

# Vendor Analysis: Moody's Analytics

## Technology Solutions for Credit Risk 2.0, 2018





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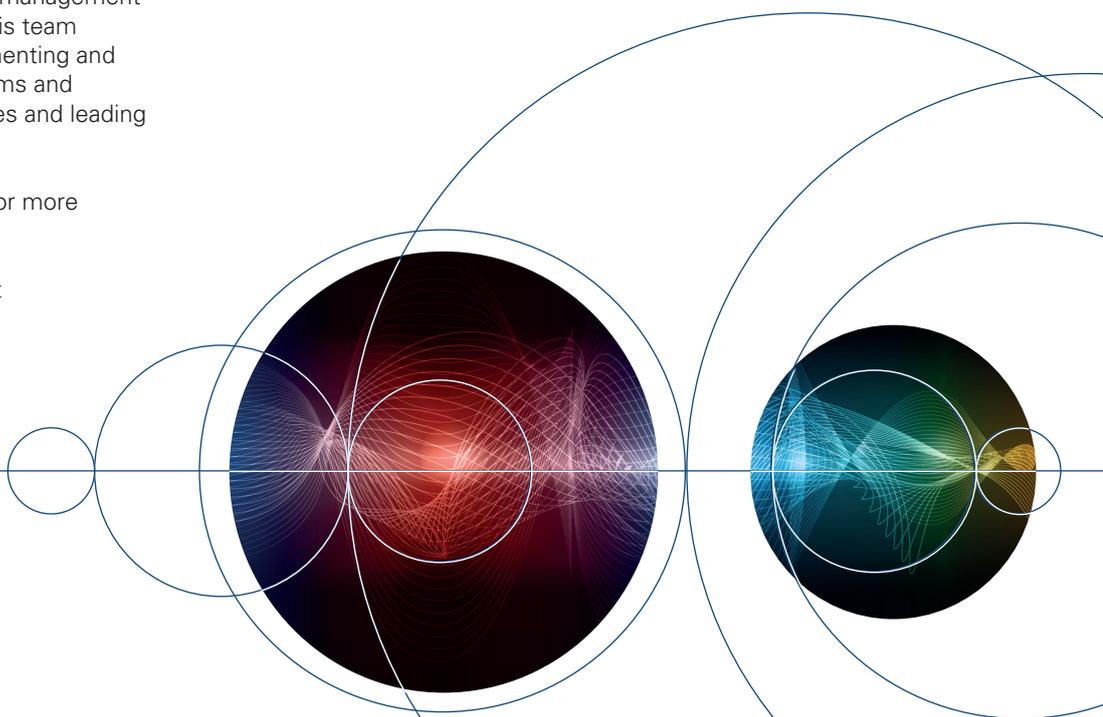
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# 1. Report context

This Vendor Analysis is based on the Chartis quadrant report *Technology Solutions for Credit Risk 2.0, 2018* (published in May 2018). This section summarizes the key theses in that report; subsequent sections take a detailed look at the quadrant positioning and scoring for Moody's Analytics, and Chartis' underlying opinion and analysis.

## Key thesis

### A new credit risk universe

The centuries-old mechanisms of credit, and in particular the ways in which they are assessed and analyzed, are in the throes of a revolution. Built on the emergence of new credit instruments, devised by the world's Financial Institutions (FIs), and propelled by innovative new technologies that are increasing the speed, flexibility and risk profile of the lending market, this revolution is reshaping the credit landscape.

Yet this is only the latest credit revolution to occur. With the introduction of internal ratings-based models, the Basel II regime heralded a step-change in the way that banks systematized their credit assessment and analysis in the mid-2000s. And, in the decade since the operationalization of the Basel II Accord, the market has continued to develop, driven by another revolution – a digital revolution – that has ushered in new capabilities, rising expectations, and a range of new risks.

Riding this wave of innovation, credit and its associated processes are, once again, poised at the brink of a totally new credit risk environment. We call this new normal 'Credit Risk 2.0', and we believe it is defined by three key factors:

- The emergence of new 'risk-aware' accounting standards, prompted by new measures like IFRS 9<sup>1</sup> and the CECL<sup>2</sup> regime. Both are altering the core of credit risk, down to the fundamental nature of how default risk is calculated.
- A new focus from regulators on market-linked contingent credit in the trading book (such as Credit Valuation Adjustment [CVA], Standardized Approach for measuring Counterparty Credit Risk [SA-CCR] and Fundamental Review of the Trading Book CVA [FRTB CVA])<sup>3</sup>. In the wake

of the financial crisis, FIs are moving to adopt clearer, more stringent and sustainable practices for measuring and managing counterparty risk.

- New computational approaches to assessing credit and credit risk – changes to the underlying mathematical models, such as new graph-based approaches and other similar innovative computational techniques.

### Trading on existing strengths

The Credit Risk 2.0 revolution can be seen most dramatically in the banking book, although it is not confined to it. In the trading book a 'credit transformation revolution' is also taking place, as FIs increasingly take on highly collateralized exposures, converting credit risk into contingent market risk and operational risk. In the wake of this transformation, a range of new analytics is emerging, such as Value at Risk (VaR)-style margin analytics and Margin Valuation Adjustments (MVA). We are also seeing the rise of new operational issues and challenges impacting the management of liquidity.

Despite challenges, credit risk analytics and methodologies in the trading book (such as CVA, CCR and margin models) all draw on a well-established theoretical framework going back many years. While CVA and MVA models may be breaking new ground, we would argue that overall they are simply signposts along the long evolutionary path of market-linked credit models, which dates back to Merton's framework<sup>4</sup> for calculating implied default rates from equity prices. Equally, while some of the Profit & Loss (P&L) practices, performance analytics and risk attributions associated with them may be relatively recent phenomena, broadly they draw on work that is relatively well established. In short, although Credit Risk 2.0 is driving significant changes in the trading book, systems and processes will continue

<sup>1</sup> The acronym IFRS is short for 'International Financial Reporting Standard'. For more on IFRS 9, see our report *IFRS 9 Technology Solutions Market Update, 2017*.

<sup>2</sup> Note that when we refer to CECL in this report, we mean the US Generally Accepted Accounting Principles (GAAP) Current Expected Credit Loss (CECL) accounting standard.

<sup>3</sup> Credit generated from derivatives and other instruments, where changes in market value can impact the amount of related credit exposure.

<sup>4</sup> Named after economist Robert Merton.

to evolve and cope – as they have been doing for years.

## Real revolution in the banking book

In contrast, we believe that the methodologies and technology underpinning models in the banking book are undergoing a profound structural revolution, and that considerable mathematical and structural development will be needed to bring them into line with the demands of Credit Risk 2.0.

To cope, we believe FIs need a new methodological and technical structure for their credit risk processes, one that is able to account systematically for the many idiosyncratic properties of banking book products. To do this it should encompass the frameworks needed to:

- Analyze the performance of loans.
- Integrate behavioral factors.
- Properly analyze the risk embedded in the contingent components of banking book products (so-called *optionality*).

As credit structures change, the character of the analytics used to analyze them will depend on the legal and operational context in which credit resides – what it is used for and how it is delivered. So, for example, while bonds and loans are similar products, they operate in different legal and market environments, with different consequences for how they are assessed and analyzed.

## Getting the technology right

Ultimately, we believe there has been a structural shift in the way that credit is provided, consumed and analyzed. Credit risk exists within an operational and analytical ‘value chain’, and credit analytics does not exist independently, but as part of a process. And on the supply-side, vendors will face several challenges in providing the most effective solution for FIs in the new credit universe.

## Demand-side takeaways

### Credit Risk 2.0: growing complexity, across the board

Chartis believes that credit risk is going through a rapid transformation, in both the banking book and the trading book. In the banking book, fundamental

elements of credit risk (such as Probabilities of Default [PDs] and Loss Given Defaults [LGDs]) have become more complex, and all credit data (whether banking or trading book) is now multidimensional. Equally, credit analytics tools must increasingly incorporate complex data sets.

We also believe that, as the credit risk evolution unfolds, the use of ‘alternative data’ will continue to rise, as diverse, non-traditional data types and non-traditional statistical processes are increasingly used in core credit scoring and in the analysis of retail and wholesale credit.

Another important dynamic is the growing importance of contingent credit, which is being driven by a combination of regulations (such as CVA, FRTB CVA and SA-CCR) and changing market conditions. Contingency and the evaluation of future states are standard features in most credit analytics products, although they are less mature on the banking book.

This activity is occurring not just in the wholesale credit sphere – we are seeing a comprehensive transformation in the retail credit business too. Although retail credit is highly constrained by regulatory requirements, we have seen a large increase in real-time credit products, as well as the use of much more sophisticated behavioral modeling.

## Understanding the technology impacts and challenges of Credit Risk 2.0

To understand the technology impacts of this new world of credit, and how FIs can mitigate them, it’s important to consider where credit risk sits in the operational value chain in the trading and banking books. This is crucial: credit risk very rarely exists as a distinct component in a software product, but almost always as part of a value chain. Few vendors offer pure credit risk solutions. Also, without the proper data structure in place to capture and define the relevant entity models, it’s impossible to calculate individuals’ credit risk.

In this increasingly complex credit environment, FIs – and vendors – must be able to manage the whole value chain, not just credit risk. By understanding where in the operational process credit risk sits, FIs can ensure they have an efficient process in place.

## Implications: rebooting the banking book

Unlike the trading book, which has been on a continually evolving path in terms of the way it

handles credit risk, the banking book is being exposed to these challenges for the first time. Unfortunately, existing banking book processes are not robust enough to cope. Some of the largest banks have recognized this issue, and are luckily well placed to tackle it: if, that is, they have the flexibility and desire to reconfigure the credit risk value chain for Credit Risk 2.0. But for most banks, these new developments are not within the scope of their traditional processes.

Analytics for the banking book need new data and computational components to address the new risk-aware world that is being ushered in by IFRS 9 and CECL. These components must include analytical techniques and data storage frameworks that incorporate the institutional, economic and cultural context within which a given borrower operates.

They will include:

- Databases that are conducive to time-series analytics.
- Simulation engines to manage the future distribution of default risks.
- Behavioral analytics.
- Dynamic data models.
- Client hierarchy management.

In the context of this challenge, the following section considers the current state of credit risk technology systems, and what we believe to be an achievable, effective end-point. We also assess where in this complex landscape the various types of vendors serving this market reside.

## Supply-side takeaways

### The current state of credit risk technology

Much of the technology environment supporting credit risk management in FIs is sprawling, lacking a centralized infrastructure. Typically, FIs use a complex web of separate application environment clouds and legacy systems linked by relatively lightweight thin connections and messaging-oriented protocols (see Figure 1). The clouds portrayed below are not computational clouds in the modern sense (i.e., Amazon Web Services or Microsoft Azure) but distinct computational

environments with their own tools, technology and standards.

Components of credit analytics are often embedded within a larger trading or risk management framework, either because that is how the institution's systems have developed organically or as the result of a specific deployment. Vendors seldom offer discrete credit analytics systems, instead deploying packages that offer both analytics and their supporting services within one solution.

So, for example, vendor-supplied counterparty management frameworks that underpin credit processes will provide the foundation for analytics elements, while stress testing frameworks provide the surrounding systems that enable a wider view of the FI's credit portfolio and processes. Very few vendors provide solutions that don't incorporate some of these added features.

### Building a workable solution

For most FIs the ideal state is largely unachievable. Nevertheless, we believe that by making judicious use of core technology elements and properly assembled credit analytics, FIs can develop an effective credit risk system, building on some of the same ideas. Increasingly important in achieving this – and offered to varying degrees by the vendors in the space – are several key components: entity and hierarchy management, credit portfolio management and behavioral analysis. Effective credit analytics also require technological 'gears' that can be applied to other areas of the credit landscape too<sup>5</sup>.

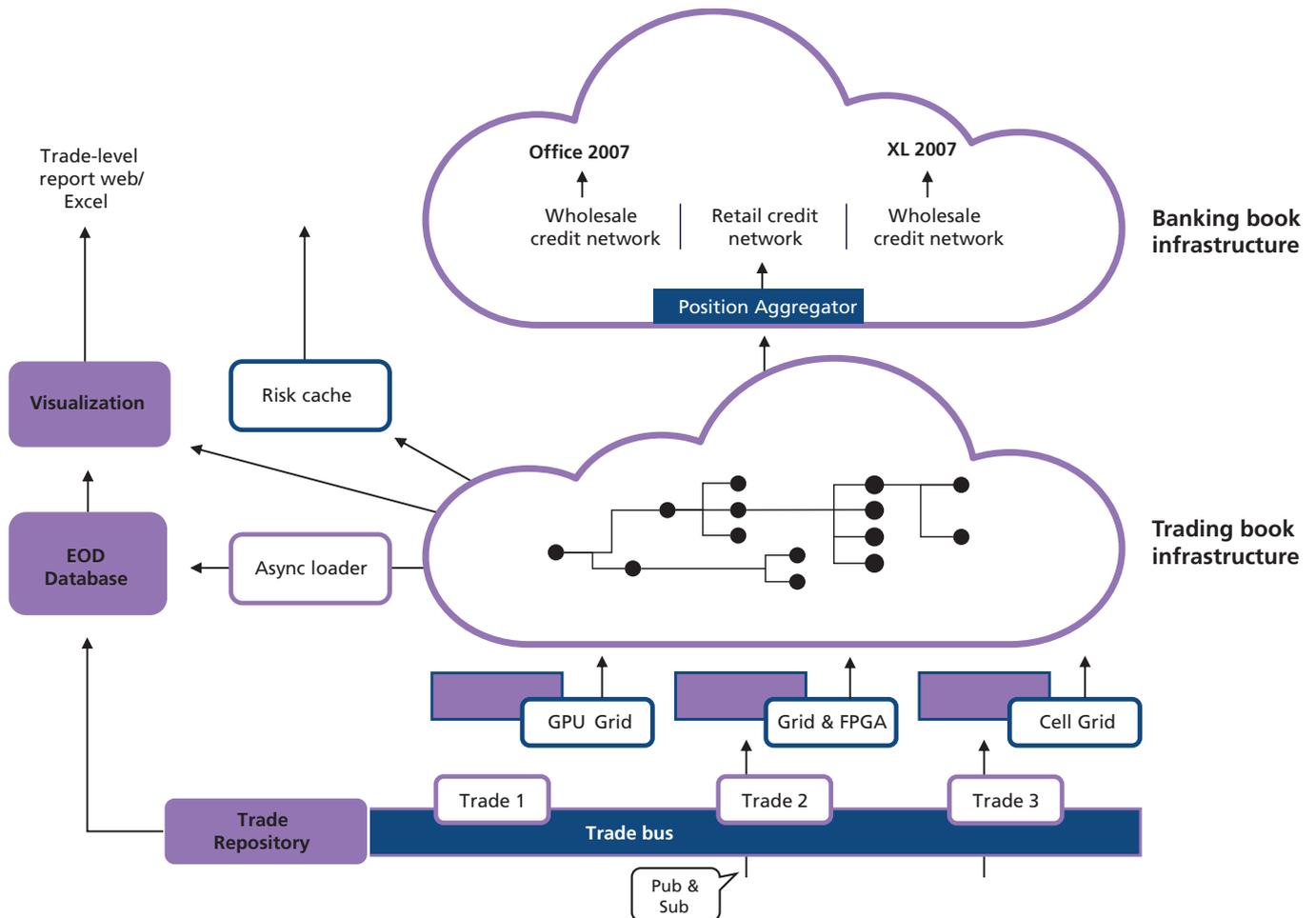
### Assessing the vendor landscape

To recap: to solve the challenges highlighted here would be to embrace an 'ideal world' – one we expect few FIs to achieve, not least because few vendors offer a 'complete' solution. Most are strong in some areas, like computation, but less strong in others, like data, which we believe broadly reflects market demand. Most banks of size, for example, will have legacy technology issues, so it is little surprise that the vendor market reflects what they are asking for: fixes to a patchwork of different problems.

Vendors' market positioning will reflect their culture and history, so although the market is evolving, many vendors may find it difficult to adapt appropriately. Wider employment and

<sup>5</sup> For more information on these aspects of credit risk solutions, refer to the *Chartis report Technology Solutions for Credit Risk 2.0, 2018*

Figure 1: Current credit risk systems – sprawling and complex



Source: Chartis Research

structural issues also play a part: all vendors find themselves fighting a war for talent, bringing in the modeling skills needed to develop such solutions, and smashing the siloed thinking and organizational structures that can hold them back.

not just pure analytics vendors, but a broad set of vendors from a variety of spaces, to deliver a comprehensive, robust and multi-dimensional picture of the market serving the needs of Credit Risk 2.0.

The future, then, is joined up and, while credit analytics can occur independently as a set of data services or analytics, we also see them embedded across a variety of trading, risk management, underwriting and capital management tools and frameworks. When evaluating vendors we considered not only their capabilities in each of the broad functional areas – analytics, data management, risk data aggregation and reporting – but also how well they have implemented the various analytical ‘gears’ into their offerings.

Crucially, we evaluated vendors within the context in which they operate. This is why we analyzed

## 2. Quadrant context

### Introducing the RiskTech Quadrant®

This section of the report contains:

- The Chartis RiskTech Quadrant® for Credit Risk 2.0 technology solutions for 2018.
- An examination of the positioning and scores for Moody's Analytics as part of Chartis' analysis.
- A consideration of how the quadrant reflects the broader vendor landscape.

#### Summary information

##### *What does the Chartis quadrant show?*

The RiskTech Quadrant® uses a comprehensive methodology that involves in-depth independent research and a clear scoring system to explain which technology solutions meet an organization's needs. The RiskTech Quadrant® does not simply describe one technology option as the best solution; rather it has a sophisticated ranking methodology to explain which solutions are best for specific buyers, depending on their implementation strategies.

The RiskTech Quadrant® is a proprietary methodology developed specifically for the risk technology marketplace, and it takes into account vendors' product, technology and organizational capabilities. Section 4 sets out the generic methodology and criteria used for the RiskTech Quadrant®.

##### *How are quadrants used by technology buyers?*

Chartis' RiskTech and FinTech quadrants provide a view of the vendor landscape in a specific area of risk, financial and/or regulatory technology. We monitor the market to identify the strengths and weaknesses of different solutions, and track the post-sales performance of companies selling and implementing these systems. Users and buyers can consult the quadrants as part of their wider research when considering the most appropriate solution for their needs.

Note, however, that Chartis Research does not endorse any vendor, product or service depicted in its research publications, and does not advise technology users to select only those vendors with

the highest ratings or other designation. Chartis Research's publications consist of the opinions of its research analysts and should not be construed as statements of fact.

##### *How are quadrants used by technology vendors?*

Technology vendors can use Chartis' quadrants to achieve several goals:

- Gain an independent analysis and view of the provider landscape in a specific area of risk, financial and/or regulatory technology.
- Assess their capabilities and market positioning against their competitors and other players in the space.
- Enhance their positioning with actual and potential clients, and develop their go-to-market strategies.

In addition, Chartis' Vendor Analysis reports, like this one, offer detailed insight into specific vendors and their capabilities, with further analysis of their quadrant positioning and scoring.

### Chartis Research RiskTech Quadrant® for Credit Risk solutions 2018 (banking book)

Figure 2 illustrates Chartis' view of the credit risk 2.0 vendor landscape, highlighting Moody's Analytics.

Figure 2: RiskTech Quadrant® for Credit Risk solutions 2018 (banking book)



Source: Chartis Research

## Quadrant Dynamics

### General Quadrant Takeaways

On the banking book quadrant, vendors fell into four groups, roughly following the quadrant’s categories:

- **Front-of-the-pack category leaders.** Four vendors – including Moody’s Analytics – led in terms of their completeness of offering, due to the vast wealth of analytical models they offer for credit risk. They also scored well for their market potential, due to their global reach, which often entails deep expertise in the nuances of credit in some niche geographies. These vendors supply cohesive suites of tools for many processes on the

banking book, from balance sheet management to expected credit loss analytics – suites that integrate well with their credit risk solutions.

- **Category leaders and enterprise solutions.** While these vendors supply strong analytics, their offerings are not quite equivalent to those of their competitors in the first category. The main difference between the two groups lies in their market potential – vendors in this second category tend to have brands that are less strong within the credit risk area. Some also lack clear strategic planning for their credit risk solution.
- **Best-of-breed.** Suppliers in this category tended to offer solutions specializing in one area of the

credit risk process, such as data or workflow. Whereas category leaders' credit risk offerings sit at the core of their businesses, however, these vendors often treat credit risk solutions as ancillary to other products in their portfolios.

- **Point solutions.** Like best-of-breed vendors these suppliers target a key segment of the credit risk process. However, their relative youth, low market penetration or lack of brand awareness in credit risk affected their market potential rating.

### Vendor Positioning in Context – Completeness of Offering

Moody's Analytics offers the most diverse set of credit risk analytics currently in the marketplace. The strength of its analytical offerings is illustrated in Table 1, which shows the vendor's rankings for each of the completeness of offering criteria. Moody's Analytics has a strong focus on credit, and has built on its acquisition of credit analytics provider Kealhofer, McQuown and Vasicek (KMV) to offer advanced statistical analytics and expertise for credit risk management. The firm's analytics include capabilities such as credit risk calculation using equity and stock prices and advanced default estimation techniques.

These analytics are supported by best-in-class data provision, in the form of the following products:

- Data Alliance for financial statements and default information. One of the world's largest and most comprehensive data consortia, this covers over 90 leading FIs, covering commercial and industrial (C&I), commercial real estate (CRE), asset finance, and project and infrastructure finance segments.
- Financial Markets Forecasts, Economic Forecast Scenarios, and other macroeconomic forecasting datasets for portfolio stress testing and strategic planning. These forecasts cover more than 80 countries, with baseline and consensus scenarios for each forecast.
- Scenario Studio for creating custom scenarios using time series supplied by Moody's Analytics.
- Bureau van Dijk for data on private and listed companies from all countries worldwide.

### Vendor Positioning in Context – Market Potential

The credit risk analytics set built from the KMV foundation is present in almost every major bank,

**Table 1: Completeness of offering – Moody's Analytics (Technology Solutions for Credit Risk 2.0, 2018)**

Completeness of offering criterion	Coverage
Analytics	High
Data management	High
Risk data aggregation and allocation	Medium/High
Enterprise stress testing	High
Reporting and visualization	Medium/High

Source: Chartis Research

giving Moody's Analytics exceptionally high market penetration. In addition, the vendor complements its technical solutions by offering extensive subject-matter expertise to its clients, which relies on the firm's global presence. Its understanding of economies large and small, and their particular credit environments, helps it implement credit risk systems around the globe.

Additional services, designed to support institutions' credit risk functions, offer a cohesive strategy for sustained growth. Services like model validation and gap analysis offer clients additional value, while strengthening the vendor's core credit risk offering. Further, its other solutions for functions such as balance sheet management integrate well with its credit risk suite, providing greater value to clients by integrating credit data from Moody's Analytics into other processes within the FI.

Table 2 shows the vendor's rankings for each of the market potential criteria.

**Table 2: Market potential – Moody's Analytics (Technology Solutions for Credit Risk 2.0, 2018)**

Market potential criterion	Coverage
Customer satisfaction	High
Market penetration	High
Growth strategy	High
Financials	Medium/High
Business model	High

Source: Chartis Research

### 3. Vendor context

#### Overview of relevant solutions/capabilities

Table 3 gives an overview of Moody’s Analytics and its enterprise fraud solution.

Moody’s Analytics provides a range of credit risk solutions which aim to help banks, asset managers and hedge funds, insurance institutions,

corporates, governments, professional services and data providers improve how they measure, mitigate and manage the credit risk in their loan and investment portfolios. The solutions assist with credit research, credit risk modeling and credit risk advisory services.

The Credit Research solutions, delivered by Moody’s Analytics and a sister company, Moody’s Investors Service, cover a range of areas including

**Table 3: Moody’s Analytics – company information**

Company	Moody’s Analytics
Headquarters	New York, NY, USA
Other offices	6,300 employees around the globe, in offices in locations including San Francisco, London, Paris, Brussels, Singapore, Hong Kong and Tokyo.
Description	Moody’s Analytics provides financial intelligence and analytical tools supported by risk expertise, expansive information resources, and the application of new technology. Its solutions, made up of research, data, software and professional services, are assembled with the aim of delivering a seamless customer experience.
Solution	<p>The Moody’s Analytics solution for credit risk management includes:</p> <ul style="list-style-type: none"> <li>• Economic forecasts and scenarios via Scenario Studio, a collaborative forecasting platform.</li> <li>• Expected Consumer Credit Loss (ECCL) service.</li> <li>• CreditForecast.com – a joint offering from Equifax and Moody’s Analytics that combines consumer credit and economic data.</li> <li>• CECL Solver for Moody’s CreditCycle – a lifetime loss forecasting module.</li> <li>• CreditLens – an integrated, cloud-based credit lifecycle management solution that automates the collection and analysis of credit data and allows lenders to easily access all portfolio and historical data from one platform.</li> <li>• Collaborative Analytics Platform (CAP) – a cloud-based solution that aims to promote collaboration and efficiency across the organization, encompassing the end-to-end lifecycle of risk and finance modeling.</li> <li>• RiskCalc Models and Scorecards – private firm default and recovery risk models and scorecards for commercial and industrial loans.</li> <li>• Commercial Mortgage Metrics (CMM) – default and recovery credit risk model for commercial income producing real-estate properties.</li> <li>• RiskBench – a global online credit risk data community and app platform that provides analytics and peer insight across asset classes.</li> </ul>

Source: Moody’s Analytics

the creditworthiness of consumers, public and private firms, commercial real estate, financial institutions, and structured finance instruments.

Moody's Analytics solution for credit risk management includes:

- Economic forecasts and scenarios.** Moody's Analytics provides baseline and alternative economic forecasts with 1,800 economic, financial and demographic variables and more than eight alternatives that are updated monthly and are available for more than 70 countries. The solution looks 30 years into the future, reverting to long-term trends after several years, and is updated in real time to capture data changes. Moody's Analytics also provides Scenario Studio, which enables users to collaborate with colleagues and/or Moody's Analytics on the same forecast.
- Expected Consumer Credit Loss (ECCL) service.** This calculates lifetime forecasts of net losses (Probability of Default [PD] and Loss Given Default [LGD]). It has a forecast horizon of up to 30 years, and can revert to long-term trends. Results can be viewed under baseline, consensus, regulatory or alternative scenarios by credit score and state.
- CreditForecast.com.** This solution, created as a result of a partnership between Moody's Analytics and Equifax, provides data, forecasts and analyses to enable users to assess how economic conditions affect consumer credit behavior and performance. It provides five-year forecasts of all variables with alternative

scenarios, monthly data and analysis updates and quarterly updates that include forecasts, industry-specific analyses and web conferences.

- CECL Solver for Moody's CreditCycle.** This enables users to generate forecasts of lifetime losses through custom econometric models under the Current Expected Credit Loss (CECL) standard. It also helps users identify correlations between economic variables and credit risk. The solution uses Moody's CreditCycle platform for visualization, estimation and forecasting.
- CreditLens.** A cloud-based credit lifecycle management solution that automates each step of the commercial credit process and removes the need for error-prone manual entry of data. The solution integrates with the vendor's customer-facing portal, the MARQ portal, allowing borrowers to link directly to their accounting system or upload PDF financial statements. The CreditLens solution also integrates with data from RiskCalc, the Data Alliance and Orbis. With built-in API integration, the CreditLens solution can pull data from existing bank systems and store live and archived data, acting as a single data repository for portfolio monitoring and auditing (see Figure 3).
- Collaborative Analytics Platform (CAP).** A cloud-based solution that encompasses the end-to-end lifecycle of risk and finance modeling. CAP uses the vendor's legacy data, expertise, and analytics to manage model governance, model development and deployment. It also

Figure 3: Moody's Analytics CreditLens platform



Source: Moody's Analytics

provides centralized access to data and models for deeper collaboration across the organization.

- **RiskCalc.** This solution offers credit risk models and scorecards of private firms for FIs and insurance companies. It provides PD, LGD and EL credit risk measures, as well as default credit risk metrics based on the relationship between default observations and financial statements. The solution aims to help users evaluate, monitor, and manage loss in the event of default based on firm risk, debt type, capital structure, and market conditions..
- **CMM.** An analytical tool to enable users to combine property performance forecasts with commercial mortgage fundamentals, to assess default and recovery for Commercial Real-Estate (CRE) mortgages. It also helps users calculate PD, LGD and EL for CRE exposures, evaluate the loan and property, and compare the distribution of future Income and value against future loan obligations. The solution also includes rent and vacancy forecasts, property details and loan terms.
- **RiskBench.** An online, global, credit risk data community platform that provides in-depth analytics and peer insights across asset classes. It allows users to compare commercial and industrial portfolio features and credit risk measures against their peers. The platform also provides access to historical scores of PD, LGD and EL for counterparty assessment, loan origination and benchmarking.

accounting and regulatory purposes. The system also employs back-testing, tracking and model validation reports.

The company's economic forecasts incorporate inter-relationships and feedback effects among their variables, and provide information at varying levels of geographic aggregation to capture local economic effects. Its scenarios are updated monthly with narratives and probability weights.

Moody's Analytics also provides loss forecasts that consider baseline, pessimistic, optimistic and probability-weighted scenarios, assigning probabilities to each scenario based on economic simulations. The forecasting tool is available on the company's website, where users can access the system and interact with the models. The collaborative forecasting platform allows users to test edits in a sandbox environment before committing them to the master forecast.

The platforms offered by Moody's Analytics feature a range of capabilities to help ensure data quality, decrease origination time, automate spreading and control business processing time. Data for the CreditLens platform can be integrated from a number of sources, including the MARQ portal, Moody's Financial Metrics, BvD Orbis, client specific sources and PDF statements. On the basis of the available data and analytics, the vendor provides a range of scoring and analyses (see Figure 4).

## Vendor leading practices

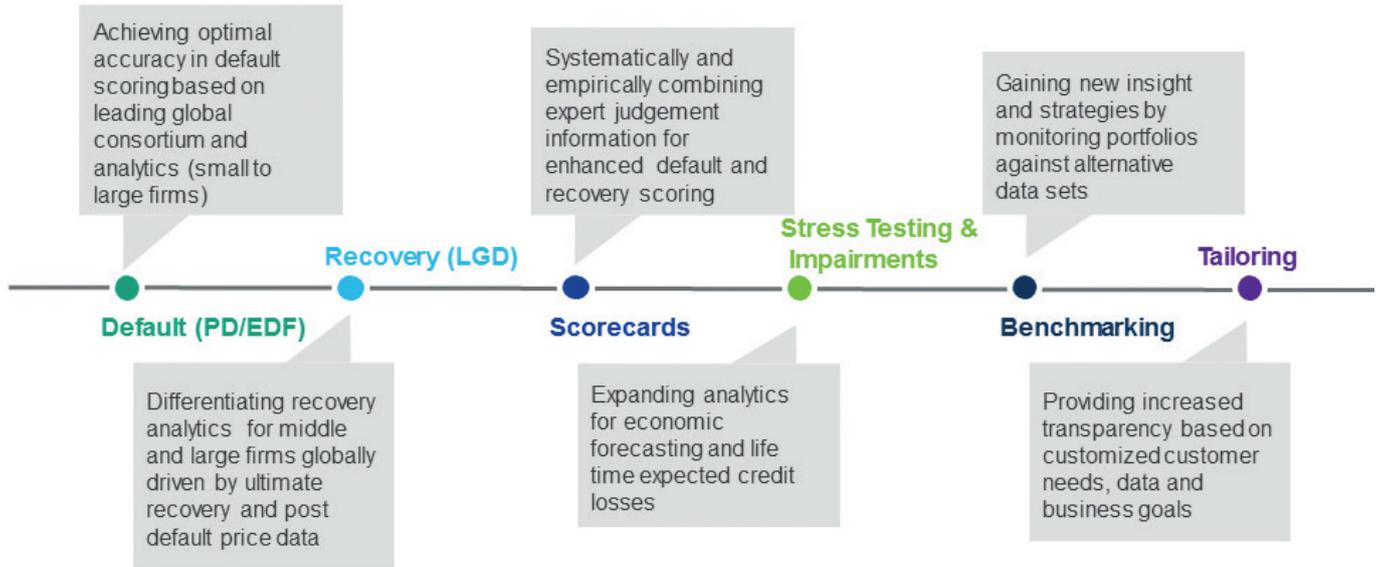
Moody's Analytics produces economic forecasts and scenarios to enable its clients to assess losses across a variety of asset classes. Clients use these scenarios for their loss-forecasting, stress testing, compliance and strategic planning needs.

The main differentiator Moody's Analytics has is its data, and in particular its data models and analysis. It collects data from public and private sources around the globe, which is continuously updated and delivered to users. The company also offers propriety data sets developed through partnerships, such as the one with Equifax.

The second differentiator is analytics. Moody's Analytics builds economic forecasting models, takes the outputs of these and applies them as inputs to models for forecast losses and other measures. All methodology is fully documented for

Figure 4: Scoring and data capabilities from Moody's Analytics

## The Cumulative Evolution of Scoring & Data



Source: Moody's Analytics

## 4. Methodology

### Overview

Chartis is a research and advisory firm that provides technology and business advice to the global financial services industry. Chartis provides independent market intelligence regarding market dynamics, regulatory trends, technology trends, best practices, competitive landscapes, market sizes, expenditure priorities, and mergers and acquisitions. Chartis' RiskTech and FinTech Quadrant reports are written by experienced analysts with hands-on experience of selecting, developing and implementing financial technology solutions for a variety of international companies in a range of industries including banking, insurance and capital markets. The findings and analyses in our quadrant reports reflect our analysts' considered opinions, along with research into market trends, participants, expenditure patterns, and best practices.

Chartis seeks to include RiskTech and FinTech vendors that have a significant presence in a given target market. The significance may be due to market penetration (e.g., a large client base) or innovative solutions. Chartis uses detailed 'vendor evaluation forms' and briefing sessions to collect information about each vendor. If a vendor chooses not to respond to a Chartis request for information, Chartis may still include the vendor in the report. Should this happen, Chartis will base its opinion on direct data collated from technology buyers and users, and from publicly available sources.

Chartis' research clients include leading financial services firms and Fortune 500 companies, leading consulting firms and financial technology vendors. The vendors evaluated in our quadrant reports can be Chartis clients or firms with whom Chartis has no relationship.

Chartis evaluates all vendors using consistent and objective criteria, regardless of whether or not they are Chartis clients. Chartis does not give preference to its own clients and does not request compensation for inclusion in a quadrant report; nor can vendors influence Chartis' opinion.

### Selection criteria

To reflect the varying maturity and focus of credit risk solutions across the landscape, we developed

two quadrants for the report: one each for the trading and banking books. When evaluating vendors we considered not only their capabilities in each of the broad functional areas: analytics, data management, risk data aggregation and reporting, but also how well they have implemented the various analytical 'gears' into their offerings. We evaluated vendors precisely within the context in which they operate, analyzing a broad set of vendors from a variety of spaces.

For our analysis of the trading book space, we took into account a broad range of credit analytical capabilities including CCR, CVA and credit risk analytics for Fixed-Income securities such as loans and corporate bonds; as well as related capabilities (credit transformation) such as margin analytics (including MVA). We gave specific weightings to vendors with the capability to analyze credit risk in Fixed-Income instruments, as well as the ability to carry out counterparty credit and margin analytics.

### Briefing process

We conducted face-to-face and/or web-based briefings with each vendor<sup>6</sup>. During these sessions, Chartis experts asked in-depth, challenging questions to establish the real strengths and weaknesses of each vendor.

Vendors provided Chartis with:

- A business update – an overview of solution sales and client satisfaction.
- A product update – an overview of relevant solutions and R&D roadmaps.
- A product demonstration – key differentiators of their solutions relative to those of their competitors.

In addition to briefings, Chartis used other third-party sources of data, such as conferences, academic and regulatory studies, and publicly available information.

### Evaluation criteria

The generic evaluation criteria for each dimension are set out below. In addition to these generic criteria, Chartis utilizes domain-specific criteria

<sup>6</sup> Note that vendors do not always respond to requests for briefings; they may also choose not to participate in the briefings for a particular report.

relevant to each individual risk. This ensures total transparency in our methodology and allows readers to fully appreciate the rationale for our analysis. The specific criteria used for credit risk (banking book) are shown in Table 4.

### Completeness of offering

- Depth of functionality.** The level of sophistication and amount of detailed features in the software product (e.g., advanced risk models, detailed and flexible workflow, domain-specific content). Aspects assessed include: innovative functionality, practical relevance of features, user-friendliness, flexibility, and embedded intellectual property. High scores are given to those firms that achieve an appropriate balance between sophistication and user-friendliness. In addition, functionality linking risk to performance is given a positive score.
- Breadth of functionality.** The spectrum of requirements covered as part of an enterprise risk management system. This will vary for each subject area, but special attention will be given to functionality covering regulatory requirements, multiple risk classes, multiple asset classes, multiple business lines, and multiple user types (e.g., risk analyst, business manager, CRO, CFO, Compliance Officer). Functionality within risk management systems and integration between front-office (customer-facing) and middle/back office (compliance, supervisory and governance) risk management systems are also considered.
- Data management and technology infrastructure.** The ability of risk management systems to interact with other systems and handle large volumes of data is considered to be very important. Data quality is often cited as a critical success factor and ease of data access, data integration, data storage, and data movement capabilities are all important factors. Particular attention is given to the use of modern data management technologies, architectures and delivery methods relevant to risk management (e.g., in-memory databases, complex event processing, component-based architectures, cloud technology, and Software as a Service). Performance, scalability, security and data governance are also important factors.
- Risk analytics.** The computational power of the core system, the ability to analyze large amounts of complex data in a timely manner (where relevant in real time), and the ability to improve analytical performance are all important factors.

**Table 4: Evaluation criteria for Chartis’ credit risk report (banking book quadrant)**

Completeness of offering	Market potential
Analytics	Customer satisfaction
Data management	Market penetration
Risk data aggregation and allocation	Growth strategy
Enterprise stress testing	Financials
Reporting and visualization	Business model

Source: Chartis Research

Particular attention is given to the difference between ‘risk’ analytics and standard ‘business’ analytics. Risk analysis requires such capabilities as non-linear calculations, predictive modeling, simulations, scenario analysis, etc.

- Reporting and presentation layer.** The ability to present information in a timely manner, the quality and flexibility of reporting tools, and ease of use, are important for all risk management systems. Particular attention is given to the ability to do ad-hoc ‘on-the-fly’ queries (e.g., ‘what-if’ analysis), as well as the range of ‘out of the box’ risk reports and dashboards.

### Market potential

- Market penetration.** Both volume (i.e., number of customers) and value (i.e., average deal size) are considered important. Also, rates of growth relative to sector growth rates are evaluated.
- Brand.** Brand awareness, reputation, and the ability to leverage current market position to expand horizontally (with new offerings) or vertically (into new sectors) are evaluated.
- Momentum.** Performance over the previous 12 months is evaluated, including financial performance, new product releases, quantity and quality of contract wins, and market expansion moves.
- Innovation.** New ideas, functionality and technologies to solve specific risk management problems are evaluated. Developing new products is only the first step in generating success. Speed to market, positioning and translation into incremental revenues are critical success factors for exploiting the new product. Chartis also evaluates business

model or organizational innovation (i.e., not just product innovation).

- **Customer satisfaction.** Feedback from customers regarding after-sales support and service (e.g., training and ease of implementation), value for money (e.g., price to functionality ratio) and product updates (e.g., speed and process for keeping up to date with regulatory changes) is evaluated.
- **Sales execution.** The size and quality of the vendor's sales force, and its sales distribution channels, global presence, focus on risk management, messaging and positioning are all important factors.
- **Implementation and support.** Important factors include size and quality of implementation team, approach to software implementation, and post-sales support and training. Particular attention is given to 'rapid' implementation methodologies and 'packaged' services offerings.
- **Thought-leadership.** Business insight and understanding, new thinking, formulation and execution of best practices, and intellectual rigor are considered important by end users.
- **Financial strength and stability.** Revenue growth, profitability, sustainability and financial backing (e.g., the ratio of license to consulting revenues) are considered key to the scalability of the business model for risk technology vendors.

## Quadrant construction process

Chartis constructs its quadrants after assigning scores to vendors for each component of the Completeness of Offering and Market Potential criteria. By aggregating these values, we produce total scores for each vendor on both axes, which are used to place the vendor on the quadrant.

### Definition of quadrant boxes

Chartis' quadrant reports do not simply describe one technology option as the best solution in a particular area. Our ranking methodology is designed to highlight which solutions are best for specific buyers, depending on the technology they need and the implementation strategy they plan to adopt. Vendors that appear in each quadrant have characteristics and strengths that make them especially suited to that particular category, and by extension to particular users' needs.

### **Point solutions**

- Point solutions providers focus on a small number of component technology capabilities, meeting a critical need in the risk technology market by solving specific risk management problems with domain-specific software applications and technologies.
- They are often strong engines for innovation, as their deep focus on a relatively narrow area generates thought leadership and intellectual capital.
- By growing their enterprise functionality and utilizing integrated data management, analytics and Business Intelligence (BI) capabilities, vendors in the point solutions category can expand their completeness of offering, market potential and market share.

### **Best-of-breed**

- Best-of-breed providers have best-in-class point solutions and the ability to capture significant market share in their chosen markets.
- They are often distinguished by a growing client base, superior sales and marketing execution, and a clear strategy for sustainable, profitable growth. High performers also have a demonstrable track record of R&D investment, together with specific product or 'go-to-market' capabilities needed to deliver a competitive advantage.
- Because of their focused functionality, best-of-breed solutions will often be packaged together as part of a comprehensive enterprise risk technology architecture, co-existing with other solutions.

### **Enterprise solutions**

- Enterprise solution providers typically offer risk management technology platforms, combining functionally rich risk applications with comprehensive data management, analytics and BI.
- A key differentiator in this category is the openness and flexibility of the technology architecture and a 'toolkit' approach to risk analytics and reporting, which attracts larger clients.
- Enterprise solutions are typically supported with comprehensive infrastructure and service

capabilities, and best-in-class technology delivery. They also combine risk management content, data and software to provide an integrated 'one stop shop' for buyers.

### **Category leaders**

- Category leaders combine depth and breadth of functionality, technology and content with the required organizational characteristics to capture significant share in their market.
- They demonstrate a clear strategy for sustainable, profitable growth, matched with best-in-class solutions and the range and diversity of offerings, sector coverage and financial strength to absorb demand volatility in specific industry sectors or geographic regions.
- They will typically benefit from strong brand awareness, a global reach, and strong alliance strategies with leading consulting firms and systems integrators.

## 5. How to use research and services from Chartis

In addition to our flagship industry reports, Chartis offers customized information and consulting services. Our in-depth knowledge of the risk technology market and best practice allows us to provide high-quality and cost-effective advice to our clients. If you found this report informative and useful, you may be interested in the following services from Chartis.

### For risk technology buyers

If you are purchasing risk management software, Chartis's vendor selection service is designed to help you find the most appropriate risk technology solution for your needs.

We monitor the market to identify the strengths and weaknesses of the different risk technology solutions, and track the post-sales performance of companies selling and implementing these systems. Our market intelligence includes key decision criteria such as TCO (total cost of ownership) comparisons and customer satisfaction ratings.

Our research and advisory services cover a range of risk and compliance management topics such as credit risk, market risk, operational risk, GRC, financial crime, liquidity risk, asset and liability management, collateral management, regulatory compliance, risk data aggregation, risk analytics and risk BI.

Our vendor selection services include:

- Buy vs. build decision support
- Business and functional requirements gathering
- Identification of suitable risk and compliance implementation partners
- Review of vendor proposals
- Assessment of vendor presentations and demonstrations
- Definition and execution of Proof-of-Concept (PoC) projects
- Due diligence activities.

### For risk technology vendors

#### **Strategy**

Chartis can provide specific strategy advice for risk technology vendors and innovators, with a special focus on growth strategy, product direction, go-to-market plans, and more. Some of our specific offerings include:

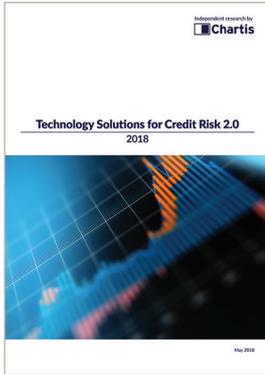
- Market analysis, including market segmentation, market demands, buyer needs, and competitive forces
- Strategy sessions focused on aligning product and company direction based upon analyst data, research, and market intelligence
- Advice on go-to-market positioning, messaging, and lead generation
- Advice on pricing strategy, alliance strategy, and licensing/pricing models

#### **Thought leadership**

Risk technology vendors can also engage Chartis to provide thought leadership on industry trends in the form of in-person speeches and webinars, as well as custom research and thought-leadership reports. Target audiences and objectives range from internal teams to customer and user conferences. Some recent examples include:

- Participation on a 'Panel of Experts' at a global user conference for a leading Global ERM (Enterprise Risk Management) software vendor
- Custom research and thought-leadership paper on Basel 3 and implications for risk technology.
- Webinar on Financial Crime Risk Management
- Internal education of sales team on key regulatory and business trends and engaging C-level decision makers

## 6. Further reading



**Technology Solutions for Credit Risk 2.0, 2018**



**Data Integrity and Control in Financial Services: Market Update 2018**



**Hedge Fund Risk Management Technology 2018**



**Open Source in Capital Markets 2018**



**IFRS 9 Technology Solutions: Market Update 2017**



**Spotlight on the CECL Reporting Standard**

For all these reports, see [www.chartis-research.com](http://www.chartis-research.com)