OSFI Guideline E-23

# Model Risk Management Assessment Report

# 1. Model Information

Model Name: SmartCredit AI Risk Assessment System

Assessment Date: September 11, 2025

Framework: OSFI Guideline E-23 Model Risk Management

Effective Date: May 1, 2027

Scope: Federally regulated financial institutions

Risk Rating: Medium

Risk Score: 49/100 points

# 2. Executive Summary

This AI/ML-powered, financial decision-making, automated processing, customer-facing model presents moderate model risk requiring standard governance procedures under OSFI Guideline E-23 Model Risk Management framework. Standard governance procedures with regular monitoring and semi-annual reviews are sufficient. The assessment indicates Medium risk classification requiring appropriate risk management intensity commensurate with the model's risk profile.

# 3. Model Description and Business Rationale

The Royal Bank of Canada is developing an AI-powered credit risk assessment system called "SmartCredit" to automate and enhance loan approval decisions for personal loans, mortgages, and small business credit applications. The system will be deployed across all Canadian branches and online platforms, processing approximately 50,000 applications monthly.  
  
Technical Architecture: The system uses a hybrid machine learning approach combining gradient boosting algorithms (XGBoost) with deep neural networks. It analyzes over 200 data points including credit bureau reports, banking transaction history, employment records, social media activity indicators, and alternative data sources like utility payment patterns. The model incorporates natural language processing to evaluate loan application essays and employment verification documents.  
  
Data Sources:  
\* Equifax and TransUnion credit reports  
\* 24 months of customer banking transaction data  
\* Employment verification through third-party services  
\* Property assessment data from municipal databases  
\* Open banking data from other financial institutions (with consent)  
\* Publicly available social media profile information  
  
Decision Scope: The AI system will automatically approve loans up to $75,000 for personal loans and $500,000 for mortgages when confidence scores exceed 85%. Applications with scores between 60-85% are flagged for human review, while scores below 60% result in automatic denial with explanation. The system affects approximately 2.5 million Canadians annually who apply for credit products.  
  
Stakeholder Impact: Primary stakeholders include loan applicants, bank staff, regulatory bodies (OSFI, FCAC), and secondary impacts on families, small businesses, and housing markets. The system particularly affects newcomers to Canada, young adults establishing credit, and small business owners seeking growth capital.  
  
Current Implementation Stage: The project is in the design phase, with model development 60% complete. Initial backtesting shows 12% improvement in default prediction accuracy compared to existing manual processes, but reveals potential disparate impact on Indigenous communities and recent immigrants. The bank plans deployment in Q2 2025 following regulatory approval.  
  
Risk Considerations: Key concerns include algorithmic bias, data privacy compliance, model interpretability for regulatory scrutiny, operational resilience, and reputational risk from automated denials. The system requires integration with existing core banking infrastructure and must comply with PIPEDA, OSFI guidelines, and emerging AI governance frameworks.

Business Rationale:

This model supports risk management objectives by providing quantitative risk assessments to inform business decisions and regulatory compliance requirements.

# 4. Model Risk Assessment

## 4.1 Risk Rating Methodology

The model risk rating follows OSFI E-23 methodology, evaluating both quantitative and qualitative risk factors. Quantitative factors include portfolio size, financial impact, and operational criticality. Qualitative factors assess model complexity, autonomy level, explainability, and third-party dependencies. Risk amplification is applied when high-risk combinations are identified, such as AI/ML usage in critical financial decisions.

## 4.2 Quantitative Risk Factors

* Significant financial impact on institution and customers
* Direct customer impact requiring enhanced controls
* Regulatory compliance and reporting dependencies

## 4.3 Qualitative Risk Factors

* AI/ML technology requiring specialized validation and monitoring

## 4.4 Risk Interactions and Amplification

* Risk factor interactions evaluated for amplification effects
* Combined risk scenarios assessed for governance implications
* Risk mitigation strategies aligned with interaction patterns

# 5. Model Risk Management Framework

## 5.1 Organizational Structure and Accountability

Model Owner: Business unit responsible for model outcomes and business rationale

Model Developer: Technical team or vendor responsible for model development and maintenance

Model Reviewer: Independent validation team responsible for model review and testing

Model Approver: Approval authority as per risk level: Senior Management or Risk Committee

## 5.2 Policies, Procedures, and Controls

* Model Risk Management Policy defining roles, responsibilities, and governance framework
* Model Development Standards specifying technical and documentation requirements
* Model Review and Validation Procedures for independent assessment processes
* Model Approval Procedures defining authority levels and approval criteria
* Model Monitoring and Performance Management Procedures
* Model Change Management Procedures for updates and modifications
* Model Decommission Procedures for retirement and replacement processes

# 6. Model Lifecycle Management

## 6.1 Model Design

* Clear organizational rationale and business case documentation
* Comprehensive data quality and governance standards
* Appropriate model development methodology and documentation
* Performance criteria and success metrics definition
* Model limitations and assumptions documentation

## 6.2 Model Review and Validation

* Independent conceptual soundness review
* Comprehensive performance evaluation and testing
* Risk rating confirmation and documentation
* Model documentation completeness review
* Limitation and mitigation strategy assessment

## 6.3 Model Deployment

* Quality assurance and change control processes
* Production environment testing and validation
* Stakeholder coordination and communication
* Risk assessment completion and sign-off
* Monitoring framework setup and configuration

## 6.4 Model Monitoring and Performance Management

Monitoring Frequency: Monthly monitoring with quarterly comprehensive review

Key Performance Indicators:

* Model performance accuracy and stability metrics
* Prediction quality and consistency indicators
* Data quality and completeness measures
* Usage patterns and volume statistics

## 6.5 Model Decommission

* Formal model retirement process and timeline
* Stakeholder notification and communication plan
* Documentation retention and archival procedures
* Downstream system impact assessment and mitigation
* Third-party model considerations and vendor coordination
* Data retention and disposal procedures
* Replacement model transition planning

# 7. Documentation Requirements

* Model rationale and business purpose documentation
* Data sources, quality standards, and governance documentation
* Model methodology, assumptions, and limitations documentation
* Performance metrics, validation results, and testing documentation
* Risk assessment and mitigation strategy documentation

# 8. Compliance Checklist

☐ Model inventory registration (design - Required)

☐ Risk rating assignment (design - Required)

☐ Model documentation completion (design - Required)

☐ Independent model review (review - Required)

☐ Formal model approval (review - Required)

☐ Production deployment testing (deployment - Required)

☐ Monitoring system activation (deployment - Required)

☐ Regular performance monitoring (monitoring - Required)

# 9. Implementation Timeline

Design Phase: 6-8 weeks

Review Phase: 3-4 weeks

Deployment Phase: 3-4 weeks

Monitoring Setup: 2-3 weeks

# 10. Recommendations and Next Steps

* Establish comprehensive Model Risk Management framework aligned with OSFI E-23
* Implement risk-based approach to model governance
* Ensure model inventory includes all models with non-negligible risk
* 📋 MODERATE RISK: Implement standard governance procedures
* Conduct semi-annual model reviews
* Establish regular monitoring and reporting
* 🤖 AI/ML: Implement explainability controls and bias testing procedures
* 💰 Financial: Implement enhanced capital and liquidity impact assessments

# 11. Appendices

## Appendix A: OSFI E-23 Core Principles

Principle 1.1: Organizational Enablement

Effective reporting structures and proper resourcing should enable sound model governance

Principle 1.2: MRM Framework

The MRM framework should align risk-taking activities to strategic objectives and risk appetite

Principle 1.3: Use of Models

Models should be appropriate for their business purposes

Principle 2.1: Model Identification

Institutions should identify and track all models in use or recently decommissioned

Principle 2.2: Model Risk Rating

Institutions should establish a model risk rating approach that assesses key dimensions of model risk

Principle 2.3: Risk Management Intensity

The scope, scale, and intensity of MRM should be commensurate with the risk introduced by the model

Principle 3.1: Policies, Procedures, and Controls

MRM policies, procedures, and controls should be robust, flexible, and lead to effective requirements applied across the model lifecycle

## Appendix B: Risk Rating Levels

Low: Minimal governance requirements (Score: 0-25)

Medium: Standard governance requirements (Score: 26-50)

High: Enhanced governance requirements (Score: 51-75)

Critical: Maximum governance requirements (Score: 76-100)

# 12. Disclaimer and Limitations

This OSFI E-23 model risk assessment is based on available project information and automated analysis. Final compliance with OSFI Guideline E-23 requires comprehensive stakeholder input, independent validation, and appropriate governance oversight. This assessment should be reviewed and validated by qualified model risk management professionals before making final risk management decisions.