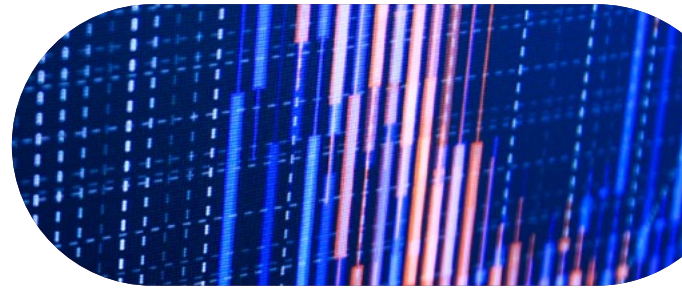
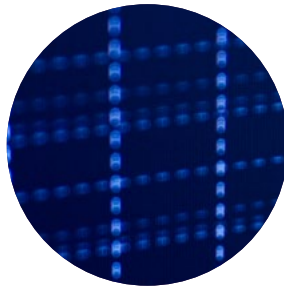


● Whitepaper

# Prudential Regulatory Authority UK Proposes Robust Model Risk Management Framework

Summary of CP6/22: Model Risk Management Principles for Banks



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## Overview

In June 2022, the Prudential Regulatory Authority (referred as the PRA/ The Regulators henceforth) published its Consultation Paper (CP6/22) on Model Risk Management Principles for financial institutions. With this document, the PRA has set out its expectation on financial institutions' model risk management and has termed MRM as a risk in its own. The PRA is looking to consolidate its guidelines and requirements on model risk management under a single directive and extend the coverage of model risk management principles to cover all model classes. The PRA further mentioned that with this Supervisory Statement (SS), it expects financial institutions to reinforce their policies, procedures, and practices to identify, manage, and control the risks associated with the use of models (in-house or vendor models) and the models used for financial reporting purposes. The PRA's expected outcome of this SS is that the covered financial institutions take a strategic approach to MRM as a risk discipline and

it has laid out five principles. Of these five principles, model inventory and model risk governance are mandatory principles for all the covered financial institutions such that the firms' board of directors have primary accountability for providing the oversight of the model risk framework of their organization.

With this document, the Evalueserve team summarizes key regulatory expectations set out by the PRA in CP6/22 and its impact on MRM in the financial institutions. The PRA expects all firms under the purview of CP6/22 to abide within one year after the publication of these guidelines.

We also present Evalueserve's capabilities to support Financial Institutions to implement CP6/22 requirements using the MRMOne™ platform, which we have developed in partnership with The MathWorks Inc.



## Use & Definition of Models

### Use of Models

The PRA mentioned that the firms are relying on a wide range of sophisticated models for their business decision-making, risk management, and reporting. However, the firms that rely on these models and scenario analyses need to establish sound model governance and effective MRM policies.

### Definition of Models / Quantitative Methods

The Regulators defined numerical calculations, systems, approaches, end-user computing (EUCs) applications and calculators as a part of models/ quantitative methods and outputs, which are fundamentally indeterminate, as the model estimates are calibrated on limited data; hence, these are simplified explanations of complex real-world systems and processes. Therefore, the PRA expects the firms to establish good risk management practices, which involve:

- Verification of model-based decisions and their real-world applicability
- Validation of the model assumptions with regards to business context



### EVS View

**1.** With uncertainty around model estimates, the firms essentially need to establish best-in-class risk management practices to back-test model-based decisions and substantiate the model assumptions with regards to real life business context.

**2.** End-user computing (EUCs) applications and calculators are also now classified as models as per the definition of models in this directive. Hence, impairment losses, expense provisions, counterparty credit liquidity shortfall estimates, and other similar estimates, which are normally done through simple excel-based calculations fall within the ambit of model risk framework and will have to be tracked and governed throughout their lifecycle. All changes to spreadsheets classified as models will need to be authorized and logged. This demands a significant shift in how spreadsheets and EUCs are developed, deployed, used, and changed. Hence, user awareness and coaching in terms of their responsibilities for these "models" will form an important component of the regulatory change management program triggered by implementation of CP6/22.

**3.** The wider definition of models is not an altogether new concept and has been implemented by many banks covered within the SR 11-7 and SS 3/18 frameworks. There are learnings and best practices, which will come to the aid of newly covered financial institutions as they gear up for compliance with CP6/22.



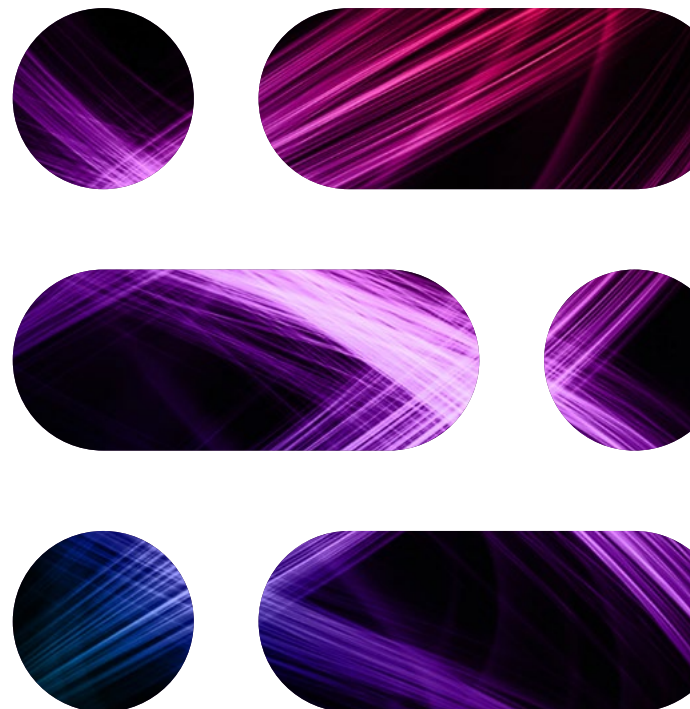
## Model Risk & Model Life Cycle

The PRA has defined various facets of model risk, as given below.

- Model risk leads to adverse consequences – such as a deterioration in the prudential position, non-compliance with applicable laws and/or regulations, or damage to a firm’s reputation – from model errors or the inappropriate use of modelled outputs to make informed business decisions.
- The model’s output depends on:
  - A.** The appropriateness of model methodology
  - B.** The quality and relevance of input data
  - C.** The accuracy of implementation
  - D.** The ongoing scope of applicability of the model. The PRA further mentioned that the suitability of the model for the intended use may be impacted by the assumptions, and hence, is required to be monitored on an ongoing basis.
- Individual model risk increases with model complexity. In addition, model risk increases with larger numbers of inter-related models and inter-connected data structures and data sources.

### EVS View

*The regulators have provided the details of the adverse impacts of model risk, and the threats emanating out of it. They have also mentioned various dimensions of model risk (complexity, inter-connectedness, and underlying data) that can be further used for tiering of the models.*



## Model Risk & Model Life Cycle

### Model Risk Management using Sound Model Life Cycle and Risk Organization Structure

The PRA expects the firms to manage model risk using an effective MRM framework, which includes a comprehensive model governance and oversight framework supported by an effective model lifecycle management.

#### EVS View

*The PRA has defined clear roles and responsibilities of the model developer, model validators, and model risk control teams. The regulators have emphasized on the segregation of roles for the model development and validation teams, while having MRM as a separate control function.*

## MRM Segregation of Roles

### Model Development

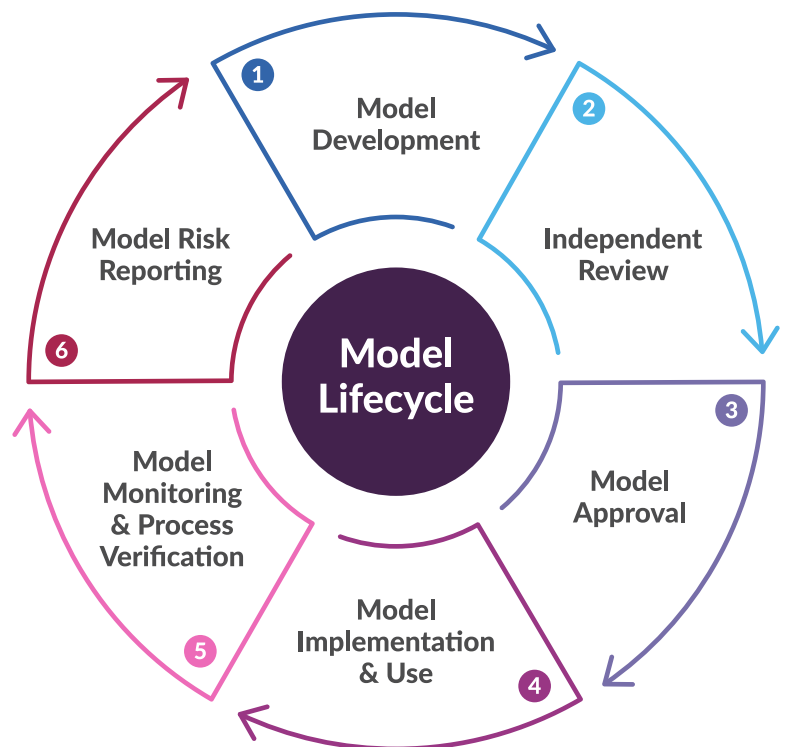
Design, develop, evaluate (test), and document models. Model developers can be model owner/users.

### Model Validation

Provide an objective and unbiased opinion on the adequacy and soundness of models. Validators should, therefore, not be part of any development activities.

### Model Risk Management

Create and maintain the MRM framework and risk controls. Responsibilities for the MRM framework and risk controls are usually assigned to individuals and/or model risk committees if MRM is not established.



## Cornerstones of Model Risk Management

Model Risk Management Principles: The PRA has set out '5' core principles for Model Risk, as given below.

### PRINCIPLE 1

#### Model Identification & Model Risk Classification

Establish definition of a model that sets the scope for MRM, a model inventory and a risk based tiering approach to categorize models to help identify and manage model risk.

### PRINCIPLE 2

#### Governance

Strong governance oversight with a board that promotes an MRM culture from the top through setting a clear model risk appetite.

The board approves the MRM policy and appoints an accountable individual to assume the responsibility of implementing a sound MRM framework.

### PRINCIPLE 3

#### Model Development, Implementation & Use

Robust model development process with standards for model design and implementation, model section, and model performance.

Testing of data, model construct, assumptions, and model outcomes is performed regularly in order to identify, monitor, record, and remediate model limitations and weaknesses.

### EVS View

- 1. The Regulators have established a clear pathway for managing model risk from the cradle to the grave while establishing the process, starting from model identification/classification □ Model Governance □ Model Development □ Model Validation □ Model Risk.*
- 2. The regulators have also tasked the internal audit function with the periodic assessment of the effectiveness of the MRM function as part of Principle 2 on governance. Hence, the model audit function, which so far has been more common among larger banks, will be required to be formally established across all covered financial institutions.*

### PRINCIPLE 4

#### Independent Model Validation

Need to establish validation process that provides ongoing, independent, and effective challenge to model development and use.

The individual or body within a firm responsible for the approval of a model ensures that validation recommendations for remediation or redevelopment are actioned so that models are suitable for their intended purpose.

### PRINCIPLE 5

#### Model Risk Mitigants

Need to have policies and procedures for the use of model risk mitigants when models are under-performing, and have procedures for independent review of post-model adjustments.

## Cornerstones of Model Risk Management

### Proportionality

PRA expects the practical application of the principles by all firms to be commensurate with their size, business activities, and the complexity and extent of their model use.

For firms with smaller number of models or less complex models, maintaining a model inventory should be less burdensome, and the criteria for classifying models into tiers can be simpler than for firms with a wider range of models or more complex models.

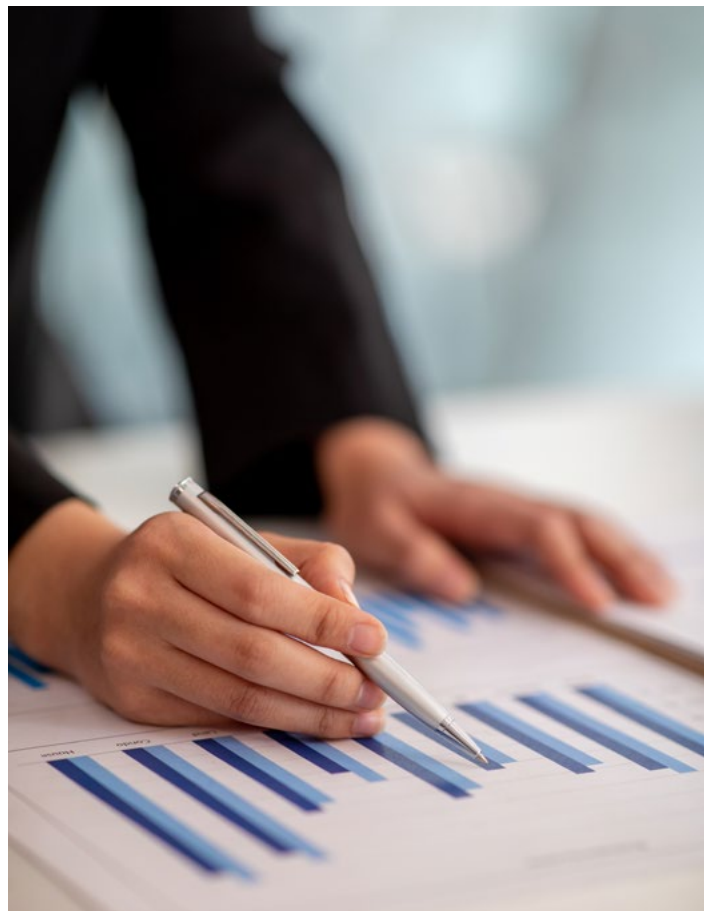
The rigour, intensity, prioritisation, and frequency of model validation, application of risk controls, independent review, performance monitoring, and re-validation are expected to be commensurate with the associated with the model tier assigned to a particular model.

In this SS, the PRA has mentioned its expectation of model risk management for simpler-regime firms as given below:

- **Principle 1:** should apply in full
- **Principle 2:** should focus on basic elements, such as board approves MRM policy and retains responsibility for MRM along with Senior Management, appoints an accountable individual to implement MRM framework, and should have clearly documented MRM policies, and Internal Audit (IA) should access the soundness of MRM framework periodically
- **Principle 3, 4, and 5:** are expected to be applied only to those models identified as having a material bearing on business decisions, and where these models are complex in nature

### EVS View

*The PRA has removed ambiguity on the application of MRM principles, especially for simpler firms. The authority has laid out how model tiering can be used for prioritizing and setting frequency for model validation, application of risk controls and independent reviews, etc.*





## Cornerstones of Model Risk Management

### Senior Management Function (SMF) accountability for Model Risk Management Framework

The PRA sets out accountability of SMF for the MRM framework, and given below are key points:

- Active senior management and board involvement in firms' MRM governance processes
- Strengthening the accountability of firms and individuals for managing model risk, which means that the PRA expects firms to identify and allocate responsibility for overall MRM to the relevant SMF most appropriate within the firm's organisational structure and risk profile as part of Principle 2

### Financial Reporting and External Auditors

The Regulators mentioned about their expectations related to the model used for accounting purpose and clearly mentioned that this SS is relevant to these models as well. They also emphasized on the role of auditors' assessment for effectiveness of MRM function and response to, the risk of material misstatement as part of the statutory audit, including its understanding of a firm's processes for monitoring the effectiveness of its system of internal controls and its understanding of a firm's control activities. The PRA further emphasized on the effectiveness of MRM for financial reporting to their audit committee on a regular basis, and at least annually.

#### EVS View

*The PRA has also clearly mentioned the Senior Management Function, including the board of directors' involvement in MRM governance processes. The firms need to make required changes in the organizational structure and risk profile of the organization.*

#### EVS View

- 1. In this SS, the PRA has set out clear expectations towards the role of auditors, the necessity for an annual audit assessment, and the essential requirements for financial reporting to the audit committee on a regular basis for an effective MRM processes. External auditors are now formally tasked with the review of the model risk management function and will have to provide an audit opinion on framework, policies, processes, and internal controls related to model risk management.*
- 2. We also expect model risk reporting to zoom in on key risk indicators related to the models used for accounting / financial purposes. These models include valuation models for balance sheet reporting, and impairment / ALLL models / IFRS 9 models for loss provisions in the profit and loss account.*

## Cornerstones of Model Risk Management

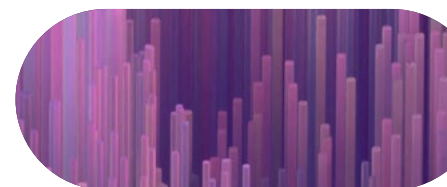
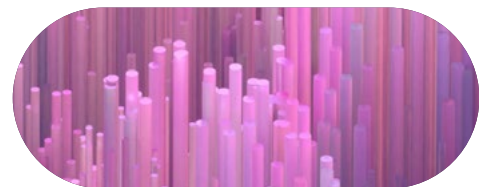
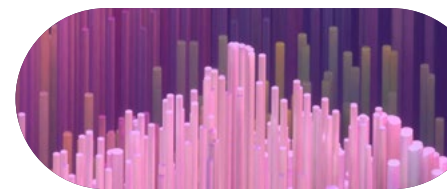
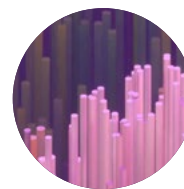
### Implementation & Ongoing Self-assessment

Most importantly, the PRA has mentioned the following key guidelines with regards to the implementation of this SS policy document for the firms under its purview:

- PRA expects the firms to implement this policy within 12 months of its publication
- By the implementation date, the firms should be able to: a) conduct and produce self-assessment of their MRM frameworks against MRM principles and b) prepare a remediation plan against any shortcomings
- Self-assessments should be updated at least annually thereafter, and any remediation plans should be reviewed and updated on a regular basis
- The relevant SMF accountable for overall MRM should be responsible for ensuring remediation plans are put in place where necessary, with clear ownership of any necessary actions

#### EVS View

*As the PRA has provided clear implementation timelines and guidance notes, the firms that fall under its purview need to work on these MRM principles on an immediate basis, and should be able to produce self-assessment reports and remediation plans across the Risk organization including all three lines of defenses.*



## Evalueserve's Solution to Meeting CP6/22 Requirements

Evalueserve has developed MRMOne™ – Model Governance Platform in partnership with MathWorks. Our partnership combines insights from the **Expertise of MRM Practitioners + Efficiency of Digital Tools** to deploy turnkey Model Risk Management solutions for our clients.

It is trusted by a wide range of FS clients across Banks, Insurance companies, and Asset Managers, and offers Market Leading Technologies for MRM Global Team of Quantitative, Risk, Analytics, and Development Specialists.

## MRMOne™'s Key Features

- Model Governance accelerator
- Ready-to-deploy Inventory system, including workflow management tools across Model Risk Activities

The following are the key challenges that FIs are likely to face with the introduction of CP6/22 requirements along with MRMOne™ solutions to tackle these challenges.

### Transparency on Model Risks

Faster and frequent communication to stay on top of issues and risk involved with the models. Executive dashboards for model risk committee.

### Audit Trails & Documentation

Auditability and controls throughout model lifecycle.

### Model Validation Findings Tracking

Visibility into model and findings dependencies. Overview and breakdown of findings by status, issue rating, due dates, etc.

### Simplifying Workflows & Tasks

Lightweight- easy to work with; balancing on and off the platform workflows. Reduced cost of model governance functions. Model attention functionality.



## Target User Groups and Benefits of MRMOne™

User Group	Key Needs	Benefits of MRMOne
<b>BoD &amp; Senior Management</b>	<ul style="list-style-type: none"> <li>• Transparency and clarity on Model Risk of the model portfolio or resource planning</li> </ul>	<ul style="list-style-type: none"> <li>• Interactive, action driving, ready to use reports for steering and executive team</li> <li>• Explainable model risk metrics</li> <li>• Bespoke dashboards</li> <li>• Data governance and add on services</li> </ul>
<b>MRM Governance</b>	<ul style="list-style-type: none"> <li>• Tracking findings and open validations through alerts</li> <li>• Configurable and customizable platform for various stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>• Robust tech stack</li> <li>• Multiple options for workflow configuration</li> <li>• Many-to-many mapping of schema objects to handle model use cases associated with legal entities and super findings</li> </ul>
<b>Model Validation &amp; Model Owners</b>	<ul style="list-style-type: none"> <li>• Simplified workflow management</li> </ul>	<ul style="list-style-type: none"> <li>• Visibility into upcoming and overdue actions and task overdue</li> <li>• Ease of collaboration in preparation for MRC meetings and other processes</li> </ul>
<b>Internal Audit Team</b>	<ul style="list-style-type: none"> <li>• Easily accessible audit trails and documentation</li> </ul>	<ul style="list-style-type: none"> <li>• Model changes tracked for audit purpose and data lineage</li> <li>• Storage of artefacts in multiple repositories</li> </ul>

## Evalueserve's Contacts



### **Anna Slodka Turner**

*Head of Quant & Risk Solutions*

Anna has 15 years of experience serving leading financial services clients. She has spent 10 years serving some of the largest banking clients at McKinsey & Co, leading several transformation programs, ensuring that the benefits are well understood and captured. With flawless execution and preparation, all projects were delivered on time and budget. She was a member of three of the largest government bail-out programs globally. Most recently, she was a Director at EY in their Financial Services Office, member of the Strategy & Customer Advisory Service. She also held the position of the Head of Research and Comparative Analysis, where she led the flagship research project "Audit of the Future" and creating some of the first RPA applications in audit. She holds a PhD in Business Studies and was also the recipient of a scholarship from the University of Sussex, UK; University of Vienna, Austria; and Business School of Thessaloniki, Greece.



### **Mamta Mittal**

*Head of India Risk Operations and MRMOne™ Solution*

Mamta has been with Evalueserve since 2004. She leverages her 18 years of financial services experience and strong analytical background to ensure the highest level of rigor to risk analytic delivery. She has experience in areas such as model validation, re-documentation and model monitoring for credit and market risk models, risk reporting and visualization. At Evalueserve, she has helped in building large accounts and leading teams in solution design, transition planning and implementation, client governance and servicing, and knowledge management. Mamta is a chartered accountant (equivalent to CPA) and holds an MBA from Management Development Institute and a bachelor's from Shri Ram College of Commerce, Delhi.



### **Amit Inamdar**

*Associate Vice President, Risk Practice, London*

Amit has 15 years of experience in risk management, regulatory advisory, and big data analytics in the banking and insurance sector. He has worked on numerous assignments, including model development and validation in the areas of pricing and regulatory risk models.

Before joining Evalueserve, Amit worked with firms such as RBS, S&P, KPMG, and J.P. Morgan. Amit has a master's degree in business administration, with a specialization in Finance. He also has a master's degree in technology from IIT Bombay, India.