

Model Risk Management With SAS and Deloitte



BUSINESS IMPACT

When risk model governance is ineffective, companies today can face millions of dollars in penalties imposed by regulators, according to the [US Securities and Exchange Commission](#).

CHALLENGES

- **Increasing model risk governance:** As models grow more complex, model risk increases. Machine learning, for instance, makes models more dynamic. So they need frequent performance monitoring, constant data reviews and benchmarking, and contingency plans.
- **Lack of integrated model information systems:** Regulations require banks to have reliable model risk management practices to identify, monitor and control models across all risk categories.
- **Resource constraints limit the quality of model documentation:** With an overstressed staff, the focus tends to be on model development and not accurate documentation. This makes it difficult to understand and explain models, internally and to regulators, when key employees leave.
- **Complexity of models built by multiple people and coding languages:** This makes it difficult to manage models at an enterprise level and can cause cascading issues as changes are made.
- **Model interconnectedness and contamination:** Companies must thoroughly understand the relationships between models and the risks of interconnectedness within their model inventory.
- **Regulatory compliance:** Banks must be able to demonstrate to regulators how and why models reach decisions. Failure to do so can result in significant penalties.

The Business Need

Times of market stress reveal the risks inherent in analytic models. These risks can potentially result in failures that prompt increased regulator and investor scrutiny. In addition, organizations are using emerging model methodologies and related modeling technologies to create an expanding and dynamic inventory of models that they cannot manage effectively using the traditional combination of humans, code, data and documents. Within industries that are maturing in their use of and reliance on models, model life expectancy is decreasing, which is complicating model management further.

Most companies today use a wide variety of models to harness growing data volumes across their business functions, lines of business and geographic areas. The ability to innovate new ways to exploit data has become a key advantage.

But the recent explosion of data and modeling techniques has become a double-edged sword for most companies.

Model development is often rooted in outdated development cycles not designed to handle today's data volumes, diversity and complexity. As a result, models often produce suboptimal outcomes and inaccurate results that negatively affect business decision making and lead to costly fines. For example, in 2019, [the SEC fined Prosper Funding LLC \\$3 million](#) for a quantitative model error that generated inaccurate performance data and misled investors.

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Regulators now expect businesses to adhere to model risk management guidance, such as in SR 11-7 in the US and Guideline E-23 in Canada. [According to legal firm Mayer Brown](#), fines can be levied for failures - for example, when models generate erroneous results (for instance, due to outdated code) or have insufficient documentation and thus cannot be explained (a common issue when models employ undocumented artificial intelligence and machine learning algorithms).

To mitigate these risks, models require regular validation, rebuilding, respecification and documentation. Organizations must regularly review, test and monitor every model, as the risks of model-related problems are real and costly. Using traditional model management approaches, the review process is highly cumbersome. For example, the modeling staff must review a model's performance, which involves rebuilding or extending the supporting data set, performing and documenting all tests and checks, and more.

Organizations need business expertise coupled with a model risk management (MRM) platform for model policy, governance and control for development, testing, implementation, validation, documentation and monitoring. MRM platforms can address model assessment, inventory and validation through all stages of the model life cycle.

Our Joint Approach

Together, Deloitte and SAS offer a comprehensive MRM solution that maximizes investment and lowers risk.

SAS offers a robust, enterprise-ready platform that is open and flexible, enabling it to support models coded with SAS®, R, Python, C++ and other languages. No matter what statistical language your company uses for models, you can benefit from:

- Support for various model types (such as risk, capital and pricing models).
- An enterprise-ready solution.
- End-to-end model life cycle management.
- Embedded controls to ensure process transparency.
- Low IT involvement, thanks to functionality that's geared toward business users.
- Out-of-the-box model risk-specific templates for workflows, business rules and more.
- Centralized model inventory.
- Effective policy enforcement.
- Customizable dashboards and reporting at multiple levels of detail.
- Support for a broad range of algorithms, such as closed form, PDE, FDM, MCS and machine learning.
- An open, white-box platform that enables model explainability.
- Multiple deployment options.
- Open source and machine learning support.



By providing model development, model validation, internal audit and overall best practices, Deloitte enables SAS solutions for MRM. Because these activities affect many aspects of a financial institution's risk management framework - including credit models, data processes and IT systems - Deloitte's industry and risk professionals bring a broad range of supporting services leveraging their:

- **Global presence:** Deloitte is the largest, most trusted global professional services firm specializing in technology delivery, domain advisory and managed services.
- **Business-led and technology-enabled delivery capabilities:** Deloitte practitioners have experience working directly for clients and regulators around the world, bringing both depth and breadth of expertise in risk, regulatory and control environments, and local and global compliance. Deloitte also has certified practitioners in SAS technology and a globally distributed, dedicated managed services practice providing level one and level two support to many of the world's largest financial services firms.
- **Experience with all types of models and platforms:** Deloitte's experience in MRM spans across all models: closed form, finite difference, Monte Carlo, classification, regression, deep learning and reinforcement learning.

Key Differentiators

- **Our strategic relationship:** A joint relationship between Deloitte and SAS will help your organization resolve current and future challenges in terms of solution methodology and tools.
- **An experienced team:** Deloitte leverages SAS risk experts and trained IT specialist resources on SAS technologies.
- **Flexible solutions:** Deloitte and SAS offer an optimal mix that gives you the ease of a packaged solution and the flexibility of a custom solution.
- **A long, successful relationship:** Deloitte and SAS have a long history of working together in an alliance that brings the optimal combination of proven technology and implementation experience.

The Benefits

With SAS technology and Deloitte services and expertise, you can realize a significant return on investment, including:

- **Stronger regulatory compliance** - enabled by model lineage and governance processes that provide effective control of your model portfolio.
- **Reduced time to value** - in as little as two months for the first results.
- **Ongoing support** - that lowers internal IT costs and by handling platform releases with incremental features delivered by SAS.
- **Support for multiple model types, algorithms and languages** - including open-source algorithms.
- **Flexible customization** - for organization-specific reporting and policies.

What if you could ...

- Leverage an experienced team of model management experts and powerful software to create and maintain a model management environment that facilitates regulatory compliance and eliminates the need to constantly update home-grown solutions to meet demands?
- Implement a solution that can be in production quickly and that grows as your needs change?
- Centrally inventory and manage all models regardless of model type, model source (in-house and third party) or development technology?
- Provide support for the model validation and governance process in accordance with supervisory guidance on model risk management?





Deloitte Facts

- Deloitte has a global network of member firms providing market-leading professional services in audit, advisory, tax and consulting services across more than 20 industries.
- Deloitte helps organizations achieve better business outcomes through analytics and AI-powered transformation via a global, issue-focused storefront of offerings and highly specialized talent models.
- As a 15-year SAS Platinum partner, Deloitte has deep SAS expertise and has pioneered the implementation of SAS risk solutions with many clients.

SAS Facts

- [Chartis RiskTech Quadrant](#) positions SAS as a category leader.
- The SAS Platform is in production with over 40 clients worldwide.
- According to IDC, SAS owns 30.8% of advanced and predictive analytics market share - more than twice that of the nearest competitor.
- SAS solutions are used at more than 83,000 customer sites in 146 countries.
- 92 of the top 100 on the Fortune 2018 Fortune Global 1000 use SAS.



Learn more about the alliance
between SAS and Deloitte at
sas.com/deloitte.

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