



## A pragmatic view on model risk(s)

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# A pragmatic definition of Model Risk (in Finance)

## *A Model*

is an implemented set of mathematical formulae and rules applied to input data, whose output data are used in management decisions

## *Model Risk*

is the risk of taking incorrect decisions due to errors while using models  
(or even if you don't use a model where you should)

# A pragmatic view on Model Risks

## Examples

- use of bad, wrong, incomplete models
- application of a model is not adapted to the specific economic situation
- unexpected use of erroneous results
- errors in the interpretation of model results
- actions taken are incomplete or wrong

## Or

- no use of models where one could profit from data and modelling!

## Models in Finance as opposed to physics:

- no „truth“, models are not „true“
- very little foundation by experiments
- almost no repeatable situations

## But models may be

- useful
- suitable
- powerful (e.g. big data)

# Critical look at the Life cycle of Models

## **5 Revalidation or replacement**

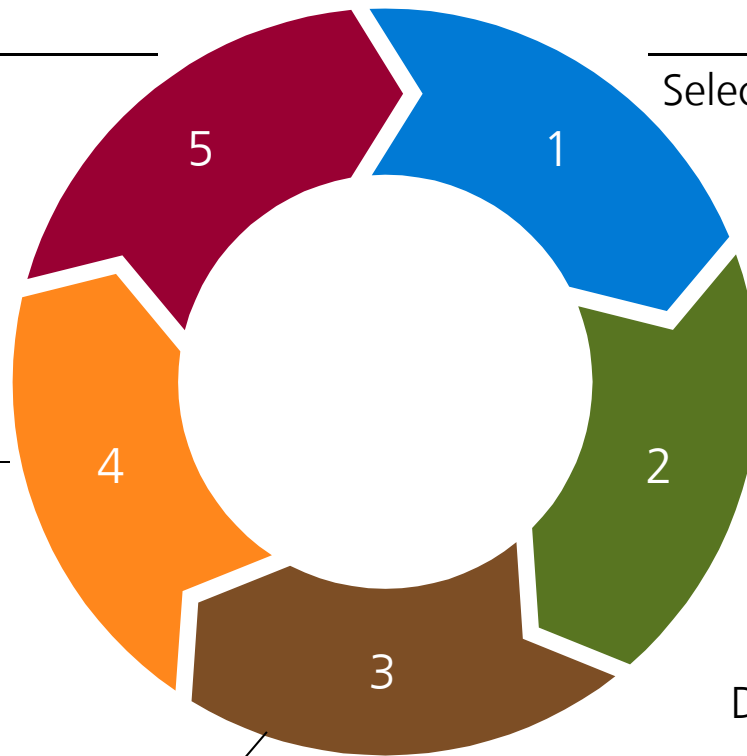
Regular validation, backtesting, replace if conditions are falsified

## **4 Application of the model**

Teaching the handling, rules of application, experiences of the users, quality and performance controls

## **3 Validation and implementation**

Independent initial validation, definition of allowed scope of application, implementation, tests of implementation



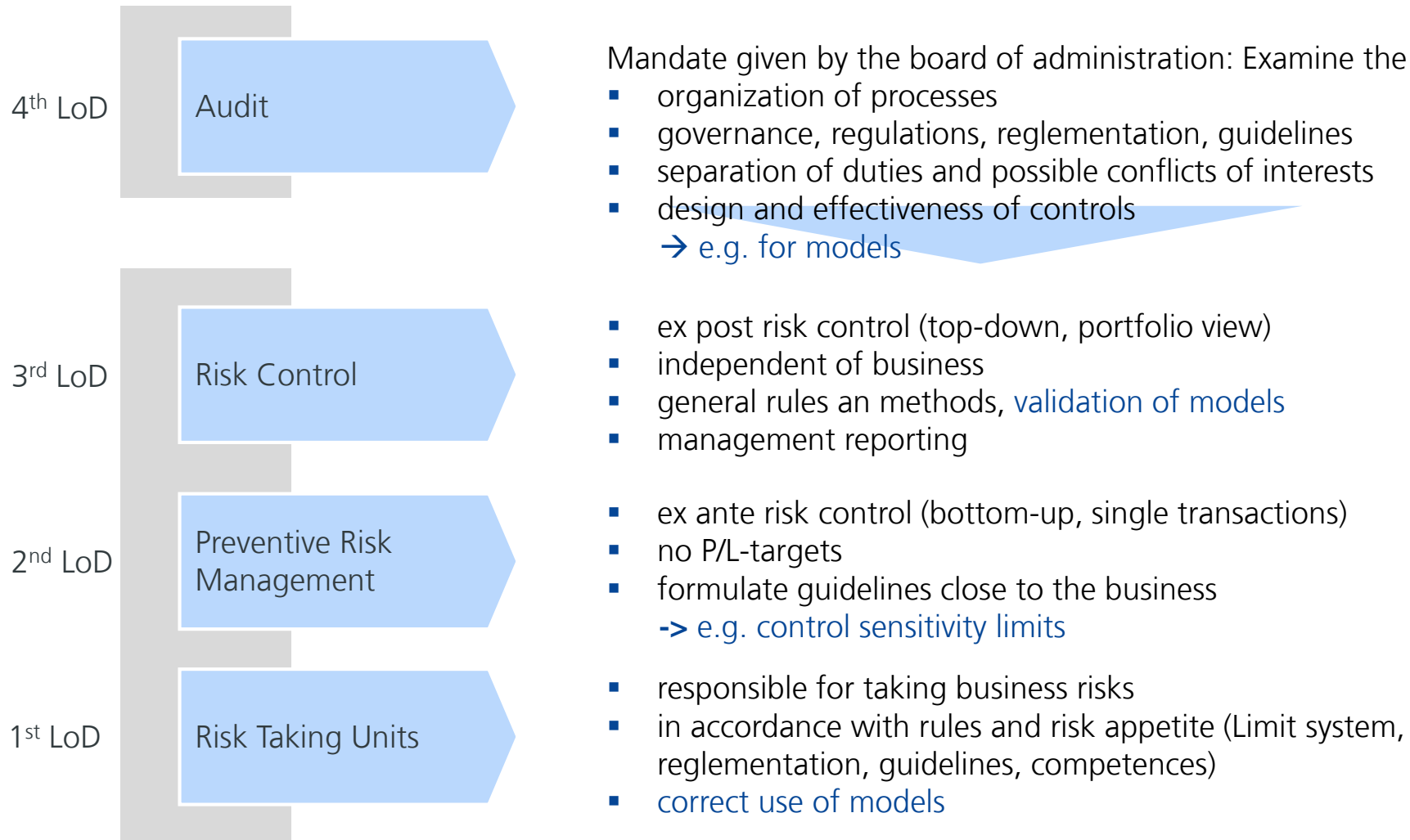
## **1 Data collection**

Selection, quality check, purification, transformation of data. Ongoing quality standards

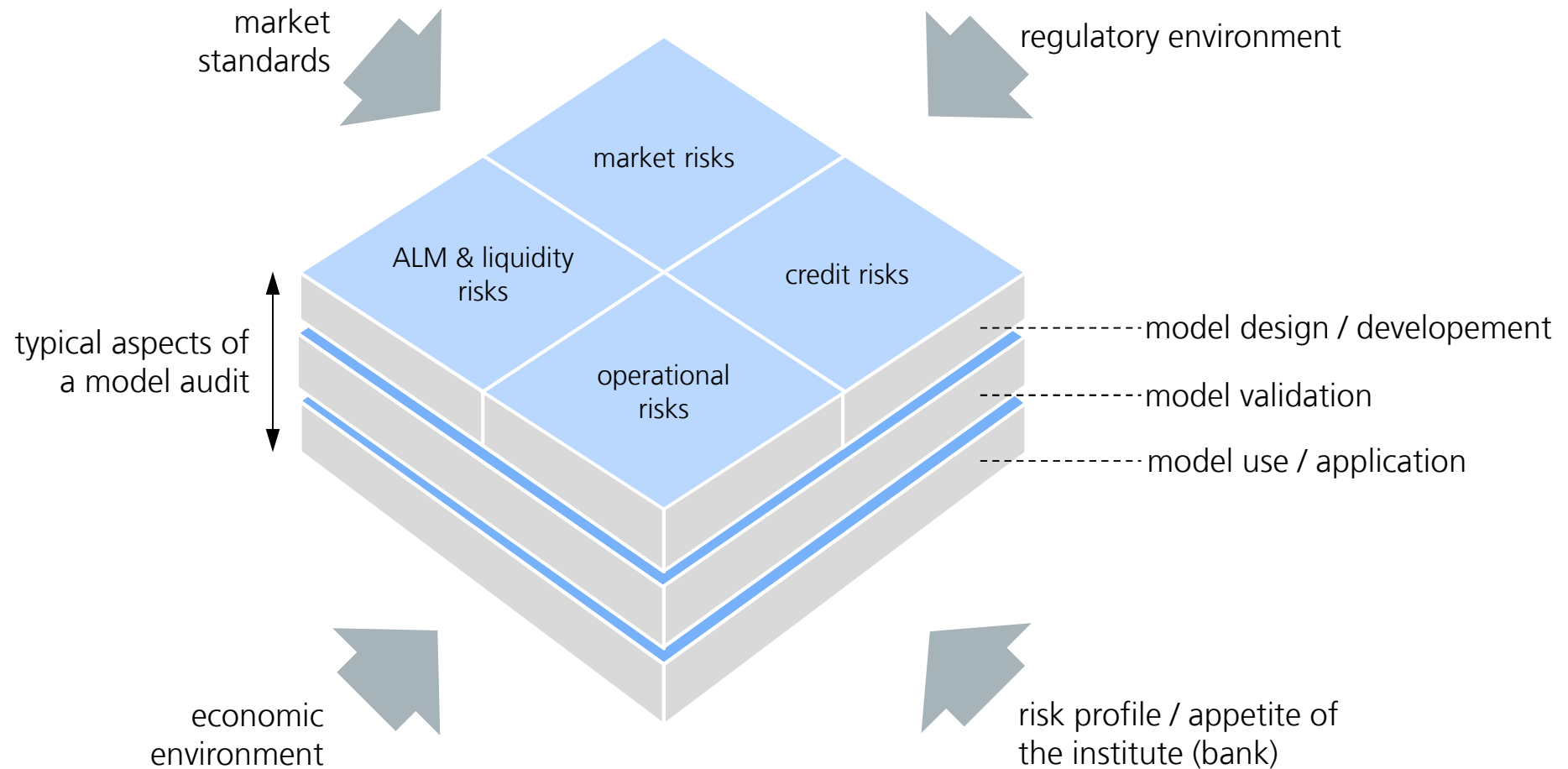
## **2 Model Development**

Choice of type, structure, risk factors, calibration. Documentation and specification

## Role of the Audit Department



# Model audits



# Audit Focus: Criteria to hold for models to be sound

## Sources of Model Risk(s) – examples

### Data

- completeness of Information
- quality benchmark
- interest of Management in data quality
- sufficient market data

### Initial Validation

- independent validation experts
- test of alternative methods
- documentation

### Handling

- only authorized access
- exceptions are documented

### Model Development

- model variables are plausible and economically justified
- variable sensitivity is reasonable
- sound statistical methods
- high predictability

### Implementation

- corresponds to model description
- correctness of coding
- all cases are documented

### Management Knowledge

- understanding of the model
- taken actions are adapted
- correct mitigation or hedging

### (Re)calibration

- adapted to economic state
- in accordance with internal processes
- reasonably conservative
- point in time or through the cycle?

### Application

- front person understands the significance
- data are correctly filled in

### Revalidation

- quarterly backtesting
- regulatory changes
- economic changes
- statistical performance testing

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