# MBBA

From use cases to star-schema definitions with Model-Based Business Analysis

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# AGENDA

Motivation and background

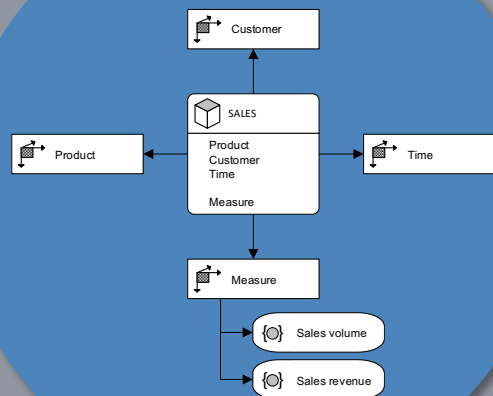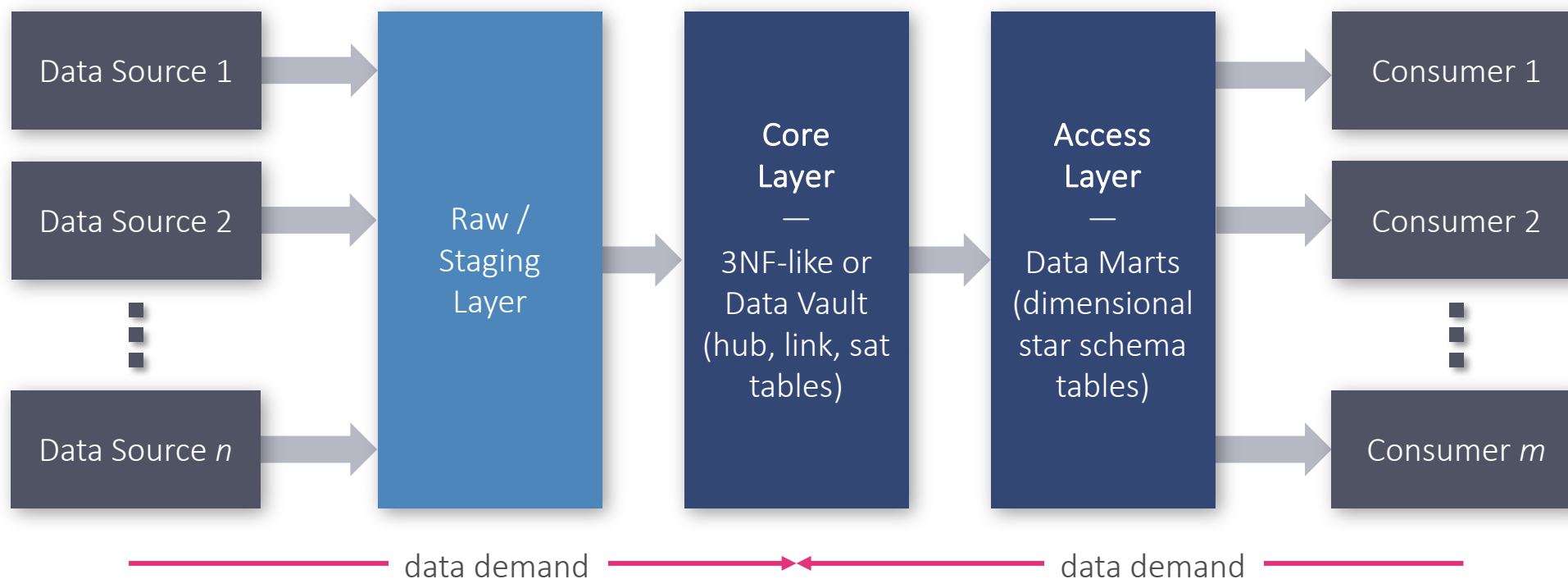# Hub-and-spoke architecture for the DWH

# Levels of abstraction of data models

## Conceptual layer

- Business objects & identification
- Roles of objects
- Business interrelationships

## Logical layer

- Table structuring & dependencies
- Attributes & keys
- Historization

## Physical layer

- Physical storage
- Technical attributes
- Distribution & performance

# Purpose of conceptual data modeling
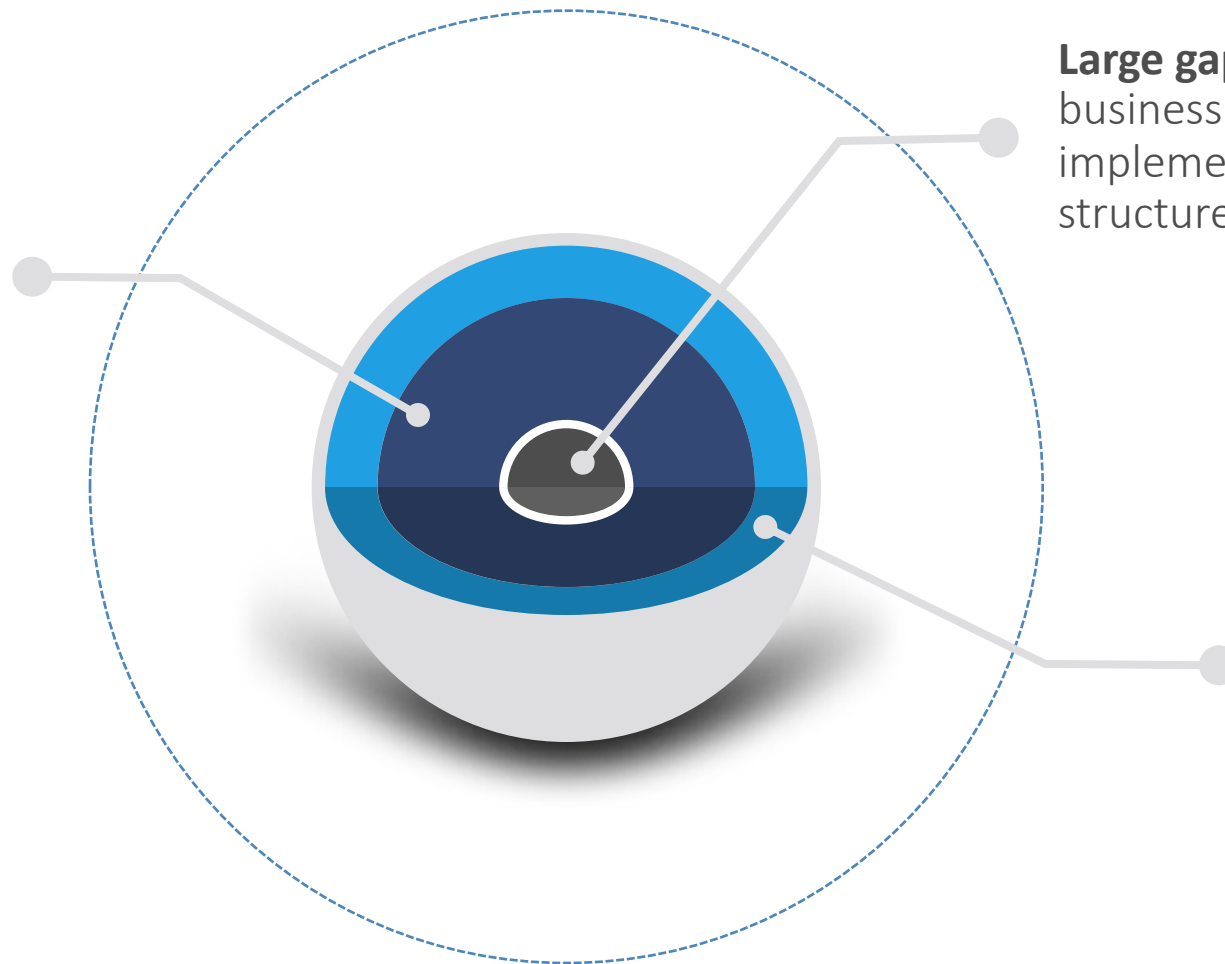
COMMUNICATION & UNDERSTANDING

DOCUMENTATION

IMPLEMENTATION TEMPLATES*

*) In particular, transfer of the model to the logical/physical level.

# From use cases to data structures – challenges

**Interaction** of different methods, techniques and models in the context of business analysis unknown.

**Large gap** between business requirements and implementation of data structures.

**Lack of a process** for systematic, model-based requirements and business analysis.

# What happens if we refrain from thorough data modeling?

## No consensus

Terms are not clearly defined and there is no company-wide consensus on their use. Calculation rules are applied inconsistently.
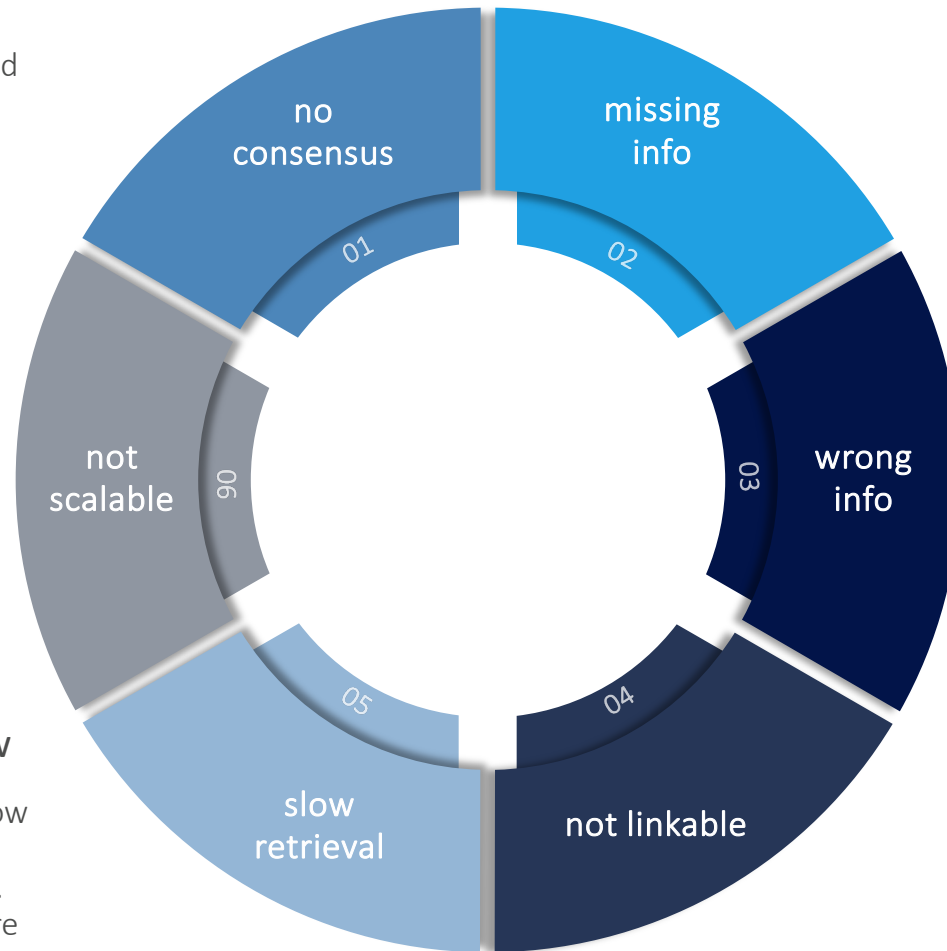
## Missing information

The gathering of requirements is probably incomplete. As a result, important information is missing from the data products.

## Structures not scalable

Missing or incorrect business information lead to conflicts during further development and thus reduce the scalability of the data platform.

## Wrong information

The integration of the source data is probably flawed due to incorrect business assumptions (e.g., regarding granularity). Therefore, the data products are also flawed.

## Information retrieval slow

The retrieval of information is slow because queries are made on granular data using many joins. Frequently used aggregations are not pre-calculated.

## Information not linkable

Information cannot be linked or combined because the underlying business and calculation rules do not match.



- 01 no consensus
- 02 missing info
- 03 wrong info
- 04 not linkable
- 05 slow retrieval
- 06 not scalable

# MBBA in general

# Model-Based Business Analysis (MBBA) – overview

MBBA is a **process model** for generating implementation patterns and templates for analytical systems. It

- uses **stakeholder knowledge** as well as **source system information**,
- is based on **models** for the **business analysis**,
- is oriented around the **multi-dimensional** paradigm,
- focuses on **key business measures and figures**.

The MBBA process can be ideally combined with a **lean, agile development model** (Scrum, Kanban).
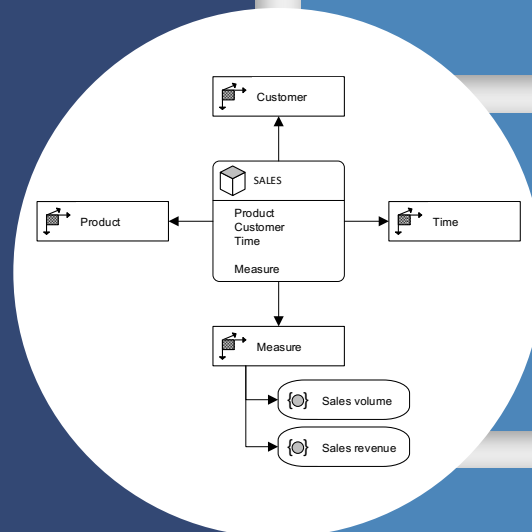
MBBA starts with a set of **given uses cases**, formulated by stakeholders.

*I as [role] want to [achieve something] based on [data] because of [a reason].*

MBBA produces a **set of artifacts** – such as data models (for core and access layer), structure definitions and attribute lists, as well as documents and records related to **data governance**.

MBBA ends with multidimensional schema definitions on a logical level for the creation of consumable data products.

MBBA focuses on business analysis and concepts, not on data provisioning!

# Conceptual data models and model types

## Business Model (BM)
### for core layer (e.g., Data Vault)

- Description and visualization of business objects and interrelationships in general

- Perspective on the entire enterprise

- Considering domains and departments for segmentation

- Application-agnostic

⇒ Core layer (Data Vault)

⇒ **e.g., ER model or ELM**

## CONCEPTUAL DATA MODELS
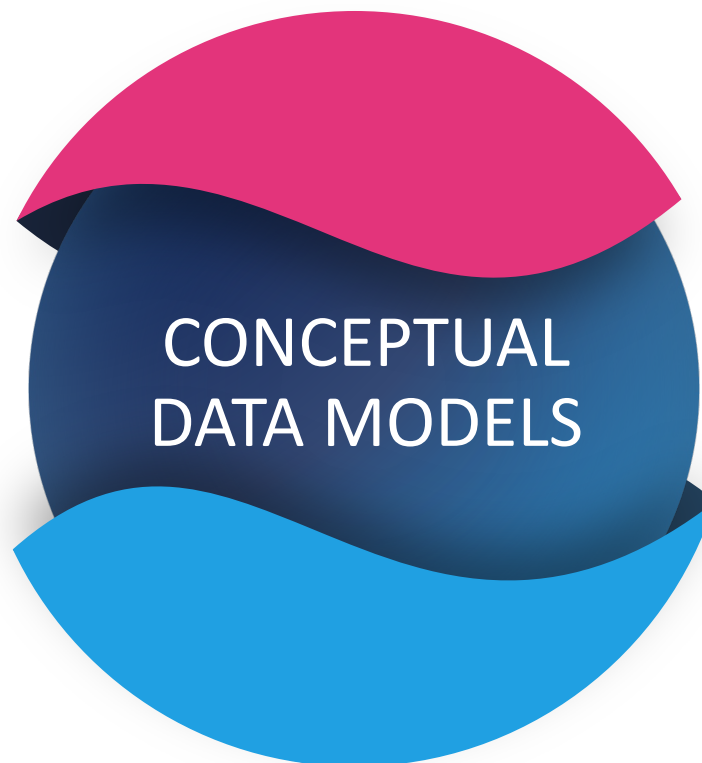
## Analysis Model (AM)
### for access layer with data marts
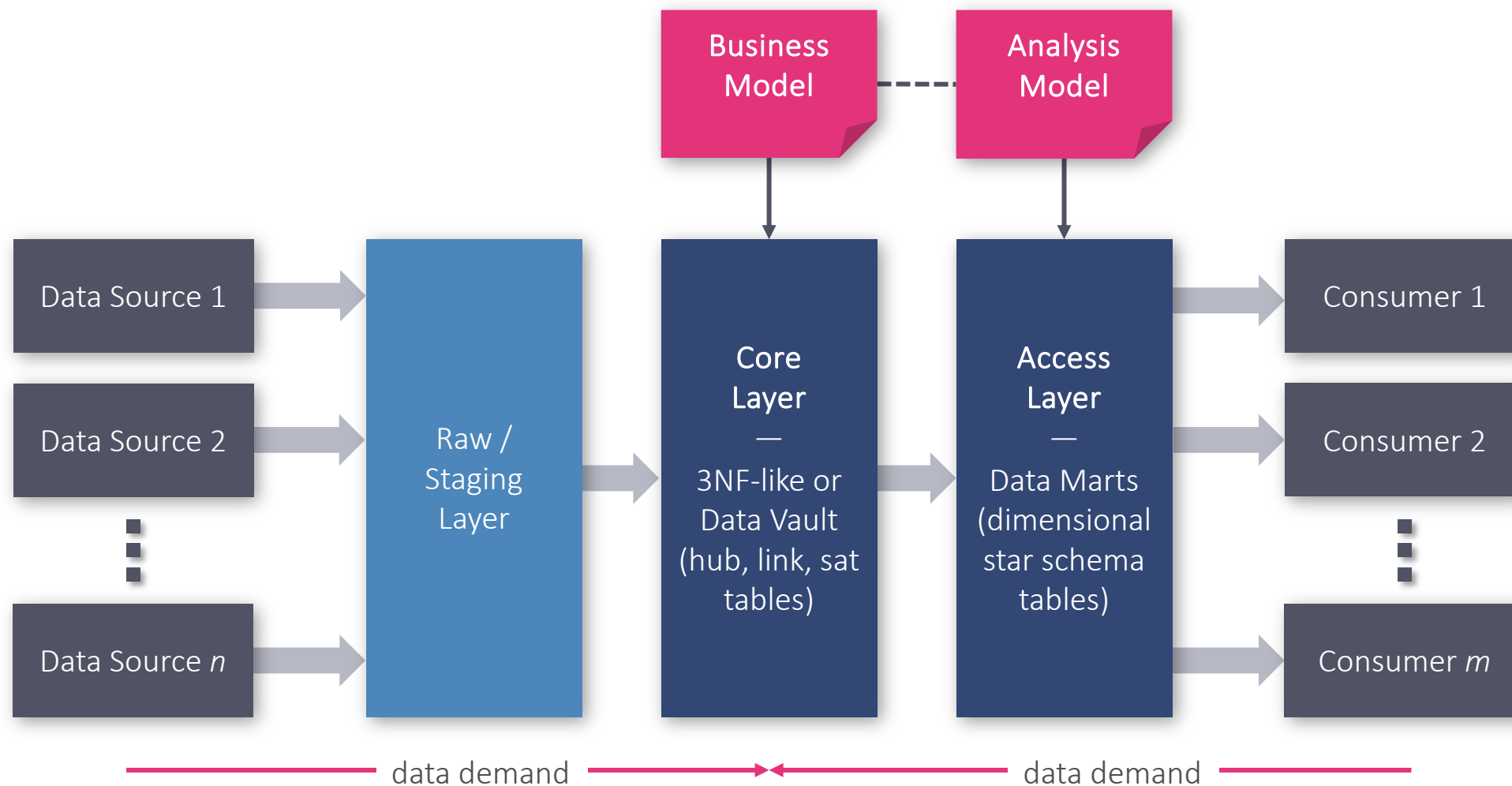
- Description and visualization of business objects and interrelationships in their respective roles

- Perspective on the area of business (domain/department)

- Multidimensional paradigm

- Focus on a concrete applications and analysis

⇒ Access layer with data marts

⇒ **e.g., ADAPT model**

# Application of conceptual data models

# Starting point: use case descriptions

*I as [role] want to [do/achieve something] based on [data/information] because of [a reason or motivation].*

*I as a procurement manager want to monitor supplier performance based on shipment dates and product quality data because I want to ensure stable supply chains and high product quality.*

*I as a production supervisor want to optimize production schedules based on workload and order data because I want to increase throughput and efficiency.*

*I as a complaint manager want to identify common complaint reasons based on complaint data and product information because I want to improve product quality and customer satisfaction.*

*I as a sales manager want to understand customer buying behaviors based on sales and customer data because I want to personalize our sales approach and increase customer satisfaction.*

# Final result and deliverable: star-schema definition
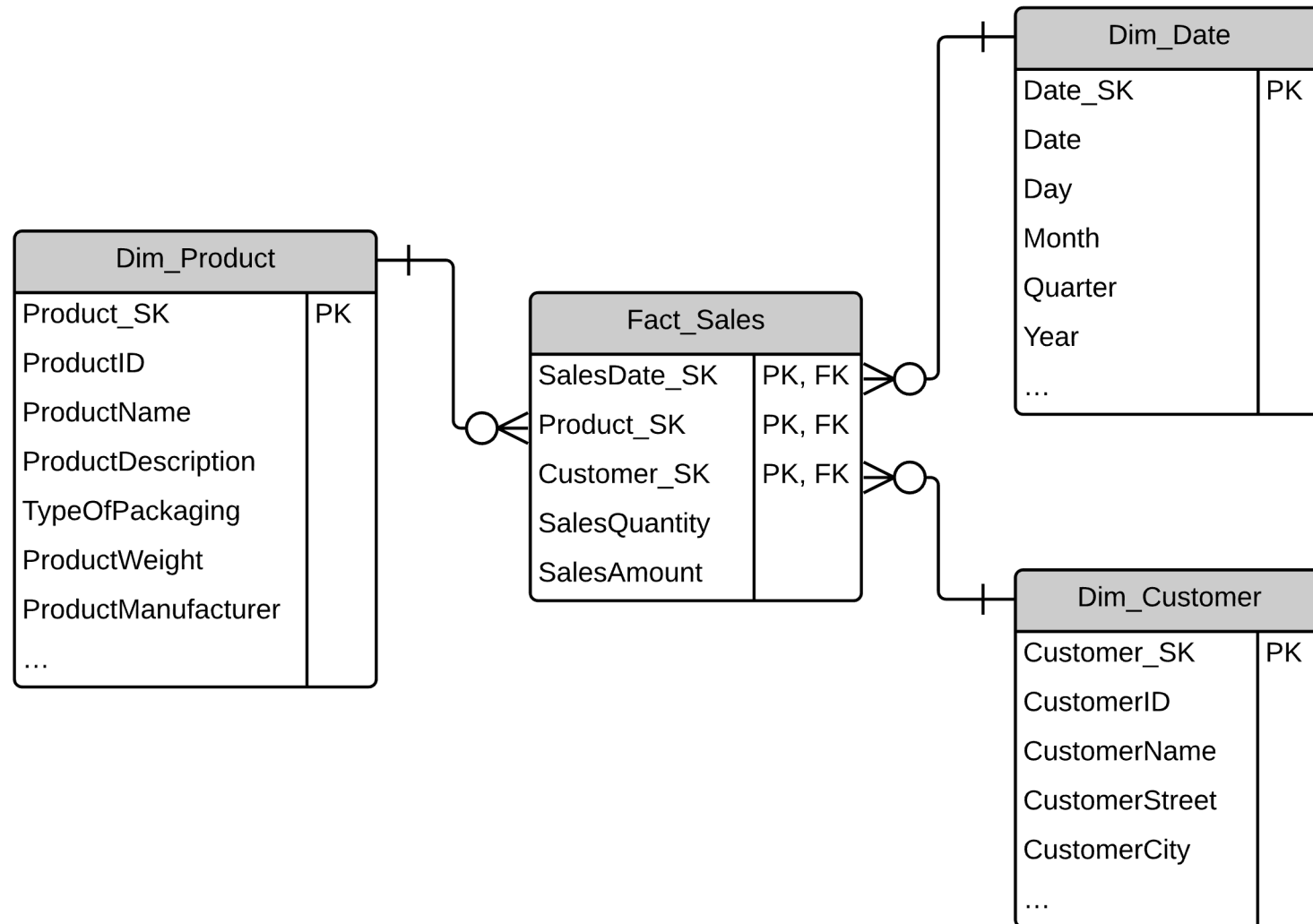


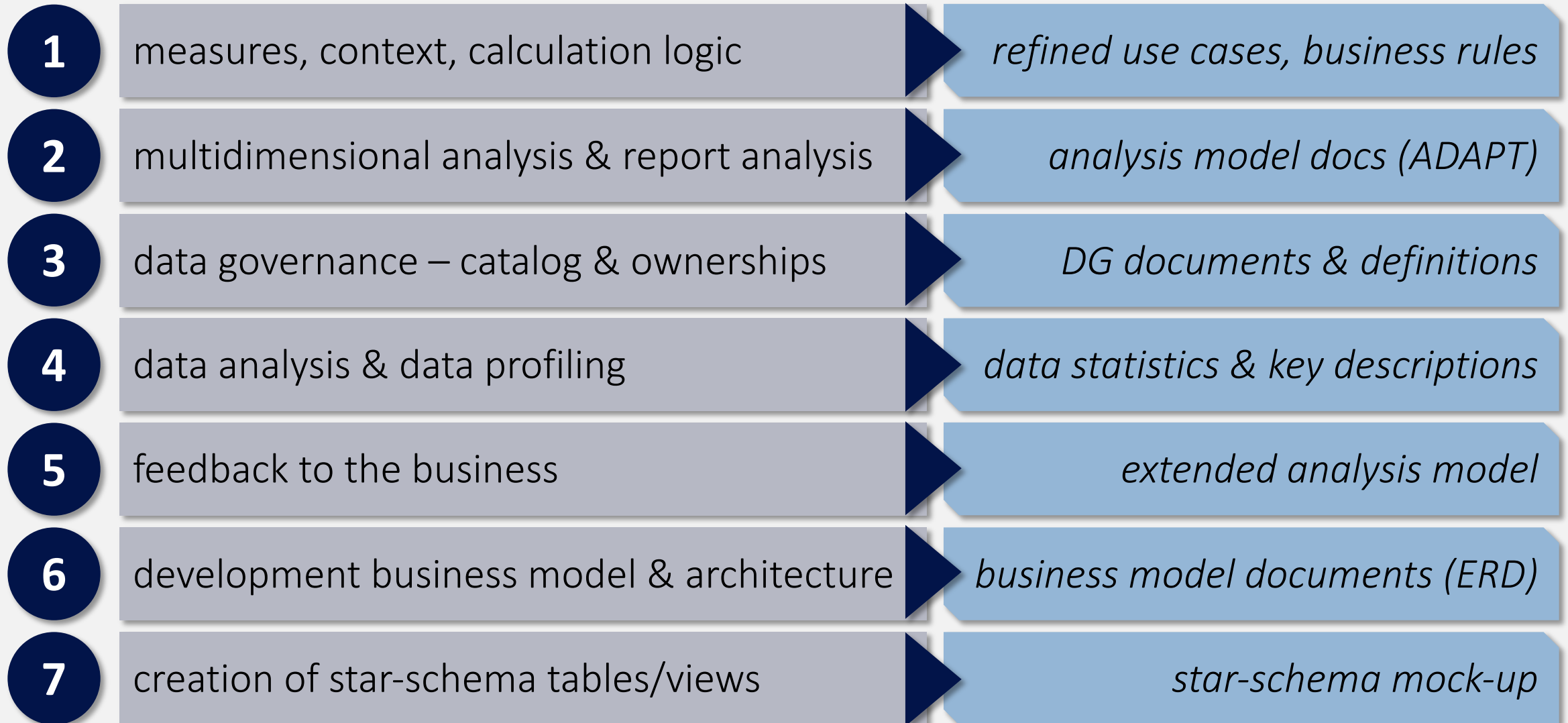**Star-schema** for customer and sales activitiy analysis

The MBBA process in detail

# Model-Based Business Analysis (MBBA) – 7 phases

| # | Phase | Output |
|---|-------|--------|
| 1 | measures, context, calculation logic | *refined use cases, business rules* |
| 2 | multidimensional analysis & report analysis | *analysis model docs (ADAPT)* |
| 3 | data governance – catalog & ownerships | *DG documents & definitions* |
| 4 | data analysis & data profiling | *data statistics & key descriptions* |
| 5 | feedback to the business | *extended analysis model* |
| 6 | development business model & architecture | *business model documents (ERD)* |
| 7 | creation of star-schema tables/views | *star-schema mock-up* |

# Application of MBBA within a Scrum process

The MBBA process is orchestrated and supervised by the **product owner**. He is accountable – also for technical debt!

Depending on the conditions of the respective increment, phases or objectives may be run through **in parallel or skipped** altogether if necessary.

No development of complete layers in their entire breadth. Focus on a **narrow scope for small product increments** through all layers.

An increment is usually created in **more than one Scrum iteration**.

For all deliverables (outputs), there must be **clear guidelines for their filing/storage** and management (as part of knowledge management).

# Reduced slide deck

**This set of slides is reduced.**

It does not contain all the slides that were presented
at the DDVUG meeting on 11 April 2024 in Hamburg.
If you are interested in the details of the MBBA process,
please contact the speaker:

**Peer M. Carlson**
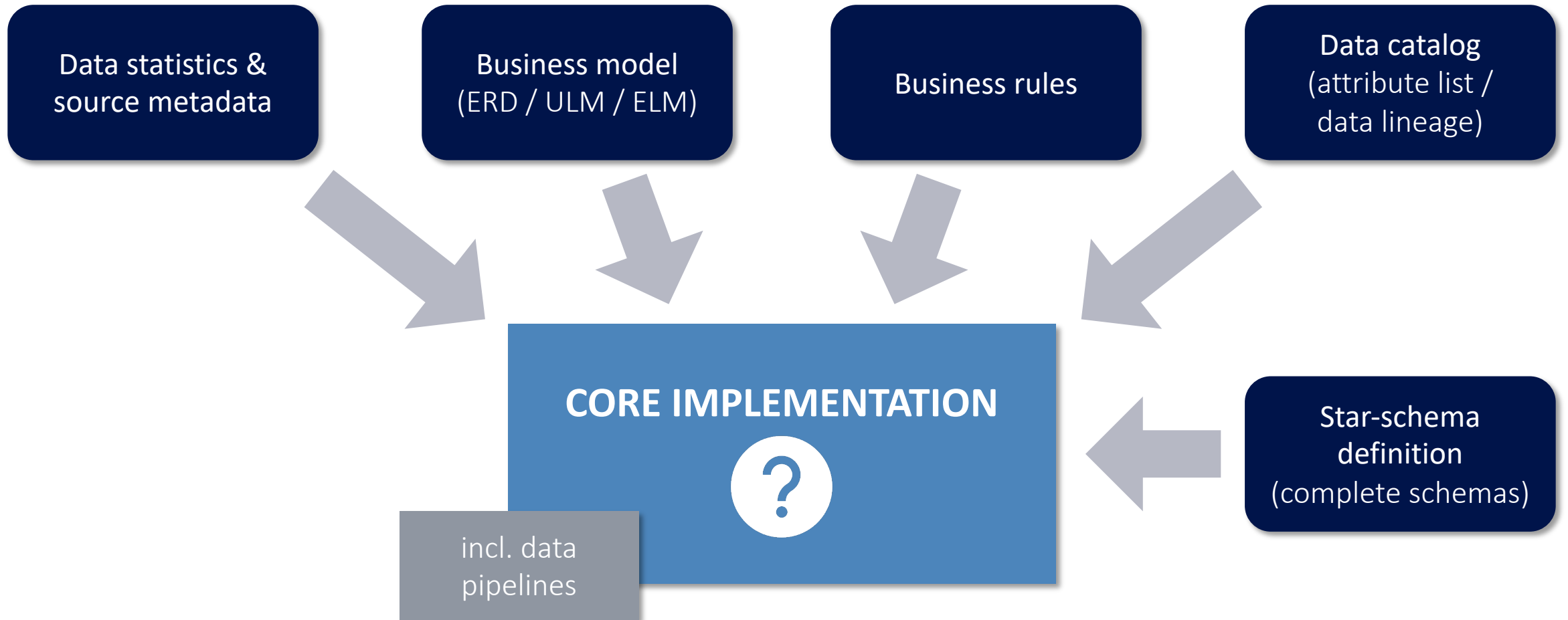Principal Consultant – b.telligent
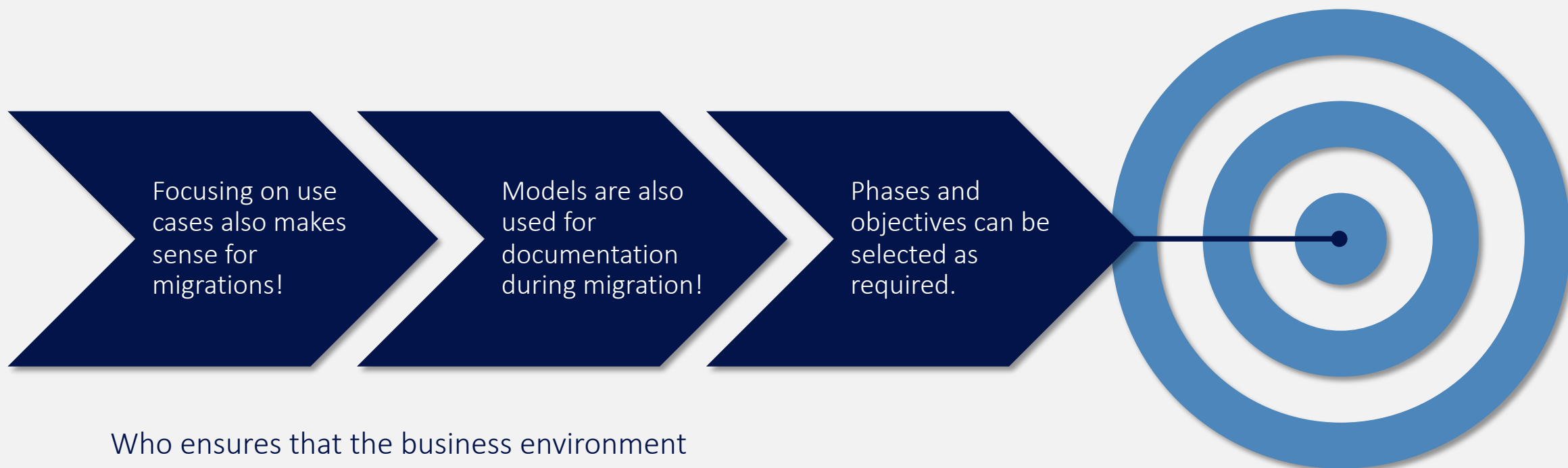peer.m.carlson@btelligent.com

Concluding thoughts

# Development of the core layer (e.g., Data Vault)

**Data statistics & source metadata**

**Business model (ERD / ULM / ELM)**

**Business rules**

**Data catalog (attribute list / data lineage)**

**CORE IMPLEMENTATION**

**?**

incl. data pipelines

**Star-schema definition (complete schemas)**

# Migration project instead of greenfield?

Focusing on use cases also makes sense for migrations!

Models are also used for documentation during migration!

Phases and objectives can be selected as required.

Who ensures that the business environment and requirements have **not changed** since the last new development?

# Final thoughts …
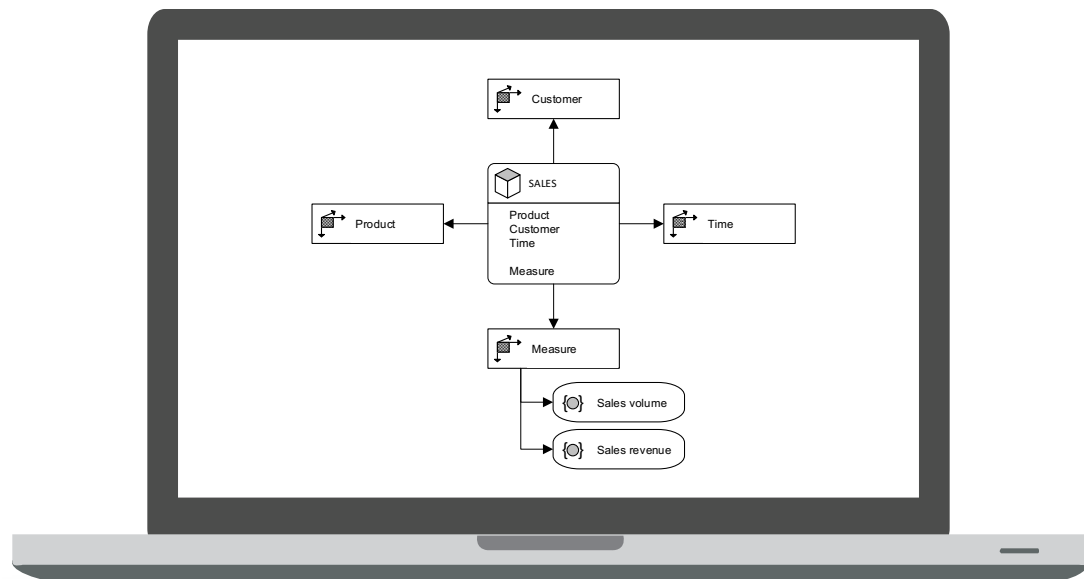


- All documents and artifacts created have to be **validated and consolitated** properly.

- MBBA offers **flexibility** regarding the final data products.

- If it's not a star-schema, then another logical implementation – but still **multidimensional**, most likely!

- Works for multidimensional databases as well … or for a unified star-schema.

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