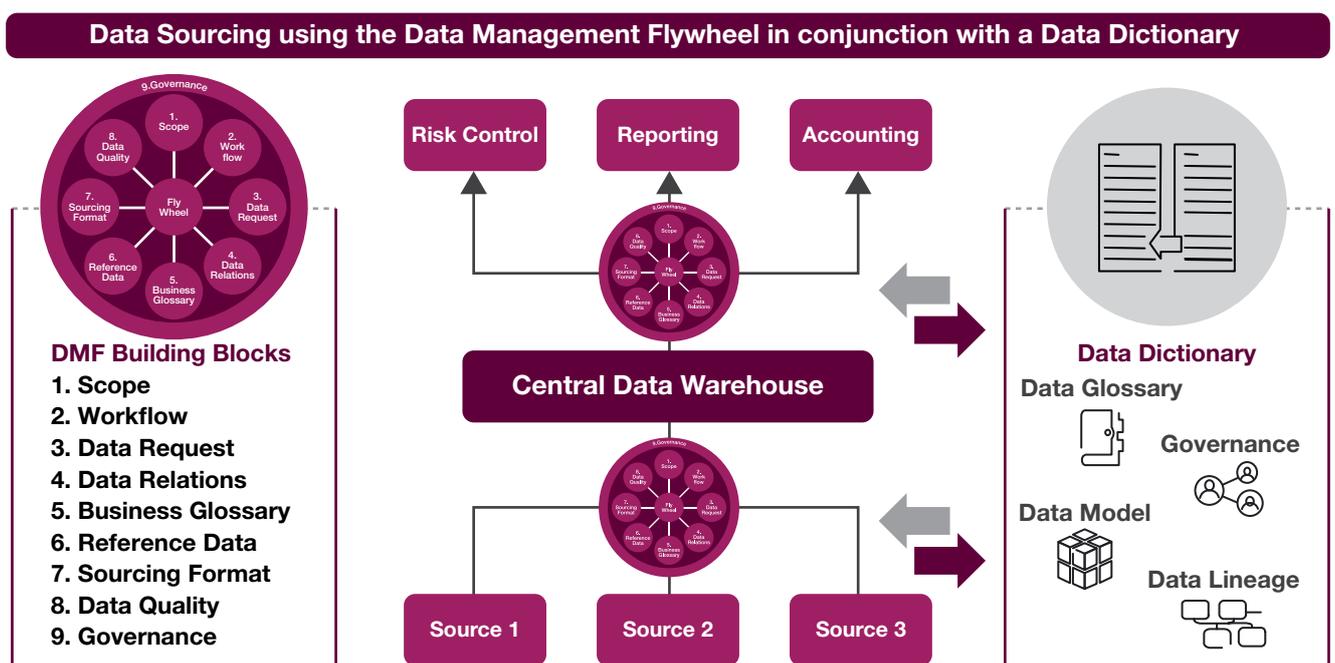
It collects, describes and structures data requirements and also implements interfaces. As a result, redundancies are avoided and granularity levels standardized.

In short, the DMF addresses everything necessary to transport data through the financial institution in an organized manner. To apply this methodology, several questions about the affected data must be answered and documented within a central Data Dictionary (see figure 6).

- What is the information transported by the data?
- Who produced the data/information and who knows possible limitations or other issues?
- Who needs the data/information and what for?
- What are the requirements on data quality?
- What is the relation to other information/data and what needs to be considered to maintain consistency?
- Who determines the quality of the data?
- What is the quality of the data based on the existing measurements?
- What is the physical name of the data?
- What is the physical data model?
- Where does the data come from?
- Where does the data go to?
- What technical processes are using the data, what is their schedule?
- Who is responsible/accountable for the information, the data and its metadata?



**Figure 6: DMF and Data Dictionary**



The best practice to handle this extensive list is to organize it in four categories:

- Governance
- Business glossary
- Data lineage (business and technical)
- Data modelling (business objects, logical and physical)

While every financial institution has addressed these four categories in one way or another, it was only in the context of BCBS 239 that an industry-wide effort was triggered to cover all of them in a coherent manner.

The tools supporting such effort are data dictionaries, which are currently available from multiple vendors. A data dictionary represents an overarching application to document important information about a firm's data, such as architectures, business and technical data lineage, and provides a common language and understanding of terms, definitions and data models. As a single source of truth for metadata it is a

central tool to steer company-wide data management activities.

Together, the DMF and the data dictionary represent the ideal combination of an approach and tool to prepare an organization for the challenges in today's data management.

The information flow between the DMF and the data dictionary runs in two directions. Initially, the existing information is used to determine the data requests together with their relations, reference data, sources and quality requirements. The changes incurred in the project using the DMF are then documented in the data dictionary, keeping it up to date.

As such the DMF can also help the setup and improvement of data dictionaries: every project should be required to close information gaps discovered. By doing so, a "fit for purpose" continuous improvement process is defined, which focusses on the information actually needed in the change-the-bank processes.

## How to get the Data Management Flywheel to fly

In order to establish the Data Management Flywheel, a transformation approach of approximately 4.5 months is required for a typical scope. This transformation journey consists of three phases.

In the pilot phase a maturity assessment is conducted (see figure 8, next page). This assessment, which utilizes an elaborated questionnaire (see figure 7), evaluates the maturity of data management and sourcing processes in three dimensions. The dimension "data and systems" covers aspects like "unique data repository", "centrally managed meta data", "establishment of full data lineage", "system independent business data models" as well as "poor data quality is detected and managed".

In the dimension "data sourcing," the "golden sources for data" are part of the assessment. Whether or not the standard data sourcing interfaces are implemented organization wide, data

**Figure 7: Data Management Flywheel Questionnaire**

Survey  
Home / Transversal topics / Data Management Flywheel

Domain 1: Data and Systems

Question 1: Data Glossary & Repository

To what extent does a unique data glossary / repository exist?

The data glossary / repository is a collection of business terms along with their definitions. It is created and maintained by the business and is designed to improve business understanding and use of data.

1. There is no data glossary / repository planned or established at all.

2. A data glossary / repository is planned but not established yet.

3. A data glossary / repository is established but rarely used / maintained by the business.

4. There is one single data glossary / repository maintained by the business and used for the entire organization.

Question 2: Data Dictionary

To what extent do data dictionaries exist?

The data dictionary is a centralized repository of information about data such as meaning, relationships to other data, origin, usage, and format. It assists management, database administrators, system analysts, and application programmers in planning, controlling, and evaluating the collection, storage, and use of data.

1. There are no data dictionaries planned or established at all.

2. Data dictionaries are planned but not established for any system yet.

3. Data dictionaries exist for a few systems but are rarely used.

4. Every (critical) system has its own data dictionary defining data elements, their meanings, and their domain values.

Question 3: Data Glossary / Repository / Data Dictionary

If a unique data glossary / repository and data dictionaries exist, are the attributes from the data dictionaries linked to the data glossary / repository?

1. No. There is no data glossary / repository or data dictionary at all.

2. No. attributes from the data dictionaries are not linked to the data glossary / repository.

3. Yes, attributes from the data dictionaries are partially linked to the data glossary / repository.

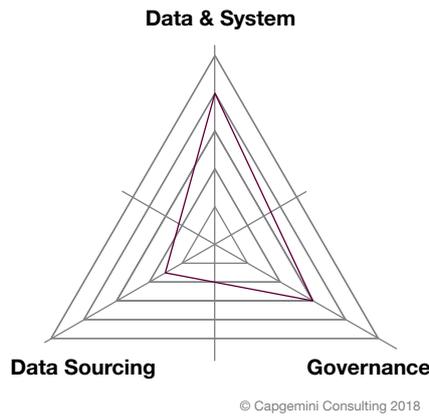
4. Yes, attributes from the data dictionaries are all linked to the data glossary / repository.

sourcing embedded in an agile way of working is also evaluated. Finally, the maturity of a standardized workflow for data sourcing is checked.

The third dimension, "governance," covers the data management office and the senior management support for the data management vision and strategy. Additionally, the data quality management structures and the communication between business and IT experts is evaluated. Data security and data privacy procedures are also included in the maturity assessment.

The maturity assessment makes transparent what information on data is documented and how easily it is available. As suggested above, improving the information access should be part of the project scope. In some cases it may be necessary to improve the metadata available before starting the actual project work. Setting up "data trees" is a scalable approach allowing to

**Figure 8: Maturity Assessment**



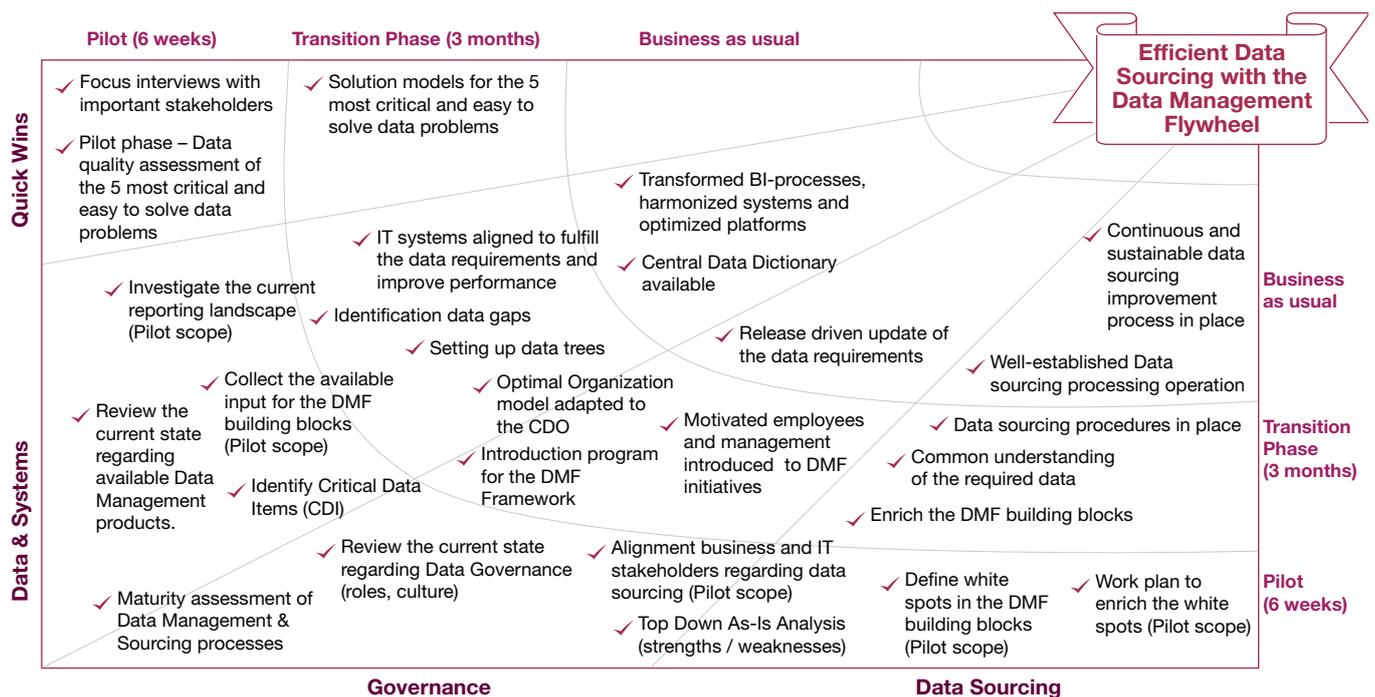
prioritize the data most relevant for the financial institution and/or the project (see figure 10 and extract on "Data Trees: Getting a Grip on Business Data Lineage").

Based on the initial maturity assessment, which usually takes two weeks of time,

a series of workshops is conducted in order to detail the assessment for prioritized dimensions and to define the transformation map (see figure 9) for the second phase of the transformation. This design phase usually takes four weeks of time.

The transformation map shows the complete transformation in one overview. The three month transition phase focuses on the gaps identified and ultimately ushers in the DMF approach. A solution model for the five most critical and easy to solve data problems ensures quick results and a remaining buy-in from senior management. An alignment of IT systems to fulfil the data requirements and to increase the performance improves the maturity of the data and systems dimension. Furthermore, the data management processes and organization is optimized, and the role of a chief data officer is established or strengthened.

**Figure 9: Transformation Map**



Then the DMF approach is introduced by enriching the building blocks discussed in Chapter 3 and bringing the data sourcing procedures in place.

Now the established DMF can serve as a basis for all upcoming data sourcing and reporting challenges and significantly improve the efficiency of such projects.

### Data Trees: Getting a Grip on Business Data Lineage

Achieving a comprehensive and comprehensible business data lineage is not an easy task. The hard drives of many financial institutions are overflowing with remnants of now outdated data flow charts. While they may have been correct at the time, they fell short of achieving their key purpose, creating transparency.

Transparency is always related to focusing on relevant information at an appropriate level of detail. The data tree approach provides a systematic, transparent focus and level of detail. They allow to step-wise widen the focus and increase the level of detail. The idea is to start where all data is eventually used, the reports. The path of the information is then

traced backwards to its source in an organized manner.

1. Prioritize the information in the reports. The data of highest importance are referred to as critical data items (CDIs). Pick one as a prototype.
2. Determine the data used to calculate this CDI. Out of those data choose those that are most critical for this calculation, e.g. because they have a high impact, they are known for frequent data quality issue, etc. They with "Critical data items are also referred to as critical data elements, but on a lower level of aggregation.

3. Leave the remaining data elements for later consideration.

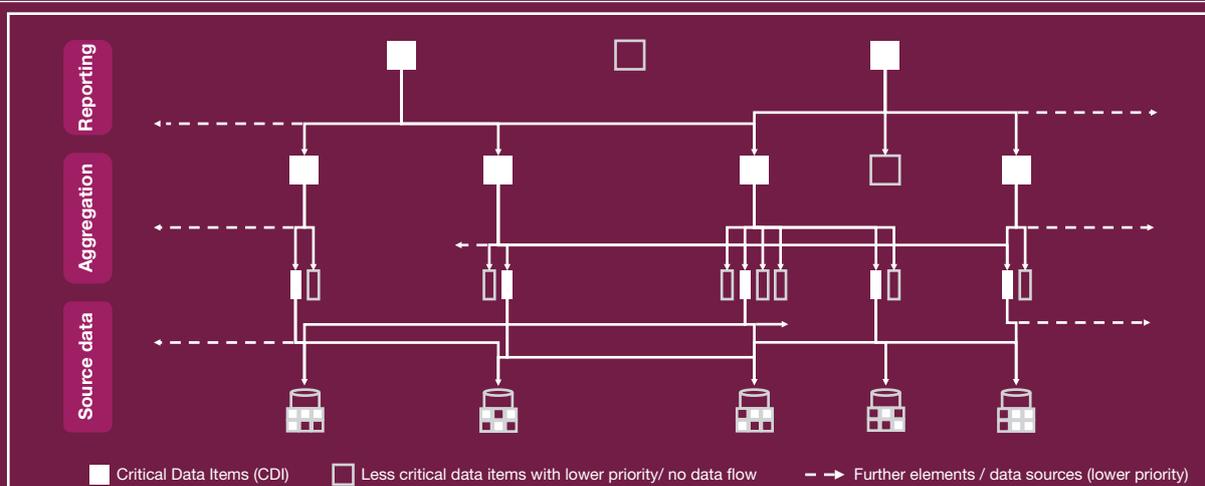
4. Document your criteria to make your prioritization well transparent.

5. Continue until you reach a level of detail sufficient for the purpose of the prototype.

6. Extend your Data Tree model and CDI universe as appropriate for your project and your data management roadmap.

Modern data dictionaries support this approach both through user friendly capturing and transparent rendering of the data trees. This way, the data trees become part of the Data Management Flywheel and data dictionary tool set.

Figure 10: Critical Data Elements in Data Trees



# 4. Case Study – Disentangling the way the data flows

## Breaking the finance and risk (data) silos

One of Europe’s biggest financial institutions faced a challenge in on time delivery of accurate reports. Regulators asked the ability to quickly deliver insights in the finance and risk reports of the financial institution, and were increasingly interested in tracking and tracing the total data flow (data lineage). Complying with those demands was hindered by the organizational reality.



*Not only did the finance and risk departments work in silos, even within those silos teams were organized around applications.”*

This led to a scattered applications and data landscape, which resulted in mismatches between finance and risk reporting.

The financial institution started a restructuring program introducing a new finance target operating model. The vision of this program was alignment of finance and risk data by creating a single source of truth and a standard global application architecture enabling self-service reporting. Driving the program was the philosophy to have a data driven organization empowered by uniform data governance across the financial institution, which would serve as a foundation for

predictive analytics and operational excellence in data exchange.

## Our Data Management Flywheel gave structure to the operational process of the program

To enable finance and risk data alignment within the IT landscape, Capgemini introduced the Data Management Flywheel methodology. A condition to use the DMF was the establishment of a proper system of data governance. Data definition owners were appointed at senior management level and data stewards led the day-to-day tasks of defining requirements based on the scope. An operational data committee was appointed to meet major decisions regarding the future business and IT architecture.

The first step of the DMF was to set a scope. For this particular financial institution, the scope was the CRD IV regulation, which required financial institutions to report on their liquidity ratios. CRD IV offered the basis of the regulatory requirements, with which we were able to set the scope for the data dictionary. The data dictionary captured the design of the physical model and interface columns of the requirement. This step is done in parallel with defining the conceptual model and populated the business terms which is in line with a global conformed product list. The reference data was based on the requirements and followed up by the population of data quality rules.

A finance analytical application tool was used to store all finance and risk data, with a functionality of predictive analytics and predefined reporting scopes. The data dictionary was made accessible for all stakeholders by a database that was updated on a daily basis. The requirements to fill the shared data warehouse (see figure 11) were communicated to the sourcing parties via the database system. For all attributes the sourcing format and the data quality rules were discussed with sourcing parties, to check if they had sufficient understanding of the data and were able to deliver.

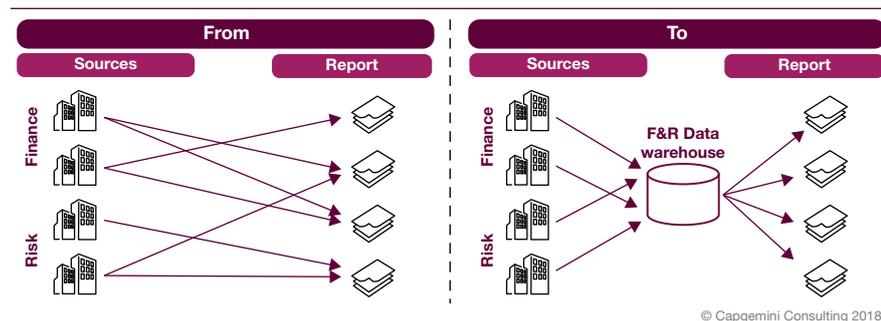
## The finance and risk integration became an accelerator for the group’s data strategy

The financial institution’s data strategy reached further than the integration of finance and risk. It aimed to integrate all data across countries and across business units. All data should be centralized in one global data lake, which would be the single source of truth for all data in the financial institution. Thus far, the financial institution was able to leverage the work being done in the finance and risk integration. Since the finance and risk departments had already agreed on the definition of, for example the ‘start date’, they provided a starting point for global data definitions.



*Currently, the financial institution is working on creating a business glossary that provides a global data definition for every piece of data.”*

Figure 11: Implementing a Centralized Data Warehouse



When finished, the glossary will be the one language in which the financial institution can communicate about their data. This common understanding on a global scale would make the sourcing process easier and could respond to reporting requests in a more agile way.

As a result of the Data Management Flywheel application within aforementioned finance transformation program a multitude of results and new assets has been realized (see figure 12):

**Figure 12: Proven Outcome of the DMF implementation**



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## 5. Let the Data Management Flywheel be a driver for change

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While pressure from regulatory demands is a good reason to step up the data management game, it should not be forgotten that a digital revolution is under way. Many financial institutions have taken on the challenge of becoming digital organizations. To get there, these organizations have drawn up digital strategies that entail predictive analysis, flexible real time reporting and new services for customers. These businesses must undergo a full business transformation. This starts with the training of employees to also make them more flexible in their reaction to change. The culture within the organization must change from administrative to creative. Ideally, this should take place in an environment where organizations feel pressure by market forces to

become leaner, in particular now that automation and robotics are becoming commonplace.



*The key to any digital strategy is having your data in order.”*

Having the right data at the right time at the right place is a condition for all the new reports, analyses and services you want to offer. This means that your data management must rise to the occasion. The DMF can be the backbone of your digital transformation program. The DMF offers governance templates and workflow processes

that fit in an agile environment. It works with multidisciplinary teams that deliver continuously. This way of working can be scaled to the rest of the program. Most importantly, the DMF improves your data sourcing capability.

Capgemini Consulting can help you in making the Data Management Flywheel a driver for change for your organization and is highly experienced in using this tested methodology. Also, the Capgemini Group's scale can be leveraged to deliver large projects. Capgemini Consulting is part of the Capgemini Group. It is the strategy and transformation brand and it is in our DNA to be the bridge between Business and IT.



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