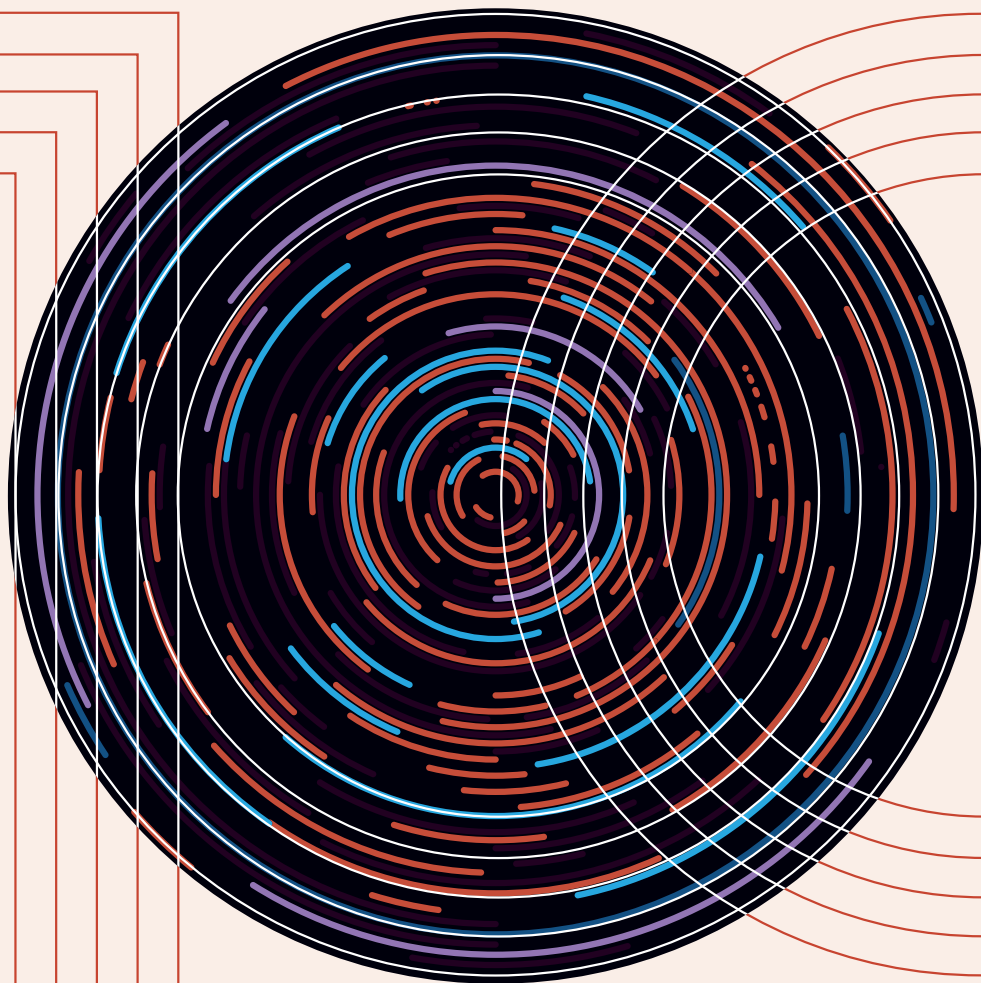




RiskTech 100 2023



Chartis
Independent. Insightful. Actionable.



Chartis Research is the leading provider of research and analysis on the global market for risk technology. It is part of Infopro Digital, which owns market-leading brands such as Risk and WatersTechnology. Chartis' goal is to support enterprises as they drive business performance through improved risk management, corporate governance and compliance, and to help clients make informed technology and business decisions by providing in-depth analysis and actionable advice on virtually all aspects of risk technology. Areas of expertise include:

- Credit risk.
- Operational risk and governance, risk management and compliance (GRC).
- Market risk.
- Asset and liability management (ALM) and liquidity risk.
- Energy and commodity trading risk.
- Financial crime, including trader surveillance, anti-fraud and anti-money laundering.
- Cyber risk management.
- Insurance risk.
- Regulatory requirements.
- Wealth advisory.
- Asset management.

Chartis focuses on risk and compliance technology, giving it a significant advantage over generic market analysts.

The firm has brought together a leading team of analysts and advisors from the risk management and financial services industries. This team has hands-on experience of developing and implementing risk management systems and programs for Fortune 500 companies and leading consulting firms.

Visit www.chartis-research.com for more information.

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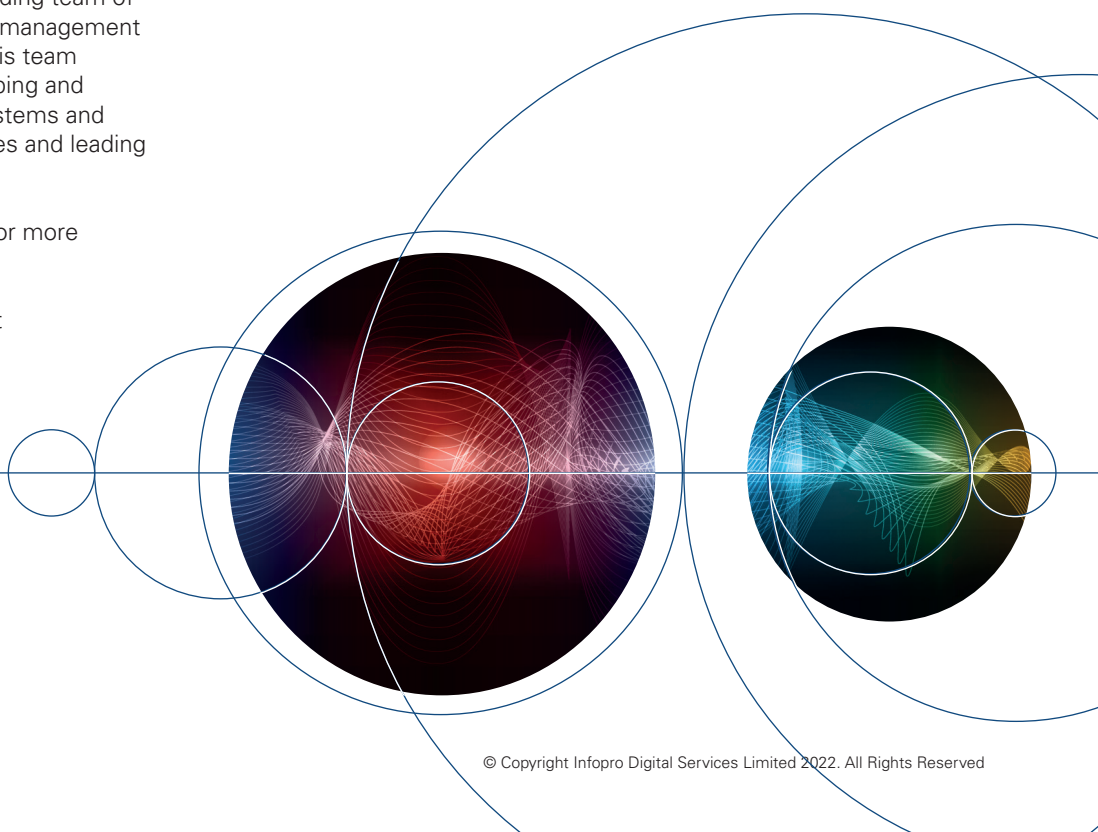


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1. Foreword



Mark Feeley, Global Brand Director

I'm delighted to welcome you to RiskTech100® 2023. Still the most comprehensive independent study of the world's major players in risk and compliance technology, RiskTech100® is globally acknowledged as the go-to place for

clear, accurate analysis of the risk technology marketplace. Together with its accompanying awards, the RiskTech100® ranking provides a valuable assessment and benchmarking tool for all participants in risk technology markets.

As Phil outlines below, and as we explore in the report, the RiskTech and wider tech markets continue to shift, and as ever we at Chartis continue to track the technology developments shaping systems, solutions and user demands.

Congratulations to the vendors that feature in RiskTech100® 2023 – and on behalf of the Chartis team, we look forward to working with these and other industry players in what promises to be another crucial year in RiskTech.

Enjoy the report!



Phil Mackenzie, Research Principal

Welcome to RiskTech100® 2023. This year, risk management techniques have moved beyond the regulatory to the existential. Rising interest rates and

record inflation have accompanied global energy and commodity shocks, and deglobalization events, from trade wars to physical conflicts, have led to a more multipolar world.

This has created volatility, and the shift away from market norms is overturning established notions of stability. Hidden leverage has been surfaced by recent market events and demonstrates how opaque chains of events can come to light, with unexpected consequences, even for relatively

'safe' assets. In these choppy waters, risk management is not simply a question of managing regulatory compliance – it can be the difference between survival and extinction.

The risks and their exposures presented by this new world are not evenly distributed, however, and Chartis expects that this will also help to generate a world of winners and losers.

In this year's RiskTech100® research we will be discussing in more detail some of the key themes (increased volatility, changing economic cycles, the evolving ecosystem of credit intermediaries, a broader range of technology options, etc) that will inform our coverage in the following year.

Our research coverage will continue to expand as we move forward, building out our team of analysts and intensifying our research across a wider range of risks. We will continue to examine how environmental, social and governance (ESG) and crypto are being affected in the current market, and analyze how energy and commodity trading is changing in the face of global disruption. We will also continue to reinforce and build out our coverage of such core markets as financial crime risk management and financial risk.

We started out as a business not too long after the global financial crisis, and periods of uncertainty have always offered opportunities for risk technology. As such, we have seen several movers and shakers in this year's ranking – including a new #1. There have also been several new entrants to the rankings, as well as a wide array of rising stars and prizewinners, reflecting both our expanding view and the potential for disruption within this fast-moving space. These are interesting times for RiskTech and technology more generally, and – together with our vendor and client community – we are excited to see what changes are coming in 2023.

2. Overview

The companies in RiskTech100® are drawn from a range of risk technology specialisms, and meet the needs of financial and non-financial organizations. They share a number of qualities that rank them among the top 100 RiskTech providers in the world.

We determine the RiskTech100® rankings based on the classifications shown in Figure 1 on the next page, and focus on solutions, industry segments and success factors.¹

Note that the RiskTech100® report only includes companies that sell their own risk management software products and solutions.

RiskTech100 2023®: highlights

Moody's moved into the number 1 spot, FICO moved into the top 5 and ION, LexisNexis Risk Solutions and Bloomberg all moved into the top 10.

There were **12 new entrants** this year:

- Sayari (ranked 51)
- Zoloz (59)
- Evalueserve (65)
- LogicMonitor (68)
- nCino (71)
- Quantifind (73)
- SteelEye (78)
- Trulioo (88)
- Shufti Pro (89)
- MEGA (90)
- Sopra Banking Software (96)
- insightsoftware (100)

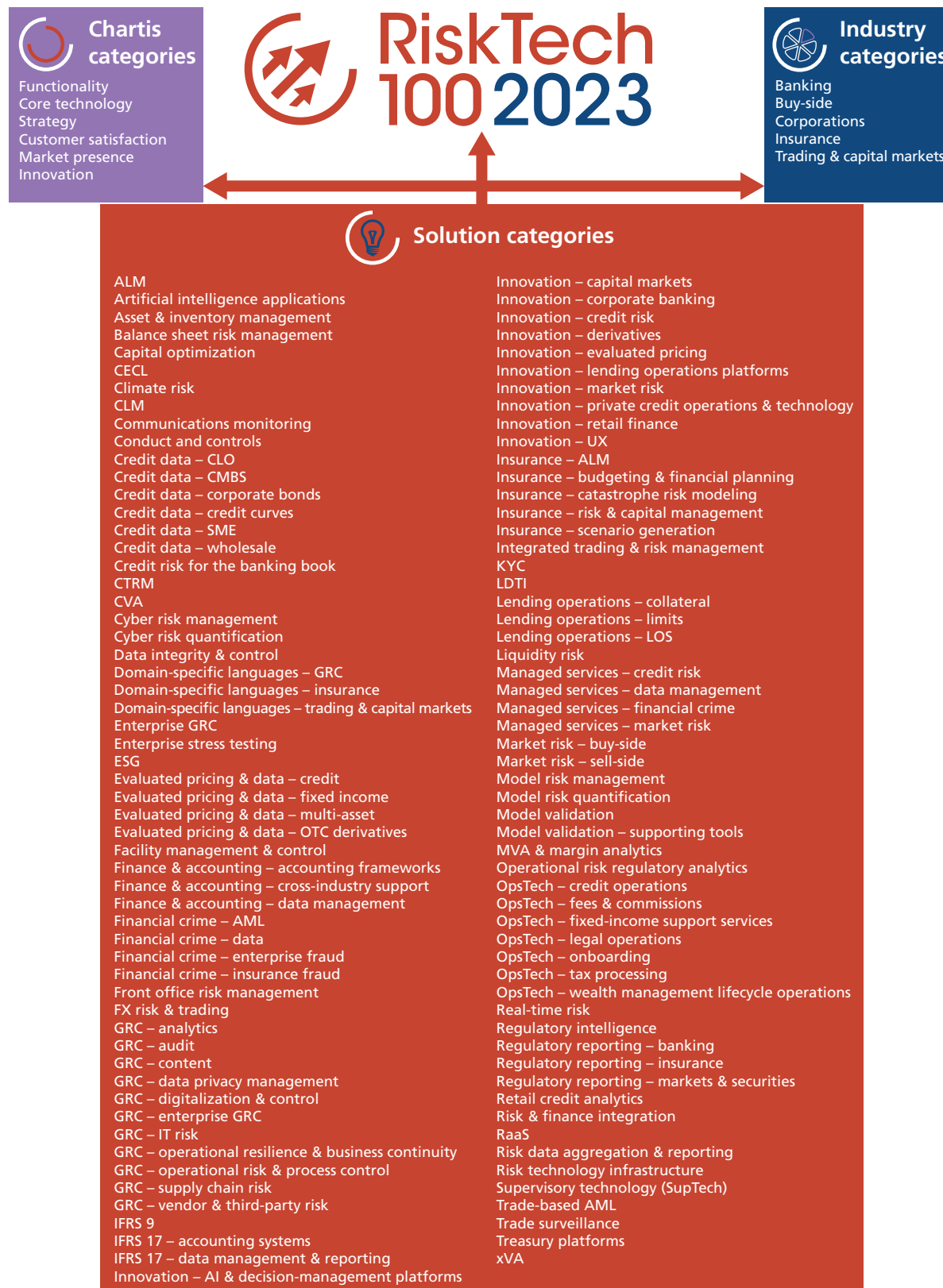
25 firms rose in the rankings **by 5 places or more**:

- ServiceNow moved up 44 places, from 81 to 37.
- Feedzai moved up 30 places, from 78 to 48.

- CubeLogic moved up 23 places, from 98 to 75.
- PwC moved up 23 places, from 62 to 39.
- SymphonyAI Sensa moved up 20 places, from 51 to 31.
- BCT Digital, Bahwan CyberTek Group moved up 17 places, from 94 to 77.
- RiskScreen moved up 14 places, from 99 to 85.
- Ripjar moved up 15 places, from 87 to 72.
- Quantexa moved up 14 places, from 40 to 26.
- SAP moved up 13 places, from 59 to 46.
- Empyrean Solutions moved up 12 places, from 64 to 52.
- Beacon Platform moved up 10 places, from 34 to 24.
- MathWorks moved up 9 places, from 79 to 70.
- Abrigo moved up 8 places, from 49 to 41.
- Appian moved up 8 places, from 58 to 50.
- Cboe moved up 8 places, from 37 to 29.
- MORS Software moved up 8 places, from 77 to 69.
- Manipal Technologies moved up 7 places, from 90 to 83.
- Nasdaq moved up 7 places, from 25 to 18.
- Quantifi moved up 7 places, from 43 to 36.
- Eastnets moved up 6 places, from 61 to 55.
- ION moved up 6 places, from 13 to 7.
- Mitratach moved up 6 places, from 60 to 54.
- RiskSpan moved up 6 places, from 68 to 62.
- Regnology moved up 5 places, from 38 to 33.

¹ Note that some categories in energy and quantitative methods are now covered in our Energy50 and STORM50 rankings and analysis.

Figure 1: RiskTech100® 2023 taxonomy



Source: Chartis Research

RiskTech themes: 2023 and beyond

This year's RiskTech100® ranking reflects some key themes surrounding Chartis' overarching research agenda, with a growing focus on:

- The industrialization of compliance technologies.
- The increased variety and diversity of available analytics.
- The increased availability of data (property, geospatial, the growing depth of evaluated pricing, etc).

Looking ahead, a significant component of our research will explore the growing intersection of different evolving technology paradigms and risk, analytics and compliance technology (which, arguably, has always been a key focus area for Chartis).

Next year, however, will see a heightened focus on how the underlying technology stack interacts with the application environment, regulatory drivers and distribution and development mechanisms and tools. As we observe the range and variety of technology choices available (such as open-source languages, varied databases, data-parallel programming options and event-driven frameworks), our central thesis is that the full set of commercial and open-source options has yet to fully permeate the risk and compliance landscape.

Cloud impacts

The impact of the cloud on risk technology (and some of the scalability and overarching economic issues it brings) has been deep. But the question of 'the cloud and its economics' has become more complex and nuanced. We will be examining this issue in considerable detail in most aspects of our research, whether market risk, credit risk, banking analytics, asset and liability management, or anti-financial crime systems, taking a close look at the impact the cloud is having (alongside its different elements, such as infrastructure as a service, platform as a service, storage and application programming interfaces [APIs]).

We will also look in much more detail at the economics and operational dynamics of managed services in our key areas of focus (risk, analytics, trading, compliance, operational risk and control, and anti-fraud). While research into managed services has been an important part of what we

do, it will now be integral to every piece of analysis and will be at the core of RiskTech100® 2024.

Language issues

Similarly, integral to all of our research publications and analysis will be a focus on the impact of low-code/no-code, domain-specific languages, scripting tools and the overarching availability of open-source or next-generation languages. We believe that various forms of dynamic application extension present a wholly new way of doing things. A vast range of possible options is available, with varying origins and levels of effectiveness. In several areas, 'cash-flow languages' are fairly well-developed, and a number of vendors have developed very well-structured domain languages, notably in the trading area and particularly in the area of derivatives pricing.

Energy volatility

There has been substantial volatility in energy markets (the pandemic, overarching new regulations and geopolitics are just three big issues of the day for the sector). However, we believe that as digital technologies arrive in the energy ecosystem, fundamental and structural challenges will arrive along with some benefits. Cyber risk, IT risk and other control/operational risk concerns have moved up the agenda. Meanwhile, we see a much stronger and deeper focus on analytics (such as statistical/AI tools, financial models and optimization) across the energy ecosystem, and for non-energy commodities. For many years we have focused on energy trading data and analytics, and have examined the major industry shifts in energy and commodities markets. We plan to do more of this in environments where energy-ecosystem dynamics have even greater resonance (because of geopolitics, the energy transition and regulatory shifts, for example).

This report does not outline all of the available technologies and the different dimensions by which we will surface these issues during the coming year. (Many of these themes have been front and center in our research this year, a fact reflected in the RiskTech100® rankings). Overall, the growing centrality of engineering, development, distribution and deployment dynamics will be seen across all our research.

3. Risk management 2.0: digitalization and the transforming risk function

Overview

Digital transformation drives an expanding risk function

As external market and industry forces evolve and intensify, the risk function is undergoing a deep and structural transformation characterized by several key trends:

- *Centralization* of the risk function in the organization.
- Growing *externalization* (links with external entities).
- The *commercialization* of various elements and capabilities.

The most important trend, however, with sweeping consequences, is *digitalization*. Digitalization includes a range of technology dynamics such as the application of AI, the increasing functionality available through application programming interfaces (APIs), cloud capabilities and automation. In considering these trends Chartis has also identified a change in the way the risk function interacts with operations, technology, finance and controls across the financial industries and beyond, into sectors including energy, IT and the professional services.

This transformation of the risk function into a centralized unit that interacts with all parts of the business has coincided – and is partly driven by – such digital processes as automation, control and quantification. New technologies, including Big Data databases and machine learning (ML), enable relatively easy mapping of unstructured data to structured analytical data (time series, etc.). The increased availability of data that results from digitalization also enables micro-level process optimization and a general improvement in operational resilience, an area of considerable focus for regulators.

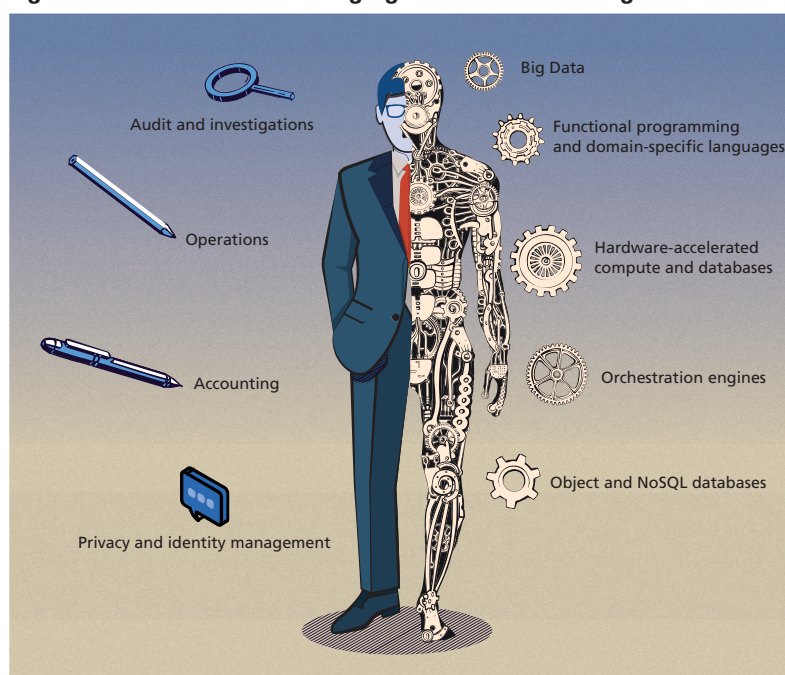
As part of this new era of digitalization, *electronic control* has become a key focus for institutions. New business models are defined by the need to safeguard profitability and growth without compromising on compliance, as institutions have to deal with wider and more varied regulations. Among other risks, institutions are increasingly contending with heightened third-party, model and IT risk compliance procedures.

GRC: maturing sub-segments and growing budgets

Consequently, the expanding risk function is coinciding with maturation of the sub-segments of governance, risk management and compliance (GRC) and firms' growing GRC budgets. In addition to compliance demands, institutions must consider the impact of economic and political uncertainty on their operational resilience and business continuity. This can include disrupted supply chains, geopolitical risk and market and system disruption resulting from the COVID-19 pandemic, as well as structural shifts in the market and a greater focus on stakeholder value. How organizations deal with technological developments and repeated tests of their operational resilience have been major strategic themes in our 2023 RiskTech100®.

One area of expansion reflected in this year's RiskTech100 is the GRC solutions market. Vendors are competing for increased technology budgets, as end users focus on implementing comprehensive controls, process and analytical automation, and sophisticated quantification methods (see Figure 2). IT frameworks and digital touchpoints are now ubiquitous across the entire

Figure 2: Processes are converging with new technologies



Source: Chartis Research

institution, and historically siloed functions such as audit and risk can be integrated through new technology platforms.

As the risk function evolves, GRC risk segments are also maturing. The risk function must now integrate these interrelated risk segments, which come with their own specific calculations, methodologies, practitioners and compliance demands.

Dynamic OpRisk

One notable shift is the evolution of operational risk (OpRisk) from a regulatory concern to a more dynamic enterprise function driven by the uptake in analytics and control. The front office, which is no longer a passive consumer of existing processes, is a major driving force behind the adoption of control libraries, which effectively reflect the day-to-day running of business lines. Regulators have made it clear through various standards, directives and regulations that the front office is expected to take an active role in identifying and mitigating instances of misconduct.²

Active participation means contributing to the process of setting controls, a responsibility traditionally confined to the back-office audit function. The broader institutional role of technology and the ubiquity of disparate IT systems and operations continue to impact institutions' workflows and tech spend. Some technology vendors with an existing client base for IT risk management operations, for example, are taking the opportunity to leverage existing digital touchpoints in institutions to cross-sell other GRC products (see Figure 3).

Digital transformation in risk management: a closer look

Balancing cost and innovation: designing digital transformation programs

Growing investment in digital transformation programs in risk management and compliance is having a profound effect in major industry segments.

In terms of the risk function, there are several dimensions of digitalization (see Figure 4):

- Cloud-ready architectures that are virtualized and API-oriented, with clear interfaces between modules).

Figure 3: Integrated GRC segments



Source: Chartis Research

Figure 4: The key technology dimensions of digital transformation programs



Source: Chartis Research

² Examples include the Financial Conduct Authority (FCA) Conduct Risk Framework, the FCA Senior Managers and Certification Regime, the Dodd-Frank Act and the Monetary Authority of Singapore (MAS) Individual Accountability and Conduct regime.

- Abstracted and API-oriented frameworks.
- AI tools (with effective model operations).
- Intelligent automation and orchestration capabilities, as well as industrialized development (DevOps) and security (security ops) characteristics.
- Open-source and industry-standard frameworks (in essence a description of best-in-class software as a service [SaaS] platforms).

(Some of these key dynamics are considered in the following sections.)

The overall view: slowing down to speed up

As part of their digital transformation programs, firms must consider the trade-off between slowing down in the short term and speeding up in the long term. Security and compliance demands, as well as industry competition, are forcing institutions to evaluate the design of their applications and technology stacks continuously.

While the availability of sophisticated technology and data has increased rapidly, institutions still face plenty of strategic decisions. For vendors and institutions alike, big decisions relating to enterprise-level computational infrastructure, including database management and data storage (regardless of whether these are cloud platforms), can lock them into proprietary formats. These formats may not be able to accommodate future data architecture requirements and can constrain the functional development of solutions and business offerings.

Cloud decisions

The question of whether financial institutions, particularly in the US banking industry, are adopting the cloud is now moot. Banks export a whole host of services to the cloud. The real question is which functions are being moved to the cloud and in what sequence.

The shift to the cloud is complex and multi-dimensional. Consumers and end users are increasingly asking more sophisticated and difficult questions about their cloud strategies. Perhaps not all applications are economically suitable for cloud deployment, for example, or some functions are better off on a proprietary cloud (or could be supported by a highly structured partnership with a cloud vendor).

There is also the challenge of having client data on the cloud – indeed, this consideration extends to any data handled or managed by third parties. Questions about cloud adoption should focus on a more nuanced analysis that considers the unique cloud deployment trends in particular market segments, business lines and geographies. Aside from major structural decisions about hardware and server management, other significant dimensions of this particular digital transformation are also key components of effective and secure applications. The adoption of such technologies as APIs has quickly become standard practice, particularly in certain industry segments. APIs are also a significant feature of secure cloud deployment, especially on public clouds.

Two key trends

The growth in cloud has a wider effect, in that its exposure of previously unchanged infrastructure is forcing firms to consider their tech stacks in more detail, and to commit to overarching decisions about their technology strategies and their associated trade-offs. This development – which we describe as ‘structural decision-making’ – is one of the key trends we have focused on in this year’s RiskTech100®.

In addition to big structural decisions, institutions can also implement technology that improves the application development and customization process. This second key trend can be seen through two lenses:

- **Operationalizing everything.** Analytical rigor is increasingly being applied to every process within the banking organization. *DevOps* is a collection of tools, practices and operating workflows to support the development process. It emerged from the ubiquity of IT operations and the need to build, test, deploy and monitor software for large and complicated applications. And as the field of machine learning rapidly advances in risk management, its training, versioning and data-driven validation requirements are swiftly creating industry best practices – and the software to manage them.
- **No-code/low-code (NC/LC) applications** are an increasingly popular choice for institutions looking to support employee engagement with digital applications. NC/LC tools allow users to build and customize modular applications in controlled development environments, without the prerequisite of coding/development knowledge.

Key trend 1: structural decision-making

API-centric architectures: creating secure modular systems

Increasingly, processes throughout financial institutions are fully digitalized, or include some form of digital touchpoint. Core banking, which historically has been difficult to transform, is among the central processes and platforms that are now digitalized. Digital processes are enabling the representation of these core applications through APIs.

APIs come in many forms and have become an important feature of vendors' SaaS offerings, as they can support end users' ability to customize, extend and integrate platforms. And while APIs can create a common framework that connects the core data from different applications, they also support the development of modular frameworks with functionally specific microservices. Platform 'openness', driven by API-centric architectures and modular and message-oriented architectures, is a vital component across risk management applications.

Despite increased awareness of the benefits of API-centric architectures, including at the executive board level, API projects can come with design and implementation challenges. The interface for the exchange of data needs to be designed for specific end-user requirements and software settings. The integration of applications should also be based on and tailored to specific organizational structures.

But greater system interoperability can come with increased security concerns. Moving applications to the cloud without an API-based interface for each software component exposes the system to cyberattacks and system integrity breaches.

But while poor API design and development can leave institutions vulnerable to security issues, institutions cannot afford to make the transition to the cloud without them. Appropriate API design is the only secure and scalable way of moving applications to the cloud. Vendors may also employ a variety of APIs as

part of their SaaS offering to continuously back up and secure an organization's data.

API-centric architectures have become especially crucial in the context of controls. Centralized control frameworks can improve an institution's enterprise oversight, compliance and operational agility. However, different operational systems, personnel, business requirements and databases can make integration especially difficult. The more ad hoc legacy systems an institution has, the greater the integration challenge.

The sophistication of control libraries and processes also varies by business line. Broadly speaking, however, control libraries and processes can increasingly be extracted, embedded or made available through APIs.

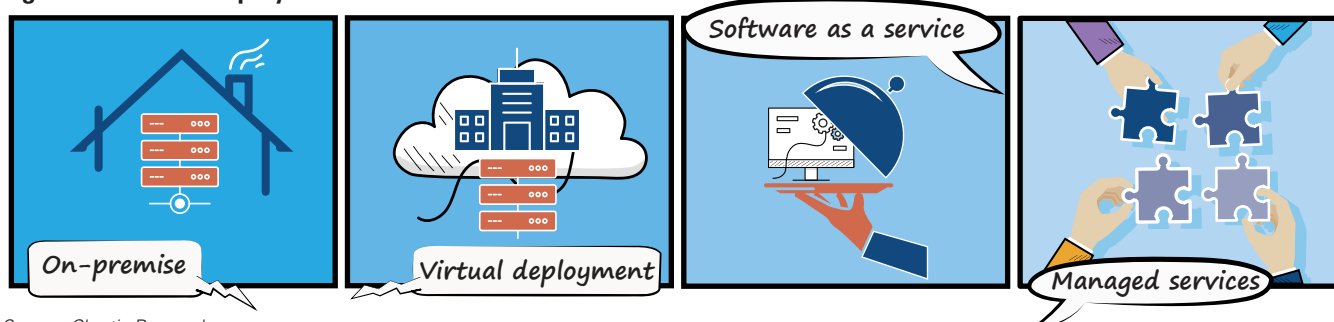
Investing for the future: short-term vs. long-term cloud and application architecture strategies

The terms 'cloud', 'managed services' and 'SaaS' can often be used interchangeably. In practical terms, 'the cloud' refers to a variety of adoption and outsourcing models. At a basic level, cloud adoption means 'infrastructure as a service' (IaaS), which describes the partial or entire outsourcing of hardware/server investment and management to a cloud provider. Compared with the IaaS model, 'platform as a service' (PaaS) entails a certain level of commitment to a particular cloud service provider.

The IaaS model requires an institution to develop systems based on the provider's specific computing platform and its software, database and analytics infrastructure. Institutions should select providers based on both current and long-term computational, database and security requirements.

A common trend across all institution types and geographies is the growing volume of decisions they are confronted with. Vendors have many decisions to make (see Figure 5), including the nature of the cloud solution to build and which 'hyperscaler' they use for their infrastructure (AWS, Azure, Oracle Cloud or Google Cloud).

Figure 5: Solution deployment and services models



Source: Chartis Research

Figure 6: The different levels of managed service



Source: Chartis Research

Enabling managed services

The ability to 'containerize' processes and access them off-site has made the cloud a natural fit with managed services, which have grown accordingly. In addressing certain market segments, like Current Expected Credit Losses (CECL) compliance for small US banks, a vendor must offer some level of managed services to be competitive. The term 'managed services' is also used as an omnibus term that in practice refers to a number of different business/service models. These different approaches can be clustered into three distinct levels of service (see Figure 6).

For vendors, managed services can be an attractive potential offering because their billing models can support long-duration licenses. Software subscription services are more likely to be open to potential replacement or negotiation by end users. However, providing managed services can be challenging, as it entails a lot more 'build risk'. Managed services require a particular operating style at a firm, and this can include the type of salespeople that are hired.

Product management needs to be much more rigorous, a trend that also applies to SaaS. Any mistakes or bugs in an application can have a lasting impression on users' perceptions of the service and can affect its future uptake. Projected economics and pricing are also critical. Vendors must build the software in anticipation of a specific level of use. Some vendors have found the transition to managed services difficult because of these challenges.

Conclusion: build out capabilities and avoid system lock-in

The potential for system lock-in as a result of particular system architecture decisions is a key consideration for vendors. Historically, legacy database vendors and their specific data formats dominated the market. These database designs constrained the ability of application vendors to optimize their data management technology for particular use cases.

Data lakes and multi-cloud ingestion can support both open heterogeneous data ingestion and engineering. Data lakes that store raw data are designed with an open format, and are platform-independent and accessible through various interfaces. They also enable interactive analytics, machine learning and scalable analytics applications. The ability to access data through SQL, high-level programmatic languages like Python or Scala, or deep learning libraries, can support the continuous data-engineering process.

Cross-platform cloud databases are becoming more and more popular. However, firms that opt for these databases may face challenges down the line as they commit to the database vendor's technology strategy rather than their own. Cross-platform databases may be restrictive in the future, as their architectural style will evolve with mass-market demands. These upgrades may not be suited to the specific financial applications firms may require them for, and the database management system could become restrictive. The benefits of cross-platform databases (such as data sharing, integration and multi-language support) can be offset by the loss of the link

between technology and evolving business needs. Indeed, different applications in finance require specific data architectures.

Key trend 2: application development and customization

Operationalizing everything: the increased uptake of DevOps and MLOps by risk teams

Analytical rigor is increasingly part of operational processes throughout financial institutions, and this is best characterized by the growing ubiquity of DevOps. Fundamentally, the term 'DevOps' refers to a set of practices and procedures that aim to speed up software deployment in a way that supports error detection and allows distributed teams to communicate effectively. By using tools throughout the development process, firms can achieve some level of predictability around project progress, ongoing challenges, system rerun requirements and production tests.

The approach systematized by DevOps is well suited to risk management and is being more widely adopted by risk teams. DevOps services can range from container orchestration to automation tools and metadata collection. Other tools support the operations process, enabling continuous delivery pipelines and integrating testing and deployment. Some services provide multiple production environments or enable 'serverless' deployment.

The success of DevOps in bridging the gap between software development and IT engineering has laid the groundwork for its newer counterpart, 'MLOps'. This analogue of DevOps is the set of machine learning practices and tools used to ease models' journey into production. The uptake of machine learning has been driven by the growing availability of deep learning libraries such as Keras, PyTorch, Apache Spark, TensorFlow, MLib, MxNet and Scikit-learn. MLOps has grown alongside, and has been applied to model management, experiment tracking, performance measurement features and visualizations. It has also been applied to data collection, in such areas as recording training data, data versioning and the tagging process.

MLOps can be employed to record hyperparameters used in the training process and measure their effects on accuracy and speed. MLOps also gives data scientists the tools to move their models into production, rather than wholly relying on engineering teams. Automated versioning and benchmarking not only support fast deployment but are also crucial aspects of governance.

Low-code/no-code and domain-specific languages – 'skilled abstractions'

LC/NC tools and domain-specific languages can be an effective way to create abstractions of the useful features of different business domains. Domain-specific languages, in particular, can enable users to generate fast and sophisticated code that expresses a particular problem clearly. In general, for instance, users of derivatives risk and pricing applications tend to operate using abstract cashflow algebra terms. A domain-specific language can provide an efficient way to enable them to construct new products while avoiding having to deal with the partial differential solver that sits below them. Similarly, LC/NC tools designed for operations staff should allow them to visualize workflows and interact with processes without the need for specialist coding skills.

In essence, effective LC/NC tools and domain-specific languages should translate deeper functionality into specific abstractions that must be appropriate for particular contexts and the user's skills and experience. But targeting LC/NC tools and domain-specific languages to specific groups of users is not always straightforward. If these abstract languages fit poorly to users, they can produce poor-quality code. Functionality should be packaged in a way that creates boundaries and controls over how users interact with the system.

Overly complicated domain-specific languages can also create a steep learning curve for practitioners, which may contribute to resource and staff-retention issues. Code efficiency is also a crucial consideration – the intermediate layer of specialized code must be well thought-out, written and packaged.

Conclusion: analytical rigor in applications changes users and vendors at a structural level

The rise of DevOps and MLOps, as well as growing operationalization, is part of a trend of embedding analytics more deeply into different dimensions of how financial institutions manage their risk. This can be seen in firms' structural transformations, as they alter their organizational and technological architectures in response.

This dynamic is also changing the vendor landscape, as more quantitative forms of risk start to predominate. This is most clearly seen in the GRC space, where firms with a more network-oriented view of GRC structures are beginning to gain market share over more process-oriented firms. Nevertheless, this is a trend we expect to affect almost all areas of the risk function.

4. Chartis' research: key highlights

This section summarizes the key research Chartis has published since the last iteration of RiskTech100®.³

Chartis Big Bets 2022

The macroeconomic consequences of COVID-19 – rapid interest rate hikes, inflation, high levels of public sector borrowing and lukewarm GDP growth forecasts – are likely to persist for some time, and firms and stakeholders will need to navigate these conditions as we pursue a full recovery.

Despite the disruptions caused by COVID-19, however, Chartis observes a good measure of continuity in both the economy and the technology infrastructure as we move through 2022. Dynamics such as the rise of transition management in portfolio rotation and beyond, and the continuing growth, componentization and 'horizontalization' of financial crime solutions represent a process that began long before the pandemic.

Credit data solutions

Because of the breadth and variety of credit data, the credit data ecosystem is extremely complex and divides along a variety of dimensions, including geography, nature of the credit user (wholesale, retail, etc.), sector (with a special focus on real estate and property markets) and the business purpose for which the data is being used.

The growth in credit data has been impacted by substantial shifts in the structure of credit intermediation, such as the creation of new institutions and the considerable movement of credit intermediation to non-banks.

Across the three sectors of the credit data landscape Chartis analyzes – wholesale, retail and commercial real estate (CRE)/property services – the use of analytical and advanced statistical techniques (such as machine learning) to capture and quantify data is also on the increase. But integrating new and traditional forms of data brings its own technical challenges.

IFRS 17 and LDTI solutions

Chartis continues to embed its analysis of International Financial Reporting Standard (IFRS) 17 and Long-Duration Targeted Improvements (LDTI) within the wider context of the shift to 'risk-aware accounting', including the transformational effects of the IFRS 9 standard and Current Expected Credit Losses (CECL) methodology. The ongoing structural revolution that risk-aware accounting has catalyzed coincides in part with broader modernization projects.

Chartis continues to view IFRS 17 and LDTI compliance as resting on three intersecting core elements of the technology stack: accounting systems, actuarial modeling systems, and data management and reporting. However, we also view implementation in the context of modernization projects accelerated by the pandemic, such as growing pressure on firms to invest in their operational resilience and business continuity planning.

Energy markets

Energy markets were set for another tumultuous year in 2022, with numerous factors causing uncertainty, including the recovery from the pandemic, higher inflation, the likelihood of higher interest rates, geopolitical tensions (including the war in Ukraine), the acceleration toward renewables, increased regulation and the growing complexity and challenges in energy finance. The Ukraine war, in particular, and the global reaction to it, has changed the dynamics of commodities markets generally and energy markets specifically.

Nevertheless, against such an uncertain background, there are several things we can say for certain about the evolving energy ecosystem. These include increasing differences between, and within, US and European market structures, more prescriptive environmental regulation, the development of better and more diverse analytical tools, a continued shock for market participants, and the continued digitalization of energy infrastructure.

³ Note that the text in this section is taken from published reports, and therefore reflects Chartis' analysis and viewpoints at the time.

Regulatory reporting solutions

The regulatory reporting landscape has changed significantly over the past couple of decades. The volume and complexity of financial regulations have increased significantly, putting pressure on financial institutions to monitor and report a range of complex exposures and comply with several different regulatory requirements.

Many banks have struggled to find the right strategic solutions to help them stay abreast of this increasing regulation and need for compliance. Many institutions are still using technologies they invested in after the financial crisis, and are looking for innovative solutions to make reporting faster and more efficient across their organizations. Emerging regulatory technology (RegTech) solutions can help firms meet their regulatory obligations, but these technologies can be expensive, especially if deployed on a stand-alone basis. To help financial institutions become more efficient, RegTech must be part of an integrated risk and finance architecture to truly add value and provide maximum benefit.

Operational risk and conduct risk and control solutions

Recent events have highlighted the importance of having comprehensive measures to mitigate the adverse effects of operational risk. This has increased the importance of analytics and quantification, since – to paraphrase – ‘what you can’t measure, you can’t manage’. The pandemic has also accelerated an emerging shift toward remote working environments and highlighted the importance of technology architecture.

Continuing strains on financial institutions highlight the growing interconnectedness and interdependence of operations and systems. Firms are now concerned not only with minimizing the effects of operational risks, but also strengthening their overall operational resilience. Achieving this means ensuring the integrity of their systems and maintaining operational processes in the face of structural changes in the operational environment.

CLM solutions: corporate and investment banks and markets institutions

Financial institutions face many challenges: increasing digitalization, more complex customer workflows and pressure from regulators and business requirements. In this context, they have been attempting to develop ‘client lifecycle management (CLM)’ frameworks – a more holistic and centralized view of their customers as they move from onboarding to offboarding.

Investment banks and markets-oriented institutions have some of the most complex and demanding CLM requirements, as their customers often have complex structures or can be a combination of institutional and individual clients (in the case of private banks and wealth managers).

To address the complexity involved, investment institutions, investment and private banks and broker dealers have to balance their desire for a single view of the customer with a variety of technical and operational components in the CLM landscape.

Trade-based AML solutions

Trade-based money laundering (TBML), a growing phenomenon within the financial services industry, is costing financial firms millions of dollars and attracting increasing regulatory scrutiny. Methods of managing it, however, are still not well-delineated.

Nevertheless, the trade-based anti-money laundering (TBAML) solution market remains an area of great opportunity for both financial institutions and vendors. Chartis expects competition in this space to intensify over the coming years, as firms expand into adjacent areas and combine fundamental and quantitative approaches to build end-to-end solution capabilities.

Financial crime risk management systems: watchlist monitoring solutions

Since Chartis first analyzed it in 2019, the watchlist screening and monitoring market has grown and evolved. Financial institutions now have

considerably more options and solutions to help them meet the challenges they face.

Against the backdrop of anti-money laundering (AML) spreading into adjacent areas of compliance (trade finance, gambling and gaming, and FinTech), several market developments have occurred. These include increased investment in watchlist screening and monitoring technology and solutions from banks and other financial institutions, new vendors disrupting the market by using advanced technology, and the growing consideration of commercial metrics such as customer experience by firms as part of their compliance and risk functions.

Vendors have focused on a few key areas: moving toward 'global' and mid-tier banking solutions, strengthening their end-to-end capabilities and investing in more product R&D.

The buy-side landscape

The buy-side, the investment side of the financial services industry, has embarked on the road to digitalization with purpose. Investment managers have recognized the need to modernize and have wisely determined that since their firms are not 'technology development shops', leveraging the financial technology (FinTech) industry to achieve their digital goals rapidly and successfully can bring considerable benefits.

Chartis believes that with this 'leapfrogging' strategy firms can achieve efficiency, analytical superiority and reliability across the investment management lifecycle.

Algorithmic trading solutions

This research examines a wide range of algorithms (algos), including scheduled algos, opportunistic algos, aggressive algos, lit and dark liquidity-seeking algos, pair-trading algos, portfolio-trading algos, delta-1 algos, cross-asset risk arbitrage algos and smart order routing (SOR) child-order algos.

Target clients are typically institutional 'buy-side' small and large hedge funds, family offices and investment managers, as well as 'sell-side' banks, brokers and introducing brokers.

Key areas covered by this research include the trends driving the algorithmic trading solutions market and vendor landscape, algorithm

performance analytics, algo predictive analytics, Big Data management, lit and dark liquidity management, algo model risk, algo model explainability, algo infrastructures, algo techniques and governance.

Outsourced trading solutions

Demand for outsourced trading solutions is increasingly coming from larger asset managers. Outsourced trading solution providers are also getting larger. In the past few years, no new small, independent boutique firms have entered the outsourced trading provider market.

Chartis estimates that the global outsourced trading commissions wallet will grow from \$1 billion in 2022 to \$1.4 billion in 2023, across the Americas (47%), Europe/UK (39%) and Asia-Pacific (14%). Nevertheless, our interviews with outsourced trading clients indicate that providers need to do more to modernize their trading technology, platform integrations and interoperability with best-of-breed specialist modules.

The development of outsourced trading solutions has progressed across three distinct generations over the past decades. Many outsourced trading solution providers are still operating with outdated first-generation infrastructure, while others are leading the way in customer satisfaction rankings with more agile and dynamic third-generation trading technology architectures.

ESG data aggregators and scorers

Environmental, social and governance (ESG) issues now constitute a major class of risk. Activism among investors and the need for regulatory compliance mean that ESG risks are now being addressed in investment portfolios, loan books and financial holdings.

Against this background, investment managers must be able to progress from simply divesting exclusionary holdings to quantifying the ESG data used in investment decisions. But the validity of the data used for ESG investing has come under scrutiny, and investors in ESG funds and regulators want assurance that data and quantitative assessments are valid.

The vendor landscape for ESG data is entering its third phase, with new challengers entering the market as demand for real-time, alternative, vertical-focused and non-financially material ESG risk data increases. Chartis also expects a fresh wave of partnerships and re-bundling to occur as investors accelerate the integration of ESG risks and advanced analytics into their investment decision-making.

RiskTech vendors

Mergers, acquisitions and partnerships continue apace among vendors in the risk and compliance technology market. This list (selected by Chartis⁴) highlights some of the deals announced in the past year:

- Exiger acquired:
 - Supply Dynamics, a supply chain collaboration platform.
- Fenergo acquired:
 - Sentinels, an AML transaction-monitoring firm.
- FIS acquired:
 - Embedded payment company Payrix.
- GBG acquired:
 - Acuant, an identify verification provider.
 - Cloudcheck, a provider of electronic Identity verification and anti-money laundering solutions.
- IBM acquired:
 - SXiQ, a digital transformation services company specializing in cloud applications, cloud platforms and cloud security.
 - Randori, an attack surface management (ASM) and cybersecurity platform.
- ICE acquired:
 - risQ and Level 11 Analytics, which deploy data-driven technologies for managing climate change risk and expanding alternative data capabilities.
- insightsoftware acquired:
 - Legerity, a provider of cloud-based accounting rules software.
- LSEG acquired:
 - Global Data Consortium (GDC), a digital ID firm providing capabilities in global name and address matching.
 - MayStreet, a market data solutions provider.
 - TORA, a trading technology provider offering an order and execution management system (OEMS) and a portfolio management system (PMS) across equities, fixed income, foreign exchange, derivatives and digital assets trading.
- Moody's acquired:
 - Bogard AB, a leading provider of data and information on politically exposed persons (PEPs) in the Nordic region.
 - PassFort, a European provider of onboarding and KYC technology solutions.
 - 360kompany AG, an audit-proof business verification and KYC technology solution firm.
- Nasdaq acquired:
 - Metrio, a privately held provider of environmental, social and governance (ESG) data collection, analytics and reporting services firm based in Montreal.
- Numerix was acquired by Genstar Capital.
- OneTrust acquired:
 - Planetly, a technology company aiming to support the business transformation to a net-zero economy.
- Pegasystems acquired:
 - Everflow, a process mining startup.

⁴ Note that this is not a comprehensive list, but a representative selection of the mergers and acquisitions that have occurred in the past year.

- Regnology acquired:
 - Belgian RegTech firm b.fine, which automates workflows for compliance teams in the last mile of the regulatory process. b.fine also offers advisory and managed services.
 - The Tax Information Reporting (TIR) software business from PwC UK.
- S&P Global completed a merger with:
 - IHS Markit, a global diversified provider of information, analytics and solutions providing information and analytics to customers in business, finance and government.
- SAS acquired:
 - Kamakura, which provides specialized software, data and consulting to help financial organizations manage a variety of financial risks.
- SS&C acquired:
 - Blue Prism Group, a leading robotics process automation (RPA) company.
- SymphonyAI Ayasdi (now SymphonyAI Sensa) acquired:
 - Financial crime detection leader NetReveal from BAE Systems. NetReveal protects against financial crime, ensures regulatory compliance and reduces risk.
- Wolters Kluwer acquired:
 - International Document Services, Inc., a leading US provider of compliance and document-generation software solutions for the mortgage and real-estate industry.
- Workiva acquired:
 - Denmark-based financial reporting company ParsePort.
- Zafin acquired:
 - FINCAD, the derivatives analytics firm.

5. RiskTech100® 2023 rankings

2023 Rank	2022 Rank	Company	HQ	Overall score	Functionality	Core technology	Strategy	Customer satisfaction	Market presence	Innovation
1	2	Moody's	US	79.17%	98.00%	70.00%	83.00%	64.50%	85.00%	74.50%
2	1	FIS	US	78.77%	96.20%	80.90%	75.00%	63.50%	88.00%	69.00%
3	4	SAS	US	76.33%	95.00%	83.00%	70.00%	62.00%	77.00%	71.00%
4	3	Oracle	US	73.72%	88.80%	87.00%	67.00%	58.50%	71.00%	70.00%
5	6	FICO	US	72.92%	85.00%	68.01%	70.00%	67.00%	69.00%	78.50%
6	9	S&P Global	US	70.58%	86.00%	69.00%	72.00%	62.00%	67.00%	67.50%
7	13	ION	Ireland	69.67%	85.00%	73.00%	69.00%	52.00%	77.00%	62.00%
8	11	LexisNexis Risk Solutions	US	69.46%	80.25%	67.00%	67.00%	61.00%	75.50%	66.00%
9	7	Wolters Kluwer	Netherlands	69.30%	85.50%	68.50%	60.00%	66.80%	73.00%	62.00%
10	12	Bloomberg	US	69.08%	79.00%	70.00%	68.00%	63.00%	68.00%	66.50%
11	8	Murex	France	68.92%	77.50%	72.00%	68.50%	62.00%	68.00%	65.50%
12	14	Adenza	US	68.75%	80.50%	67.00%	69.00%	68.00%	69.00%	59.00%
13	10	Numerix	US	68.67%	69.00%	63.00%	74.00%	70.00%	69.00%	67.00%
14	15	MetricStream	US	69.45%	72.25%	64.00%	72.50%	70.00%	72.00%	60.50%
15	16	NICE Actimize	US	68.17%	74.00%	66.00%	69.00%	59.00%	74.00%	67.00%
16	5	MSCI	US	67.92%	82.00%	65.00%	70.00%	60.00%	68.50%	62.00%
17	17	IBM	US	67.50%	71.00%	84.00%	69.00%	53.00%	62.00%	66.00%
18	25	Nasdaq	US	65.54%	64.00%	66.00%	70.00%	60.50%	65.00%	67.75%
19	20	SS&C	US	65.38%	77.80%	59.00%	69.50%	59.00%	70.00%	57.00%
20	19	LSEG	UK	65.08%	82.50%	65.00%	56.00%	55.00%	75.00%	57.00%
21	18	Finastra	UK	64.83%	80.00%	69.00%	58.00%	50.00%	76.00%	56.00%
22	24	Prometeia	Italy	64.58%	72.00%	63.00%	62.00%	71.50%	53.00%	66.00%
23	26	Dun & Bradstreet	US	64.17%	78.00%	65.00%	68.00%	53.50%	65.00%	55.50%
24	34	Beacon Platform	US	63.75%	67.50%	68.50%	56.00%	64.00%	59.50%	67.00%
25	21	Qontigo	US	63.25%	71.50%	61.00%	64.50%	61.50%	58.00%	63.00%
26	40	Quantexa	UK	63.17%	62.00%	70.00%	62.00%	60.00%	55.00%	70.00%

2023 Rank	2022 Rank	Company	HQ	Overall score	Functionality	Core technology	Strategy	Customer satisfaction	Market presence	Innovation
27	30	Experian	Ireland	63.08%	68.00%	62.00%	64.00%	59.00%	60.50%	65.00%
28	29	Fenergo	Ireland	63.00%	67.00%	63.00%	63.00%	58.00%	65.50%	61.50%
29	37	Cboe	US	62.67%	61.00%	66.00%	66.00%	62.00%	59.00%	62.00%
30	22	FactSet	US	62.50%	69.00%	59.00%	67.00%	51.50%	61.50%	67.00%
31	51	SymphonyAI Sensa ¹	US/India	62.42%	70.00%	67.00%	57.00%	54.50%	60.00%	66.00%
32	36	ICE	US	62.21%	72.75%	57.00%	67.00%	53.50%	61.00%	62.00%
33	38	Regnology	Germany	61.88%	68.25%	59.00%	61.00%	70.50%	55.50%	57.00%
34	35	Intellect Design	India	61.80%	72.03%	63.50%	60.00%	60.50%	55.75%	59.00%
35	27	GBG	UK	61.67%	65.00%	61.00%	67.01%	55.00%	57.50%	64.50%
36	43	Quantifi	US	61.42%	71.50%	65.00%	51.00%	61.50%	55.50%	64.00%
37	81	ServiceNow	US	61.33%	56.00%	69.00%	67.00%	55.00%	60.00%	61.00%
38	32	Fiserv	US	61.17%	74.53%	63.00%	51.00%	61.50%	68.00%	49.00%
39	62	PwC	UK	61.08%	74.50%	68.00%	60.50%	56.00%	53.00%	54.50%
40	31	BlackRock Solutions	US	61.00%	73.50%	50.50%	67.00%	51.00%	63.00%	61.00%
41	49	Abrigo	US	60.92%	65.03%	59.00%	60.50%	61.00%	65.50%	54.50%
42	33	Dow Jones Risk & Compliance	US	60.83%	67.00%	67.00%	52.00%	59.00%	60.00%	60.00%
43	28	Confluence	US	60.21%	64.25%	54.50%	62.00%	61.50%	56.50%	62.50%
44	44	Workiva	US	60.17%	54.00%	50.00%	59.00%	72.00%	64.00%	62.00%
45	45	OneTrust	US	60.10%	71.50%	53.00%	61.50%	53.60%	71.00%	50.01%
46	59	SAP	Germany	60.08%	75.00%	69.00%	56.50%	50.00%	57.00%	53.00%
47	48	ACI Worldwide	US	59.43%	62.05%	63.00%	57.00%	49.50%	70.00%	55.00%
48	78	Feedzai	US	59.25%	66.00%	62.00%	59.00%	62.50%	52.00%	54.00%
49	47	Conning	US	58.58%	67.00%	58.00%	59.00%	53.00%	55.00%	59.50%
50	58	Appian	US	58.50%	53.03%	64.00%	64.00%	57.00%	51.00%	62.00%
51	–	Sayari	US/India	58.33%	50.00%	64.00%	61.00%	61.00%	43.00%	71.00%
52	64	Empyrean Solutions	US	58.13%	71.25%	58.25%	60.50%	61.25%	37.25%	60.25%
53	50	QRM	US	57.92%	67.50%	50.00%	53.00%	53.00%	66.00%	58.00%

2023 Rank	2022 Rank	Company	HQ	Overall score	Functionality	Core technology	Strategy	Customer satisfaction	Market presence	Innovation
54	60	Mitrastech	US	57.68%	73.00%	49.00%	58.50%	51.60%	71.00%	43.01%
55	61	Eastnets	UAE	57.58%	67.50%	52.00%	55.00%	60.00%	59.00%	52.00%
56	53	Loxon	Hungary	57.50%	67.00%	67.00%	47.00%	72.50%	48.00%	43.50%
57	56	RSA	US	57.42%	63.50%	54.50%	51.50%	54.50%	63.50%	57.00%
58	55	FINCAD ²	Canada	57.29%	69.00%	62.00%	36.25%	61.50%	49.00%	66.00%
59	–	Zoloz ³	Singapore	57.17%	59.00%	60.00%	54.00%	54.00%	59.00%	57.00%
60	54	Broadridge	US	57.08%	65.50%	56.50%	60.00%	57.50%	58.50%	44.50%
61	63	SAI360	US	57.02%	70.00%	50.00%	56.50%	50.60%	71.00%	44.00%
62	68	RiskSpan	US	56.88%	57.75%	60.50%	56.50%	64.00%	47.00%	55.50%
63	52	Pelican	US/India	56.75%	58.00%	62.00%	57.00%	53.50%	44.00%	66.00%
64	67	Kiya.ai ⁴	India	56.33%	59.00%	54.00%	49.00%	61.00%	67.00%	48.00%
65	–	Evalueserve	Switzerland	56.17%	59.00%	58.00%	59.00%	54.00%	50.00%	57.00%
66	65	Azentio	Singapore	56.09%	61.53%	52.00%	52.00%	61.00%	65.50%	44.50%
67	70	Pegasystems	US	56.00%	55.50%	67.50%	59.00%	48.00%	49.00%	57.00%
68	–	LogicMonitor	US	55.85%	63.00%	54.00%	57.50%	50.60%	63.00%	47.00%
69	77	MORS Software	Finland	55.75%	72.00%	67.50%	44.00%	68.00%	32.00%	51.00%
70	79	MathWorks	US	55.67%	54.00%	61.00%	52.00%	58.00%	52.00%	57.00%
71	–	nCino	US	55.63%	69.25%	47.25%	58.50%	59.25%	40.25%	59.25%
72	87	Ripjar	UK	55.46%	47.25%	56.00%	56.50%	68.00%	40.00%	65.00%
73	–	Quantifind	US	55.42%	49.00%	64.00%	55.00%	57.50%	43.00%	64.00%
74	76	Supply Wisdom	US	55.27%	63.00%	52.00%	55.50%	51.10%	65.00%	45.00%
75	98	CubeLogic	UK	55.21%	63.75%	56.50%	52.00%	61.00%	47.50%	50.50%
76	71	Surya	India	55.13%	60.50%	60.00%	53.25%	59.00%	38.00%	60.00%
77	94	BCT Digital, Bahwan CyberTek Group	India	54.96%	56.25%	56.50%	49.00%	58.00%	54.50%	55.50%
78	–	SteelEye	UK	54.88%	49.25%	60.50%	49.00%	59.00%	53.50%	58.00%
79	75	AML Partners	US	54.79%	56.75%	58.00%	59.50%	55.00%	40.50%	59.00%
80	84	Integro Technologies	US	54.67%	48.50%	58.00%	57.00%	60.00%	51.50%	53.00%

2023 Rank	2022 Rank	Company	HQ	Overall score	Functionality	Core technology	Strategy	Customer satisfaction	Market presence	Innovation
81	83	Aravo	US	54.60%	61.50%	49.50%	57.00%	50.60%	63.00%	46.00%
82	72	Clari5	India	54.50%	63.00%	61.00%	44.50%	56.50%	48.00%	54.00%
83	90	Manipal Technologies	India	54.42%	56.00%	56.00%	50.50%	57.00%	51.50%	55.50%
84	82	SureCloud	UK	54.27%	62.00%	50.50%	54.50%	51.60%	62.00%	45.00%
85	99	RiskScreen ⁵	UK	54.17%	50.00%	50.00%	59.00%	53.00%	58.00%	55.00%
86	73	Camms	Australia	54.10%	62.50%	53.00%	55.50%	46.60%	62.00%	45.00%
87	88	Equifax	US	53.92%	72.00%	55.00%	56.00%	42.50%	55.00%	43.00%
88	–	Trulioo	Canada	53.75%	49.00%	52.00%	51.00%	57.00%	58.50%	55.00%
89	–	Shufti Pro	UK	53.67%	50.00%	51.00%	60.00%	57.00%	48.50%	55.50%
90	–	MEGA	France	53.58%	65.00%	58.50%	53.00%	54.00%	43.50%	47.50%
91	92	Aptitude Software	UK	53.50%	76.00%	59.50%	47.00%	53.50%	35.00%	50.00%
92	96	Diligent	US	53.42%	63.00%	56.50%	52.00%	53.00%	48.50%	47.50%
93	85	CareEdge Risk Solutions	India	53.33%	53.50%	57.00%	53.50%	61.50%	43.00%	51.50%
94	97	Featurespace	UK	53.17%	45.00%	49.50%	54.50%	61.00%	43.00%	66.00%
95	89	NetGuardians	Switzerland	53.08%	60.25%	56.25%	53.50%	66.00%	37.25%	45.25%
96	–	Sopra Banking Software	UK	53.00%	48.00%	49.50%	49.00%	64.50%	47.00%	60.00%
97	93	ComplyAdvantage	UK	52.92%	52.00%	44.00%	56.00%	61.00%	44.50%	60.00%
98	86	ReadiNow	Australia	52.77%	57.00%	53.00%	52.00%	51.60%	58.00%	45.00%
99	91	zeb	Germany	52.71%	74.50%	65.25%	41.25%	52.75%	33.25%	49.25%
100	–	insightsoftware ⁶	US	52.50%	73.00%	62.50%	45.00%	53.50%	30.00%	51.00%

¹ Formerly SymphonyAI Ayasdi.

² FINCAD is the capital markets division of Zafin.

³ Owned by Ant Group.

⁴ Formerly InfracoreTech.

⁵ Formerly KYC Global.

⁶ Formerly Legerity.

6. Category winners

Category award	2023 winner
Overall Winner	Moody's
Chartis categories	
Functionality	Moody's
Core Technology	Oracle
Strategy	Moody's
Customer Satisfaction	Loxon
Market Presence	FIS
Innovation	FICO
Industry categories	
Banking	Moody's
Buy-side	Bloomberg
Corporations	SAP
Insurance	Moody's
Trading and Capital Markets	FIS
Solution categories	
Artificial Intelligence Applications	FICO
Asset and Inventory Management	SAP
Asset and Liability Management (ALM)	QRM
Balance Sheet Risk Management	SAS
Capital Optimization	Prometeia
Client Lifecycle Management (CLM)	Fenergo
Climate Risk	Moody's
Commodity Trading Risk Management (CTRM)	ION
Communications Monitoring	NICE Actimize
Conduct and Controls	TCS
Credit Data – Collateralized Loan Obligation (CLO)	Moody's
Credit Data – Commercial Mortgage-Backed Security (CMBS)	Trepp

Category award	2023 winner
Credit Data – Corporate Bonds	Bloomberg
Credit Data – Credit Curves	Bloomberg
Credit Data – Small and Midsize Enterprise (SME)	Dun & Bradstreet
Credit Data – Wholesale	Moody's
Credit Risk for the Banking Book	Moody's
Credit Valuation Adjustment (CVA)	Numerix
Current Expected Credit Losses (CECL)	Moody's
Cyber Risk Management	IBM
Cyber Risk Quantification	RiskSense
Data Integrity and Control	Oracle
Domain-specific Languages – GRC	MetricStream
Domain-specific Languages – Insurance	FIS
Domain-specific Languages – Trading and Capital Markets	Numerix
Enterprise GRC	MetricStream
Enterprise Stress Testing	SAS
Environmental, Social and Governance (ESG)	Moody's
Evaluated Pricing and Data – Credit	Moody's
Evaluated Pricing and Data – Fixed Income	Bloomberg
Evaluated Pricing and Data – Multi-asset	ICE
Evaluated Pricing and Data – OTC Derivatives	LSEG
Facility Management and Control	SAP
Finance and Accounting – Accounting Frameworks	Oracle
Finance and Accounting – Cross-industry Support	SAP
Finance and Accounting – Data Management	Oracle
Financial Crime – Anti-Money Laundering (AML)	Oracle
Financial Crime – Data	Moody's
Financial Crime – Enterprise Fraud	FICO
Financial Crime – Insurance Fraud	Shift Technology

Category award	2023 winner
Front Office Risk Management	Numerix
FX Risk and Trading	ICE
GRC – Analytics	TCS
GRC – Audit	MetricStream
GRC – Content	SAI360
GRC – Data Privacy Management	RadarFirst
GRC – Digitalization and Control	TCS
GRC – Enterprise GRC	MetricStream
GRC – IT Risk	IBM
GRC – Operational Resilience and Business Continuity	ServiceNow
GRC – Operations Risk and Process Control	TCS
GRC – Supply Chain Risk	SAP
GRC – Vendor and Third-Party Risk	SAP
International Financial Reporting Standard (IFRS) 9	SAS
IFRS 17 – Accounting Systems	Aptitude Software
IFRS 17 – Data Management and Reporting	Oracle
Innovation – AI and Decision-management Platforms	FICO
Innovation – Capital Markets	Cboe
Innovation – Corporate Banking	nCino
Innovation – Credit Risk	Moody's
Innovation – Derivatives	Numerix
Innovation – Evaluated Pricing	Bloomberg
Innovation – Lending Operations Platforms	Kuliza
Innovation – Market Risk	Riskfuel
Innovation – Private Credit Operations and Technology	Oxane Partners
Innovation – Retail Finance	FICO
Innovation – User Experience (UX)	Topaz
Insurance – ALM	QRM

Category award	2023 winner
Insurance – Budgeting and Financial Planning	Aon
Insurance – Catastrophe Risk Modeling	Moody's
Insurance – Economic Scenario Generation	Conning
Insurance – Risk and Capital Management	Aon
Integrated Trading and Risk Management	Murex
Know Your Customer (KYC) Solutions	Fenergo
Long-Duration Targeted Improvements (LDTI)	Wolters Kluwer
Lending Operations – Collateral	Broadridge
Lending Operations – Limits	FIS
Lending Operations – Loan Origination System	Moody's
Liquidity Risk	Wolters Kluwer
Managed Services – Credit Risk	Abrigo
Managed Services – Data Management	SmartStream
Managed Services – Financial Crime	Nasdaq
Managed Services – Market Risk	MSCI
Market Risk – Buy-side	S&P Global Market Intelligence
Market Risk – Sell-side	FIS
Model Risk Management	SAS
Model Risk Quantification	Prometeia
Model Validation	CRISIL (an S&P Global Company)
Model Validation – Supporting Tools	Evalueserve
Margin Valuation Adjustment (MVA) and Margin Analytics	FIS
Operational Risk Regulatory Analytics	RiskLogix
OpsTech – Credit Operations	FIS
OpsTech – Fees and Commissions	Cognizant
OpsTech – Fixed-Income Support Services	Broadridge
OpsTech – Legal Operations	Mitratach
OpsTech – Onboarding	Fenergo

Category award	2023 winner
OpsTech – Tax Processing	Wolters Kluwer
OpsTech – Wealth Management Lifecycle Operations	Delta Capita
Real-time Risk	Cboe
Regulatory Intelligence	Wolters Kluwer
Regulatory Reporting – Banking	Regnology
Regulatory Reporting – Insurance	Oracle
Regulatory Reporting – Markets and Securities	Adenza
Retail Credit Analytics	FICO
Risk and Finance Integration	SAS
Risk as a Service (RaaS)	RiskSpan
Risk Data Aggregation and Reporting	Oracle
Risk Technology Infrastructure	NVIDIA
Supervisory Tech (SupTech)	Regnology
Trade Surveillance	Nasdaq
Trade-based AML	Quantexa
Treasury Platforms	ION
xVA	Numerix

7. 2023 Rising Stars

This category recognizes a selection of vendors that, in the opinion of our analysts, are companies to watch.

★ Ainsurtech (an AJMS Group Entity)

Ainsurtech is a leading global InsurTech provider for the banking, financial services and insurance sectors. Its cutting-edge technologies and services are backed by a team of domain experts, with the aim of providing cost-effective, highly scalable and efficient technology solutions to address the business challenges faced by regulators, insurance companies and other key stakeholders.

★ AsiaVerify

AsiaVerify provides access to business, customer and shareholder verification data, sourced from government registries across Asia and translated in real time. The company's platform leverages natural language processing (NLP), Asian optical character recognition (ACP) and proprietary artificial intelligence and translation technologies to streamline workflows for Know Your Business, Know Your Customer and ultimate beneficial owner compliance checks across Asia-Pacific.

★ Climate X

Climate X combines climate science with econometric modeling to deliver location-specific risk ratings and climate-adjusted loss estimates for extreme weather events linked to climate change, up to the year 2100. The company's Spectra product, available through an online platform or via APIs, combines the latest climate models with up-to-date real-world data to project the financial impact of climate change on properties, buildings and infrastructure under multiple future emissions scenarios.

★ CogNext

CogNext is a RegTech company that provides a no-code compliance platform that automates and simplifies regulatory compliance for banks and financial institutions. Its cloud-native, end user-focused cognitive platform addresses risk, finance and regulatory challenges through AI/machine learning (ML) and the ability to connect data pipelines seamlessly in the evolving technology stack. CogNext also offers credit modeling, model automation and dynamic balance sheet modeling.

★ DataTracks

DataTracks provides a cloud-based software solution to help clients prepare compliance reports for filing with regulators worldwide. DataTracks' solution covers 26 countries, serves more than 21,500 clients and has facilitated the preparation of more than 220,000 reports since inception. DataTracks provides services in selected regulatory regimes, converting inputs provided by clients in traditional formats to HTML, XML, XBRL or iXBRL formats and tagging them with the most appropriate taxonomy element of applicable accounting standards.

★ Diligencia

Diligencia gathers reliable and accurate entity data and specialist corporate intelligence from primary sources to provide insight into the relationships that underpin business activity. The company's clients, which include financial institutions, law firms, risk advisory organizations and multinational corporations, use the data to manage their compliance obligations, market strategies and counterparty risks in Africa and the wider Middle East. The company's online platform, ClarifiedBy.com, offers access to verified information on organizations and individuals, including company registration, ownership, management, subsidiaries and associated companies.

★ Exiger

Exiger helps corporations, government agencies and banks manage risk and compliance through technology-enabled and SaaS solutions. Exiger addresses financial crime compliance, including model validation and optimization, remediations and lookbacks, audit and assurance, third-party risk management and program design. It also supports local, state and federal agencies in supply chain risk management, intelligence analysis, construction-integrity monitoring, and company and personnel vetting.

★ Jocata

Jocata's GRID is an enterprise ecosystem technology platform that provides an integrated

real-time view of business, risk, operations and compliance. A multi-layered stack of technology capabilities, each layer solves a specific challenge in the digital transformation initiatives of financial institutions. Although the individual feature sets of GRID are mapped to discrete products, its architecture enables them to be deployed separately, all together or in specific combinations, depending on the client's requirements. GRID plugs into back-end systems through a secure interface, reducing up-front costs for training, setup and infrastructure.

★ Kuliza

Kuliza's Finvolv is a low-code, API-driven platform for global banks and FinTechs. Its loan-management system automates customer management operations, digitizes repayment options and provides insights from data obtained throughout the loan. The digital origination system provides automated and improved credit decisioning across the digital lending marketplace. Seamless, easy to integrate and secure, the system also aligns with the requirements and guidelines of multiple geographies. Finvolv's API Hub also offers 250+ compliance-ready APIs for various data sources and FinTech solutions.

★ KYC Portal

KYC Portal offers a CLM platform that manages the end-to-end process of due diligence and KYC. Its system's risk scoring engine allows clients to define their regulatory process at a product or service level, and includes an embedded document management system and inbuilt workflows.

★ Molecule

Molecule offers a cloud-native energy/commodity trading risk management (E/CTRM) system with front- to back-office capabilities. Trade capture, mark-to-market, value at risk (VaR), settlement and other functions are fully automatic, and offered in near-real time. Features include automatic deal capture, market data, automatic position, P&L and risk, and customizable reporting. The solution is used by independent power producers, oil, gas and chemicals marketers, energy and commodities consumers, hedge funds and prop funds. Specialized upgrade packages are available for renewables, physical power and crypto, alongside a data lake as a service.

★ MyComplianceOffice

Formerly Governor Software, MCO helps senior risk and compliance executives at financial institutions improve compliance across their organization. The company uses visualization technology to tackle the issues associated with governance and oversight by delivering the context of risk, requirements, objectives and controls and how they interrelate and map to each other.

★ Napier

Napier provides an AI-enhanced platform that integrates multiple compliance solutions into one master dashboard for intelligent AML and trade compliance. Highly scalable and deployable on-premise or in the cloud, Napier's platform enables non-technical business users to define and test rules, and uses AI and ML to reduce false positives, identify more false negatives, enhance insights and automate reporting.

★ Owlin

Owlin provides AI-powered text and news analytics solutions for financial institutions, leveraging ML and NLP to cluster, extract, score and visualize unstructured data in real time from millions of news and web sources, and across multiple languages. It generates early-warning signals to identify risks, detect new entities in the risk domain, uncover unknowns and capture potential investment opportunities.

★ Oxane Partners

Oxane's CREST platform helps real-estate lenders, investors, lending platforms and asset managers transform the investment lifecycle from origination to exit. It provides a comprehensive ecosystem for managing both debt and equity investments and helps streamline origination, underwriting, servicing and portfolio management. Panorama PM helps firms to centralize portfolio management workflows across asset types on a single technology platform, giving clients the flexibility to manage a wide range of private and illiquid credit asset types. Oxane Panorama DD is a portfolio due-diligence platform that streamlines the process and allows parties to collaborate and exchange.

★ RadarFirst

RadarFirst manages privacy and security incidents involving regulated data through intelligent, automated and purpose-built SaaS technology. RadarFirst's intelligent incident management software automates privacy risk assessments and enables exhaustive investigations that ensure that all critical details from an incident are captured. Throughout the profiling of an incident, RadarFirst automatically and seamlessly connects critical data to the appropriate breach-notification laws.

★ Riskfuel

Riskfuel's software enables calculations that normally take hours or days to be completed in seconds, giving clients full insight into their risk at all times. Among the features of Riskfuel's software are real-time valuations and P&L, real-time risk sensitivities, accuracy with any valuation technique, accuracy under volatile market conditions, accurate outputs and real-time 'what-if' scenario analysis.

★ RiskLogix

RiskLogix is a GRC solution provider whose platform has more than 500,000 financial services users across 80 countries. In addition, the company's consultancy and risk training programs have helped financial institutions worldwide develop and improve their enterprise risk management (ERM) strategies.

★ Senzing

Senzing entity resolution software allows customers to add advanced data matching and relationship discovery capabilities to their applications and services quickly. With Senzing's easy-to-use API, customers can be up and running in minutes and deploy in days or weeks. Senzing's purpose-built AI is designed just for entity resolution and learns through experience. It also allows sub-second adds, changes, deletes and queries, and maps messy and structurally inconsistent data.

★ SGR COMPLIANCE

SGR COMPLIANCE is a leader in data analysis and collection. The company gathers, organizes and constantly updates libraries of crucial information for the prevention of money laundering and terrorism financing. The company's solution, SGR Daily Control, offers an accessible interface

combined with clear information on politically exposed persons (PEPs), sanctions, legal enforcement events and adverse media. This helps clients meet legal requirements for the prevention of money laundering, terrorism financing and other related threats.

★ Shift Technology

Shift enables insurers to automate and optimize decision-making across key insurance functions, including fraud detection, claims and compliance, with solutions that combine AI and deep insurance expertise. The company's products contribute to better customer experience, increased operational efficiency and reduced costs.

★ Sigma Ratings

Sigma is an AI-driven risk intelligence platform used by global organizations to fight financial crime and make more informed, automated counterparty risk decisions. Sigma uses point-in-time risk analysis and ongoing monitoring technology to screen thousands of global data sources and return a unified stream of compliance intelligence on companies and people.

★ Signzy

Signzy is a digital banking infrastructure provider that enables clients to onboard customers and businesses digitally with speed and accuracy. The company works with more than 250 financial institutions globally, including the four largest banks in India and a Top 3 acquiring bank in the US. The company's GO platform delivers seamless, end-to-end, multi-product user journeys from lead to activation without writing a single line of code. It also gives clients access to more than 240 bespoke APIs that can be added to any workflow.

★ Silent Eight

Silent Eight helps financial institutions manage their compliance and risk obligations. The company, whose solutions are deployed in more than 150 global markets, leverages AI and ML to improve the name-screening process, weed out money laundering and terrorist financing, reduce manpower and compliance risks, and enable better decision-making.

★ smartKYC

smartKYC supports financial services firms in their KYC due diligence by using AI to extract precise open-source intelligence from the internet and deep web, news archives, watchlists and corporate databases across 35 languages. The solution can be hosted on-premise or in the cloud, is scalable, supports a multi-tenant architecture and can be integrated into proprietary systems or third-party tools.

★ Tookitaki

Tookitaki provides enterprise software solutions that create sustainable compliance programs for financial services companies. Its analytics platform and suite of ML-enabled applications are built on a distributed computing framework. They provide recommendations and insights for reconciliation and AML process workflows, as well as detailed model management and audit capabilities.

★ Topaz

Topaz provides advanced commodity trading and risk analytics for traders and risk teams. It gives leading trading organizations access to real-time valuations, exposure and risk analysis across their trading activity, no matter how complex. It also offers comprehensive professional services covering implementation, integration, bespoke solutions and end-user support. Topaz also provides bespoke quantitative modeling services for derivatives, physical optionality and asset modeling.

★ Torstone Technology

Torstone Technology offers a cloud-based platform for post-trade securities and derivatives processing that simplifies post-trade complexities. Torstone's open APIs deliver a suite of real-time functionality, from middle-office initial trade capture and confirmations through to back-office settlement, risk management, reconciliation, accounting, cash and collateral management.

★ Vector Risk

Vector Risk provides high-performance analytics for areas including VaR, potential future exposure (PFE), xVA and the International Swaps and Derivatives Association (ISDA) Standard Initial Margin Model (SIMM), on hosted cloud technology. The company built a native cloud solution to take advantage of new delivery, support and upgrade capabilities and now has deployments in cloud data centers in North America, Europe, Australia and Asia. Vector Risk onboards new customers rapidly by using SaaS and analytics that are pre-integrated with several trading platforms, speeding up the mapping process.

★ Vneuron

Vneuron provides a complete package for anti-money laundering and combating terrorist financing. The platform fulfills international risk-based customer due diligence standards by collating all customer information in one place and merging with existing KYC processes. Real-time, AI-supported transaction monitoring helps identify suspicious transactions, which can be checked against international sanction and watchlists. The presentation of compliance data via dashboards helps to improve operational efficiency and automated reporting and filing.

8. Appendix A: Research methodology

Chartis' RiskTech100® report is the most comprehensive study of its kind, and is a core element of our annual research cycle. The rankings in the report reflect our analysts' expert opinions, along with research into market trends, participants, expenditure patterns and best practices. We also validate the analysis through several phases of independent verification (see Table 1).

So that we can continue to assess the market and its key players accurately, we are developing and refining our methodology as the risk technology market evolves. Any changes will be reflected in subsequent reports.

Table 1: RiskTech100® research methodology

<ul style="list-style-type: none"> Performed a comprehensive market sweep of leading market participants in 40 risk categories.
<ul style="list-style-type: none"> Completed 1,500 surveys and interviews with risk technology buyers and end users.
<ul style="list-style-type: none"> Collected data on organizations' expenditure priorities and vendor preferences.
<ul style="list-style-type: none"> Collated 400 completed questionnaires, briefing documents and product specifications from risk technology vendors.
<ul style="list-style-type: none"> Conducted and attended 200 interviews, product demonstrations and strategy briefings with risk technology vendors.
<ul style="list-style-type: none"> Conducted 150 interviews with risk technology buyers to validate our survey findings.
<ul style="list-style-type: none"> Conducted more than 50 interviews with independent consultants and system integrators specializing in risk technology.
<ul style="list-style-type: none"> Applied RiskTech100® assessment criteria to filter the top 150 vendors.
<ul style="list-style-type: none"> Reviewed data with 30 independent consultants and 110 risk technology buyers.
<ul style="list-style-type: none"> Interviewed 60 ex-employees of the top 50 risk technology vendors to validate our findings.
<ul style="list-style-type: none"> Undertook final data validation with 100 vendors, receiving 80 completed questionnaires and carrying out more than 100 vendor briefings.
<ul style="list-style-type: none"> Completed 100+ independent reference checks to validate vendor claims and client satisfaction levels.
<ul style="list-style-type: none"> Developed the final top 100 rankings, identified the category winners and finalized the report.

Source: Chartis Research

9. Appendix B: How to read the RiskTech100® rankings

The RiskTech100® assessment criteria comprise six categories:

- Functionality.
- Core technology.
- Strategy.
- Customer satisfaction.
- Market presence.
- Innovation.

Within each category, we have included a number of sub-categories to encompass the range and scope of current risk technology solutions (see Table 2).

Table 2: RiskTech100® assessment criteria

Functionality	<ul style="list-style-type: none"> • Depth of functionality. The level of sophistication and detailed features in the software product. Aspects assessed include: innovative functionality, practical relevance of features, user-friendliness, flexibility and embedded intellectual property. High scores are given to firms that achieved an appropriate balance between sophistication and user-friendliness. In addition, functionality that links risk to performance is given a positive score. • Breadth of functionality. The spectrum of risks covered as part of an enterprise risk management solution. The risk spectrum under consideration includes treasury risk management, trading risk, market risk, credit risk, operational risk, energy risk, business/strategic risk, actuarial risk, asset-liability risk, financial crime and compliance. Functionality within and integration between front-office (customer-facing) and middle-/back-office (compliance, supervisory and governance) risk management systems are also considered. High scores are given to firms achieving (or approaching) integrated risk management – breaking the silos between different risk management functions.
Core technology	<p>Chartis evaluates a vendor's overall technology stack by benchmarking it against latest best practice. Key considerations this year have been the use of cloud and Big Data technologies, as well as the agility and openness of the overall technology architecture.</p> <ul style="list-style-type: none"> • Data management. The ability of enterprise risk management systems to interact with other systems and handle large volumes of data. 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. • Risk analytics. The computational power of the core system, the ability to analyze large amounts of data in a timely manner (e.g., real-time analytics) and the ability to improve analytical performance are all important factors. • Reporting and visualization. The ability to surface risk information in a timely manner. The quality and flexibility of visualization tools, and their ease of use, are important for all risk and compliance management systems.

Source: Chartis Research

Table 2: RiskTech100® assessment criteria (continued)

Strategy	<ul style="list-style-type: none"> • Vision and leadership. Market understanding, a scalable business model, product strategy, technology strategy and go-to-market strategy are critical success factors. Both organic and inorganic growth strategies are considered, as well as strategic alliances and partnerships. • Ability to execute. The size and quality of the sales force, the sales distribution channels, the global footprint, partnerships, differentiated messaging and positioning are all important factors. Specific consideration is given to the quality of implementation and support functions, post-sales support and training. • Financial performance. Revenue growth, profitability, sustainability, financial backing and the percentage of recurring revenues. The ratio of license to consulting revenues is key to business scalability.
Customer satisfaction	<ul style="list-style-type: none"> • Value for money. The price to functionality ratio, and the total cost of ownership versus license price. • After-sales service and support. Important factors include the ease of software implementation, the level of support and the quality of training. • Product updates. Important considerations for end users include how often vendors issue updates and how well they keep pace with best practice and regulatory changes.
Market presence	<ul style="list-style-type: none"> • Market penetration. The number of customers in chosen markets and the rate of growth relative to sector growth rate. • Market potential. Brand awareness, reputation, thought leadership and the vendor's ability to use its current market position to expand horizontally (with new offerings) or vertically (into new sectors). • Momentum. Performance in the past 12 months, including financial performance, new product releases, quantity and quality of contract wins and market expansion moves.
Innovation	<ul style="list-style-type: none"> • New product development. New ideas, functionality and technologies to improve risk management for target customers. Chartis assesses new product development not in absolute terms, but in relation to a vendor's closest competitors. • Exploitation. Developing new products is only the first step in generating success. Speed to market, positioning of new products and translation to incremental revenues are critical success factors. • New business models. Innovation is not limited to the product dimension. Some risk technology vendors are also actively working toward new business models for generating profitable growth.

Source: Chartis Research

10. How to use research and services from Chartis

In addition to our industry reports, Chartis offers customized information and consulting services. Our in-depth knowledge of the risk technology market and best practices 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.

Advisory services

Advisory services and tailored research provide a powerful way for Chartis clients to leverage our independent thinking to create and enhance their market positioning in critical areas.

Our offering is grounded in our market-leading research, which focuses on the industry and regulatory issues and drivers, critical risk technologies and leading market practices impacting our sector. We use our deep insight and expertise to provide our clients with targeted market and industry analysis, tailoring content to assess the impact and potential of relevant regulatory and business issues, and highlighting potential solutions and approaches.

Chartis' advisory services include:

Market dynamics

The markets that our clients – vendors, institutions and consultants – address are changing at an ever-increasing pace. Understanding the market dynamics is a critical component of success, and Chartis uses its deep industry and technical knowledge to provide customized analysis of the specific issues and concerns our clients are facing.

Market positioning

In today's highly competitive market, it is no longer enough simply to have a leading product or solution. Buyers must be able to appreciate the differentiating capabilities of your brand and solutions, and understand your ability to help them solve their issues.

Working with our clients, we generate compelling, independent co-branded research, targeting critical business issues. This helps our clients to position their solutions effectively, 'own' key issues and stand out from the crowd.

Collaborating closely with our clients, we develop pragmatic, resonant thought-leadership papers with immediate industry relevance and impact.

Our offerings include:

- **Co-branded research** on key market topics to provide a unique and compelling point of view that addresses a key industry driver and highlights the relevant issues. Reports can be tailored to varying levels of depth and can be powered by quantitative survey fieldwork, qualitative industry interviews, our deep domain expertise or a blend of all three.
- **Chairing roundtables and/or facilitating events and workshops** to support clients in hosting compelling events that put them at the heart of the discussion.
- **Targeted marketing through our sister brands**, leveraging the power of our parent group – Infopro Digital – to reach across leading brands such as Risk.net, WatersTechnology, FX Week and Central Banking.

Competitor analysis

Our unique focus on risk technology gives us unrivalled knowledge of the institutions and vendors in the sector, as well as those looking to enter it. Through our industry experts, Chartis clients can tap our insights to gain a much deeper understanding of their competitors and the strategies they should pursue to better position themselves for success.

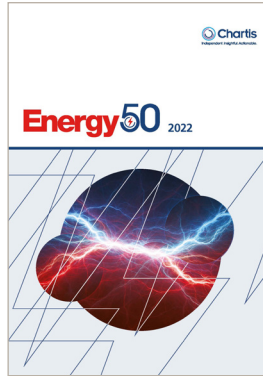
Regulatory impact analysis

The analysis and assessment of regulatory change and implementation is one of Chartis' core strengths. We can apply our insights to assess the impact of change on the market – either as it applies to vendors and the institutions they serve, or on a client's specific product and customer base. We can also provide insights to guide product strategy and associated go-to-market activities, which we can execute for internal use to drive our clients' strategy or as a co-branded positioning paper to raise market awareness and 'buzz' around a particular issue.

11. Further reading



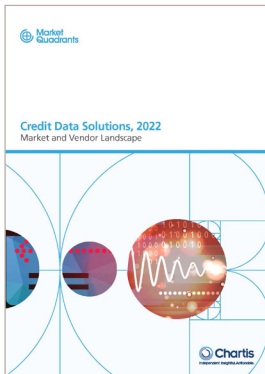
Big Bets 2022



Energy50 2022



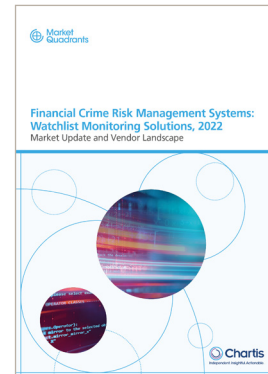
Buyside50 2022



**Credit Data Solutions, 2022:
Market and Vendor Landscape**



**Regulatory Reporting
Solutions, 2022: Market
and Vendor Landscape**



**Financial Crime Risk
Management Systems:
Watchlist Monitoring
Solutions, 2022; Market
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