Chartis ClimateRisk50 2024

1. Foreword

I'm delighted to welcome you to the inaugural ClimateRisk50 ranking and report from Chartis Research. In it we recognize the major players in climate risk analytical technology, providing a valuable assessment and benchmarking tool for market participants.

To provide more context around the ranking and awards, and our view of the market, this report also includes a short analysis of the high-level trends and dynamics we are seeing in the space:

- The complex world of climate risk and analytics and the evolving regulatory environment surrounding it.
- The potential impact of geopolitical and societal shifts.
- The technical, data and mapping issues that model developers must address if they are to continue to refine their climate analytics.

In this context, Chartis believes that ongoing improvements in data management and analytical capabilities, and the increased availability of powerful computational architectures, will present vendors in this space with new opportunities to explore and benefit from.

And as always in our rankings, we highlight the innovation and expertise of the companies that continue to do great things in this market.

Finally, it only remains for me to congratulate all the featured vendors.

Enjoy the report!

Sid Dash
Chief Researcher

2. Overview and context: complex issues, evolving solutions

The world of climate risk and analytics is complex and multidimensional, with models and techniques that target a variety of requirements and problems – not all of which are new. Natural catastrophe (NatCat) models (for climate-related events such as wildfires, hurricanes and storms) have been around for many years, and are used by government agencies. And various stakeholders, including model developers, data providers and insurance carriers and brokers, have been collecting data and refining these models for some time.

Moreover, the regulatory environment around climate risk management systems (of which there are many) is evolving rapidly. In our view, an evolving technical structure based around modeling, risk management and data will be central to this evolution. We can also expect significant structural changes in the political environments of both North America and Europe. While these may not affect firms' requirements for superior analytics for underwriting and assessing physical portfolio risk, they are likely to impact the structural dynamics of transition-risk assessments.

Given these dynamics, a broad range of institutions must now determine the long-term impact that climate risk will have on their portfolios and assess the implications of physical and transitional risks. As regulators and market participants attempt to develop coherent, consistent structures for analyzing climate risk and its impact, Chartis has identified several distinct and emerging themes:

- The need to assess the impact of climate risk on capital markets accurately.
- The growing need for investors to define and demonstrate responsible investing.
- The need for certain firms to provide compliance information about the goals embedded in some of the investment products and services they have sold (or mis-sold).
- The challenge financial institutions face in quantifying investors' and bondholders' appetite for climate risk and other environmental, social and governance (ESG) issues.
- The challenges around data requirements for climate risk modeling.
- The impact of global warming on how banks manage their credit portfolios.

What this ranking covers

In this report and ranking, we take a broad view of climate risk and analytics, and consider a variety of firms in the climate risk sector:

- Vendors that provide NatCat models.
- Providers of physical-risk and transition-risk models.
- Specialists that provide platforms for locational analytics with significant and obvious links to climate and weather forecasts.
- Vendors of financial impact analysis tools.
- Firms that provide emissions analytics.
- Vendors, data providers and analytics firms that are addressing carbon markets.

We also recognize that many different institutions in the insurance value chain (such as brokers, reinsurance providers and consultants) may use and supply sophisticated analytics.

The issues with climate risk modeling

In technical terms, current climate risk models have become both broader and deeper. Regardless of how complex models are, however, several issues currently limit their overall predictive capacity and usefulness. These include their intensive technical requirements, large data gaps, a lack of standardized measurement, and debates and differences around core theory.

Data is key

Institutions require quantification and structure when analyzing climate risk because of both regulatory and business pressures. But several persistent issues can make this a challenge. Central to many of these is data.

A key element in any assessment of climate risk is access to suitably detailed information. To properly assess physical climate-related risks and opportunities in loan portfolios, and develop financial metrics, firms need data that translates climate science into impacts on their clients and the wider economy. They often require a wide range of data to stress-test climate change, including climate data, economic and market information, accounts information and exposure to potential losses. Exposure data can include investments by industry sector, loans by type of borrower and geographic location, and insurance risk by coverage and type of property.

To convert physical risks into market impacts, firms need:

- A strong data foundation, including a database that combines time-series data with historical physical risk data.
- Information on a financial institution's capital structure.
- Entity data.
- A process to map physical assets.

Banks' true exposure to physical risk is in their portfolios. When mapping the risks of a portfolio, banks can use a broader dataset to outline hotspots that may bring higher risk for their loans and collateral. With location data they can assess the exposure of physical assets to hazards, while data on particular sectors or activities is vital to gauge sensitivity to hazards. With this in mind, Chartis advises firms to integrate a diverse set of climate and environmental datasets to capture different elements of changing conditions.

Availability and quality

Vendors of physical risk models are racing to use the most granular and up-to-date data possible, while also adapting existing models to increase their time horizons and predictive power across new scenarios. Even for well-established vendors in this space, building datasets for physical risk models is already a huge technical challenge in terms of the collection, storage and validation involved. For start-ups looking to innovate with new tools or methodologies, the technical challenges involved in collecting and maintaining data make it a difficult proposition, and financial institutions that require geographically specific data struggle to find solutions.

And not all climate and emissions data, or methods of collecting it, are uniform. Differences exist between countries, industries and firms around legal obligations, voluntary disclosures, collection methods, data quality and granularity, and reporting methods. Industries are linked to different regulations and regulators around the world, and because firms have different internal data collection capabilities, there are inevitable discrepancies in the breadth, depth and format of the climate disclosure data that's available. Moreover, while more private firms are making voluntary disclosures, many are still not reporting the full breadth of their disclosures and emissions data to stakeholders and outside agencies, leading to even bigger information gaps.

Until there is more universal agreement on data measurement standards, collection methods and common disclosures, Chartis believes that climate risk management solutions must take a dynamic approach to addressing these inconsistencies.

The methodology issue: mapping climate change to financial impact

One of the core methodological challenges developers face is how to ensure that climate risk models can translate climate change predictions into financial impacts. NatCat models have been central to many areas of the financial landscape for decades. But as they have evolved and expanded to include overall physical and transitional risks, the scope of their required analysis has also increased.

Unfortunately, there is a lack of consensus about how to map climate change to financial market impact. Current risk models can accurately show a portfolio's exposure to natural catastrophes and the physical risks of chronic climate change. But transition risk models attempt to integrate climate data, financial data and non-financial data (such as social and governance factors), so their scope can often outgrow their capabilities. We believe that the next evolutionary iteration of these models should reliably incorporate sector-specific analysis and/or deep supply chain risk analysis.

Ultimately, to develop models that can deliver financial metrics, firms must carefully consider model inputs and processes:

- **Capital structure and specific risk entities**
  - To model and report on climate data, models must link to financial entities. By linking financial entities and specific issuances (for debt and credit), firms can create and operate stress-test frameworks and develop scenario management processes with broad and relatively well-known mechanics.
  - The mapping process can be complex and involves mapping to the requisite hierarchy, whether this is physical, organizational or capital, to build risk entities that can then be modeled. Many tools and data sources can provide some mapping of physical assets to specific entities and their capital structure. Corporate credit and counterparty databases are useful for providing entity details. Large entities and banks may have fully available hierarchies, while smaller corporates may not have the same structure. To create a link between financial assets and the underlying physical ones, supporting data about physical assets (including at-risk properties and processes) can be mapped to hierarchies from such sources as balance sheet databases and real estate registers. Once this mapping has been established, links can be made between individual financial assets (securities, etc.) and physical assets, using option-theoretic or pure statistical models.
- **Capital impacts**
  - Firms can use an option-theoretic approach (or other statistical function approximators, including such relatively novel frameworks as ML/DL) to provide links between climate variables and financial elements (including stock price, the value of a firm's assets and default risks). Several approaches can be used to create these links, including the Merton model.

Broadly, the next evolution of models must encompass a more realistic view of the impact of climate risk on transition risk models. But this is easier said than done. At their core, transition risk models aim to combine climate, financial, social and governance data to predict the risks present in different global climate scenarios. Achieving this in a methodical way is still outside the scope of what is currently possible, as it requires a much more detailed understanding of the secondary effects of climate change worldwide.

A positive outlook

Increasingly, improvements to solutions are being triggered and enhanced by three powerful dynamics:

- Improved data management technologies and vast new datasets.
- Rapidly improving locational intelligence capabilities.
- Rapidly improving computational capabilities at the software, hardware and methodological levels.

Computational architecture will prove a cornerstone of any developments. Given the need for financial markets to understand the impacts of climate change, solution providers face a huge challenge as they attempt to match the sophistication of their tools to the global nature and scope of the issue. Underpinning their efforts will be the availability and power of computation. For us, three themes stand out in this area:

- The use of high-performance computing (HPC)-style frameworks.
- The transition of HPC-style models to the current hyperscaler-led cloud. This not only leverages the hyperscalers' existing architectures, it also allows for considerable economies of scale and scope.
- Leveraging new graphics processing unit (GPU)-centric clouds, which come with ready-made software (generally CUDA).

Those firms that can leverage the technological opportunities while understanding the complexities of the climate risk environment will weather the market changes we are likely to experience in the coming years.

3. ClimateRisk50 2024 rankings

2024 Rank	Company	HQ	Overall score	Functionality	Impact	Core technology	Innovation	Strategy
1	Moody's	US	82.2	81	80	85	83	82
2	CoreLogic	US	81.8	80	81	81	82	85
3	Munich Re	Germany	75.6	75	78	73	76	76
4	WTW	UK	73.4	74	78	69	72	74
5	ISS ESG	US	72.8	73	77	68	71	75
6	Aon	UK	72.2	78	80	70	69	64
7	Swiss Re	Switzerland	71.8	73	75	69	70	72
8	ICE	US	71.6	76	70	70	70	72
9	Riskthinking.AI	Canada	71.4	72	75	74	68	68
10	S&P Global Market Intelligence	US	71.2	76	72	68	72	68
11	FIS	US	70.2	69	70	70	67	75
12	Wherobots	US	69.98	58.6	68.5	74.2	74.3	74.3
13	Bloomberg	US	69.4	73	73	70	62	69
14	FactSet	US	69.16	73	71.8	63	69	69
15	Conning	US	68.2	71	67	69	67	67
16	AIR (Verisk)	US	68	75	75	65	60	65
17	MathWorks	US	67.94	68	66.7	70	70	65
18	Mitiga	Spain	67.4	67	65	70.8	67.2	67
19	Prometeia	Italy	66.72	67	65	66	70.6	65
20	Oracle	US	66.3	63	61	75.5	66	66
21	MSCI	US	66.08	73	68	53.4	67	69
22	Iceberg Data Lab	France	65.32	67	60	68	67.6	64
23	Gallagher Re	UK	65.12	67	65	70.6	61	62
24	JBA Risk Management	UK	65.04	61	65	70	67.2	62
25	Guy Carpenter	US	65	67	65	70	61	62

2024 Rank	Company	HQ	Overall score	Functionality	Impact	Core technology	Innovation	Strategy
26	Sust Global	US	64.6	65	53	71	67	67
27	CAPE Analytics	US	64.2	63	65	70	61	62
28	CARTO	US	63.9	59	65	73.5	65	57
29	Karen Clark & Company	US	63	59	59	69	68	60
30	Sustainalytics	Netherlands	59.68	67	60	55	61.2	55.2
31	Arturo	US	59.6	61	45	65	67	60
32	Jupiter Intelligence	US	59	60	55	58	63	59
33	EigenRisk	US	58.6	47	50	70	65	61
34	Climavision	US	58.2	58	47	69	65	52
35	Sphera	US	56.8	60	60	61	52	51
36	Ambiental Risk (Twinn)	UK	56.4	54	53	62	58	55
37	Reask	Australia	56.3	55	51	63	60.5	52
38	OS-Climate	US	56.2	57	53	53	69	49
39	Clarity AI	US	55.4	53	51	51	60	62
40	ZestyAI	US	55.1	55	53	60	57	50.5
41	FutureProof	US	53.84	55.2	53	53	56	52
42	Floodbase	US	53.6	47	49	65	57	50
43	AlphaGeo	US	53.3	54	53	53	54.5	52
44	Carbon4 Finance	France	53.2	54	55	53	52	52
45	ClimateAi	US	52.6	47	49	63	52	52
46	RED	Italy	52.48	54	51	53	52	52.4
47	Risilience	UK	52.2	53	51	53	52	52
48	COMBUS	Australia	51.4	48	48	55	56	50
49	IdealRatings	US	51.2	49	50	53	52	52
50	ESG Book	UK	51	47	50	53	53	52

4. Category winners

Category award	2024 winner
Overall Winner	Moody’s
Chartis categories	
Functionality	Moody's
Impact	CoreLogic
Core Technology	Moody's
Innovation	Moody's
Strategy	CoreLogic
Solution categories	
Climate Risk Modeling – Business Strategy Analytics	Riskthinking.AI
Climate Risk Modeling – Financial Impact Analytics	ICE
Climate Risk Modeling – Government Services	CoreLogic
Climate Risk Modeling – Mortgage Analytics	CoreLogic
Climate Risk Modeling – Underwriting	Moody's
Computational Architecture	Moody's
Core Platform	Moody's
Data Infrastructure and Aggregation	CoreLogic
Data Management	CoreLogic
Emission Analytics	ICE
Geospatial Tools and Technologies	Wherobots
Reporting and Dashboarding	FIS
Transitional and Macro Event Models	Moody's
Weather Analytics	Climavision