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RiskTech Buyside50 2022

About Chartis

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.

Join our global online community at **www.risktech-forum.com**.

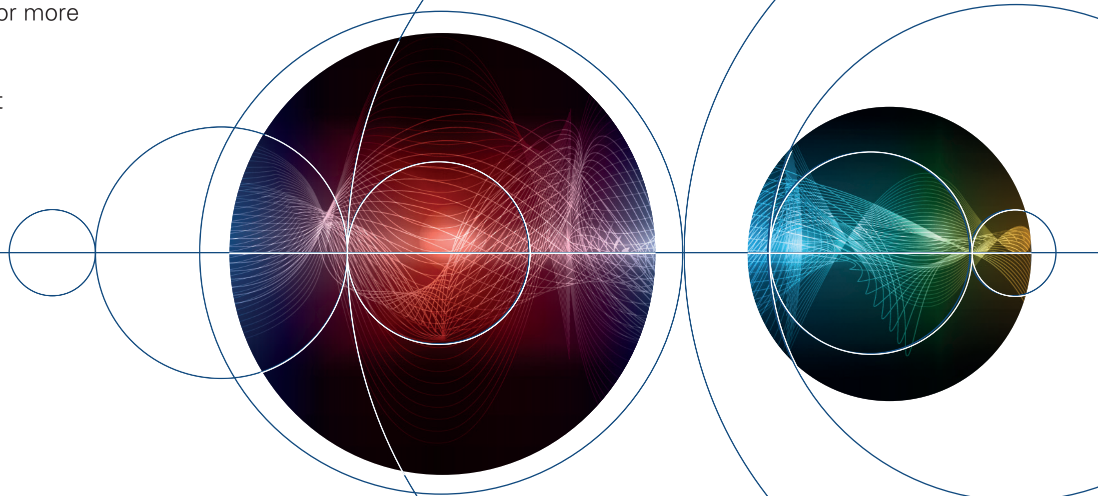


Table of contents

1. Foreword 5
2. Context: the investment management lifecycle 6
3. Buyside50 – an overview 8
4. Buy-side highlights 9
5. Key trends on the buy-side 11
6. Buyside50 2022 rankings 16
7. Buyside50 2022 category winners 17
8. Appendix A: Buyside50 – methodology 22
9. How to use research and services from Chartis 23
10. Further reading 24

List of figures and tables

Figure 1: The investment management lifecycle 6

Figure 2: RiskTech Buyside50 2022 taxonomy 8

Figure 3: The path to the SFDR 13

Figure 4: The Buyside50 research process 22

Table 1: The Buyside50 scoring criteria, with definitions 22

1. Foreword

Welcome to Chartis' inaugural **RiskTech Buyside50 2022** ranking and report. The buy-side, the investment side of the financial services industry, has embarked on the road to digitalization with purpose. Investment managers[1] have recognized the need to modernize and have wisely determined that since their firms are not 'technology development shops', leverage 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. While the Buyside50 covers investment management functions in considerable depth, the sector's complexity makes it difficult to capture in one take. Accordingly, we have created a category taxonomy to develop a view across the investment management lifecycle that is useful for investment managers and other market participants.

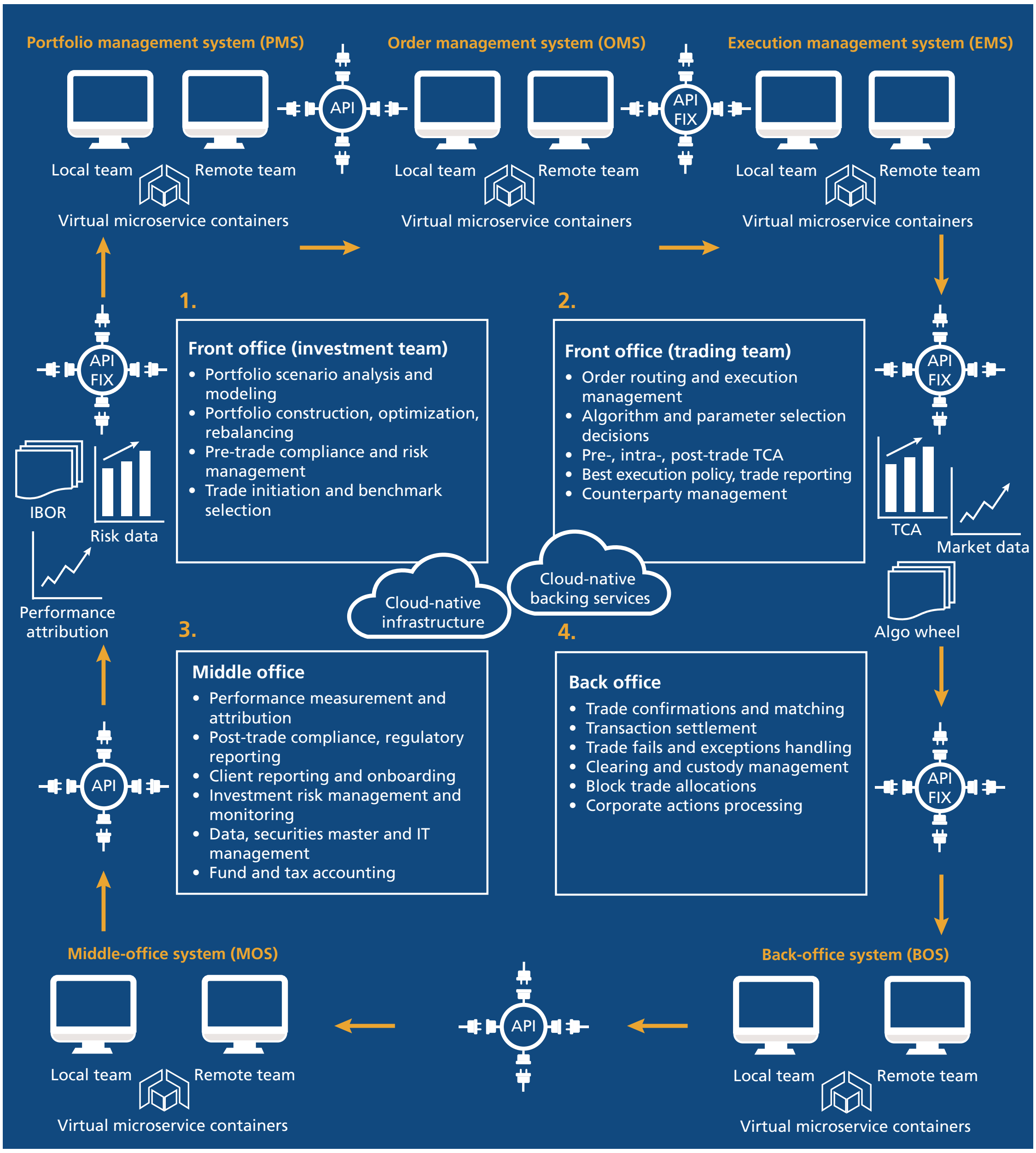
[1] In this report, the term 'investment managers' comprises asset managers and asset owners/institutional investors. Institutional investors include insurance companies, pension funds, endowments, central banks and sovereign wealth funds.

2. Context: the investment management lifecycle

The Buyside50 will examine the current buy-side landscape, highlighting the overarching dynamics and identifying key trends, market dynamics and technology advances. This report highlights and focuses on the full, front-to-back investment lifecycle that is incorporated into asset/securities investing. Figure 1 presents a high-level view of the scope of the investment management lifecycle. Its key elements are:

- **Front office (investment team)**. Provides research into ex-ante 'what-ifs', risk and performance, portfolio construction and rebalancing. Within buy-side firms, the investment management team is considered the crux of the investment process, an entity where investment ideas percolate through research/analytics, portfolio construction and continued risk-performance management.

Figure 1: The investment management lifecycle



Source: Chartis Research

- **Front office (trading team)**. Responsible for trade execution, execution management, transaction cost analysis (TCA) and trade management. Within this team the portfolio is constantly traded, rebalanced and transitioned to realize profits/losses in investment decisions.
- **Middle office (ops/finance/risk team)**. Responsible for ex-ante/ex-post views of risk, compliance and performance attribution. These activities involve a reassessment of portfolio decisions and a termination of positions, and/or rebalancing and additions. The middle office is critical to managing portfolio financing, account allocation and the oversight of operations, while mitigating operational and financial risks.
- **Back office (ops/finance team)**. Responsible for reconciling operations, corporate actions/ dividends, payments and collateral. The finance organization includes general ledger, fees, billing and cash-management operations.

3. Buyside50 – an overview

The companies featured in the RiskTech Buyside50 are technology vendors from a variety of backgrounds that target users across the investment management lifecycle. While these firms can differ considerably, they share common qualities that contribute to critical services for capital markets buy-side investment firms and their front-to-back processes.

We determine the RiskTech Buyside50 rankings based on the classifications shown in Figure 2, focusing on solutions, industry segments, and the scope and breadth of investment lifecycle functionality.

Figure 2: RiskTech Buyside50 2022 taxonomy

Chartis categories

Breadth of Functionality
Depth of Functionality
Technology & Techniques
Differentiated Capabilities
Customer Satisfaction
Market Presence

RiskTech Buyside50 2022

Industry categories

Investment Lifecycle – Alternatives
Investment Lifecycle – Crypto
Investment Lifecycle – Derivatives, Commodities
Investment Lifecycle – Equities
Investment Lifecycle – Fixed Income
Investment Lifecycle – Hedge Funds
Investment Lifecycle – Insurance/Pension Funds
Investment Lifecycle – Overall

Solution categories

Algorithmic Trading
Artificial Intelligence – Investment Lifecycle
Buy-side Asset Liability Management
Buy-side Cash Management/Treasury
Buy-side Client Reporting
Buy-side Sales Client Enablement
Client Relationship Management
Collateral Management
Collateral Management – Enterprise
Collateral Management – Optimization
Compliance Monitoring
Conduct and Controls
Corporate Actions
Data Analytics
Data Management
EMS
Environmental Social and Governance – Analytics
Environmental Social and Governance – Climate
Environmental Social and Governance – Overall
Environmental Social and Governance – Physical Risk
Environmental Social and Governance – Primary Data Provider
Environmental Social and Governance – Private Company Coverage
Environmental Social and Governance – Transition Risk
Evaluated Pricing and Data – Alternatives
Evaluated Pricing and Data – Commodities
Evaluated Pricing and Data – Credit
Evaluated Pricing and Data – Fixed Income
Evaluated Pricing and Data – OTC Derivatives
Front Office Research
Front Office Risk Management
Front Office Technical Integration
Fund Accounting
Fund Accounting Outsourcing Provider
Fund Administrator
Fund Management Outsourcing Provider
Fund Outsource Asset Servicing Provider
IBOR – Component
IBOR – Enterprise
IT Integration
Investment/Market Risk – Analytics
Investment/Market Risk – Commodities
Investment/Market Risk – Credit
Investment/Market Risk – Managed Service
Investment/Market Risk – Real-time
Investment/Market Risk – Structured Products
OMS
Operational Risk and Process Control
OpsTech – Buy-side reconciliation
Outsourced Trading
Outsourcing – Asset Servicing
Outsourcing – Front Office
Outsourcing – Middle Office
Outsourcing – Risk as a Service
Performance Attribution
Performance Attribution – Equities
Performance Attribution – Fixed Income
Portfolio Management – Overall
Regulatory Monitoring/Reporting – Asset Managers
Regulatory Monitoring/Reporting – Hedge Funds
Regulatory Monitoring/Reporting – Private Equity
Regulatory Monitoring/Reporting – Wealth Managers
Risk & Finance Integration
TCA
Trade Surveillance
Transition Management

Source: Chartis Research

4. Buy-side highlights

Tackling new and building pressures on the buy-side

More than $100 trillion of global investment assets are currently under management, with approximately $40 trillion in the Americas, $35 trillion in Europe, $20 trillion in Asia-Pacific and $15 trillion in other areas across the globe. Global assets under management are projected to reach more than $200 trillion by 2030.[2]

These investment assets originate from:

- Retail investing.
- Wealth management.
- Retirement (defined benefit and contribution plans).
- Insurance premiums.
- Institutional sources (corporations, college endowments).
- Governments.

A volatile macro environment

In terms of their services and tools, investment managers are not standing still. In fact, Chartis sees the reengineering of the buy-side proceeding apace, with firms now executing, processing, managing and servicing their investments and clients with greater consideration and higher priority than at any previous time. Competition is fierce and margins are thin, and clients that are aware of the slightest investment inadequacies will switch unabashedly to better-run firms.

The most visible current dilemma facing institutional investors is that at present asset owners' investment returns are not matching their liabilities. A typical example of this is a situation in which life insurance investments are unable to match liability schedules. In today's markets, meeting liabilities with only government bond returns is an inadequate approach, and the traditional 60/40 equity/bond investment allocation is proving no better. Investment managers are under extreme macro, micro and internal investment-management constraints, with pressure from investment charters to find improved returns. Whether the concern is active, passive, factor-tilted or alternative investment products and strategies, more complex and sophisticated investment strategies demand more digitally sophisticated services and technology across the investment management lifecycle.

As investment managers expand their investments in non-traditional, more exotic assets in an effort to increase their returns, the traditional investment management lifecycle faces the following challenges:

- Alternative investments require sophisticated analytics for comprehensive risk mitigation and performance enhancement.
- Alternative investments are less liquid and can incur high costs if traded poorly.
- Alternative investments are less standardized and less digitized, requiring exception-based processing.
- Investment managers are hampered by the technical limitations of legacy systems, which cannot be adapted easily to new asset classes.
- Investment managers' fees and costs are being scrutinized by clients demanding more efficiency.
- Investment managers are subject to increased regulatory, compliance and reporting requirements.

On the positive side, technology – especially the cloud, application programming interfaces (APIs), microservices, virtualization, programming languages (such as Python, Scalar and R), machine learning (ML), open source and vendor connections – are all at the forefront of firms' attempts to solve multiple business and functional issues in the investment management lifecycle.

Revenue pressures on front office trading and investment

Market movement and portfolio construction

Many investment managers face fast-moving, volatile markets where tactical asset allocation can add to a portfolio's gains in basis points. The ability to run real-time market risk analysis, asset

[2] *Note that no market predictions or investment advice will be offered here, only advice on services and tools.*

allocation and compliance constraints, and act responsibly on model findings, can enhance a firm's prospects of attaining its investment goals.

Investment managers who are starting to build portfolios that reflect current market demand, such as environmental, social and governance (ESG) portfolios that increasingly use third-party data, are blending this data with in-house transactional data for portfolio construction and analysis.

Real-time portfolio analytics/risk

Firms face tight margins and fee compression and need real-time performance analytics with proper risk measurement to achieve their investment goals. Accurate and meaningful risk management and portfolio analysis, using mainly transactional and position data, must be complete and readily assessable in real time. Beyond fundamental tag data used to define transactions (such as security IDs, reference data and pricing and valuation data), any aggregation of transactions into positions must contain all cash flows/events from contract/trade initiation onward.

Asset managers and asset owners are under pressure from regulators, clients and stakeholders to assess risk accurately and quickly. The year 2021 called much into question. Pensioners are worried about their underfunded pension funds, regulators are hovering on stress testing and transparency, and insurance firms are losing premiums from large and small businesses with lost pandemic revenues, and facing more exposure to claims.

Portfolio stress/scenario testing

When portfolio and risk managers can stress portfolios that move toward real time, particularly on an enterprise level, they have much more control of investment risk on a micro level, as well as having a macro view. While they may not be able to foresee upcoming volatility completely, they are certainly in a better position to handle it.

Multi-asset portfolios and derivatives

Asset managers attempting to meet asset-liability schedules and increase their returns continue to turn to multi-asset overlays and alternative investments. Sophisticated, specialized ex-ante and ex-post analytics are vital in balancing potential performance with risk, especially for non-linear risk profiles.

Clients and investment managers are fully aware of past financial crises and now demand full asset-management transparency in the investment lifecycle, to avoid 'black box' scenarios.

Collateral management/funding

Multi-asset portfolios immediately lead to derivatives hedging strategies, equities lending, repo and/or the pledging of positional funding. The optimization of collateral, using the most economic collateral schedule for eligible assets, has become a cost saver and a potential source of revenue.

For investment managers, tools to reprice, rate-change and optimize ongoing collateral have become essential elements of their workflows. The first concern with collateral is to meet regulatory obligations, and investment managers recognize superior collateral optimization as an additional source of incremental return on their portfolios.

Compliance/regulatory issues

Regulatory requirements across the buy-side are on the increase. For firms, attempting to tackle each new regulatory issue is an inefficient approach, creating a web of high-maintenance code that is costly and that can fail dramatically – resulting in fines, revenue losses and extreme reputational damage.

Digital compliance/regulatory frameworks and workflows are rapidly becoming available in the cloud and offer comprehensive coverage across multiple regulatory jurisdictions. Investment managers are leveraging hybrid connections that combine core frameworks and individual firms' requirements to meet regulatory demands.

Fees and expenses

Exchange fees, commissions, custodial fees and fund administration fees need to be incorporated within the overall cost structure of fund/portfolio management. When margins were high, fees and expenses were not detailed, but in today's competitive environment, the tracking and proper auditing of all expenses is necessary.

Client/investment committee reporting

Institutional clients and investment committees want to be digitally up-to-date across holdings, risk and P&L, with full transparency. The days of 'black-box' portfolio management are gone. Investment managers must be able to digitally report all aspects of the investment management lifecycle to clients, internal constituents and investment committees. Again, there is little reason to attempt to build these frameworks internally, as leveraging the FinTech services market it a more efficient approach.

5. Key trends on the buy-side

Outsourcing the buy-side investment lifecycle

Trading

Demand for outsourced trading solutions is coming increasingly from larger asset managers. Outsourced trading solution providers are also fulfilling demand from investment managers who would rather let trading specialists handle buying and selling in the markets. Interestingly, all new entrants to the outsourced trading solutions space have come from larger sell-side financial institutions. In the past few years, no new small, independent boutique providers have entered the outsourced trading market.

The strongest growth in demand for outsourced trading solutions is coming from managers seeking supplementary asset-class specialist trading expertise, especially for more complex fixed-income, derivatives and cryptocurrency trading workflows. Leveraging outsourced trading to handle specific international markets with local market expertise and personnel in specific time zones is an additional consideration.

Fixed-income trading is exceedingly complex, as there are millions of bonds and the vast majority are highly illiquid. While most global fixed-income trading is executed by phone or chat, a growing share of investment-grade fixed-income trades are executed through electronic platforms and execution algorithms.

Derivatives trading is increasingly complex, so it makes sense that more and more asset managers are choosing to outsource their derivatives trading workflows. While the majority of global derivative notional value outstanding is traded through over the counter (OTC) swap contracts, electronic and algorithmic trading tools are increasingly being used in the derivatives space.

Regulatory uncertainty around cryptocurrency trading is one of the biggest drivers of growth in demand from large asset managers for outsourced trading services. According to Chartis' interviews with providers of outsourced trading solutions, about 30% to 50% of discussions with new clients include questions about the outsourced trading firm's crypto-trading capabilities.

Middle office

Investment managers buffeted by market structure shifts and continued fee compression are moving beyond first-generation outsourcing to deeper and more fundamental outsourcing, and in the process are triggering significant changes to business models. In addition, outsourcing services are widening from the usual middle- and back-office functions to include asset servicing, reconciliation, regulatory reporting and accounting. One notable trend is wealth managers' use of turnkey asset management programs (TAMPs) to provide professional asset management outsourcing to their clients. TAMPs allow registered investment advisors (RIAs) to concentrate fully on their clients' wealth management needs while offering superior investment management choices. Many RIAs already take advantage of technology outsourcing and operations through their custodians and fund administrators. Attempts have been made to address security concerns with advances in cybersecurity and cloud hosting. Moves to outsource multiple investment processes are also growing.

As many institutional investors extend into alternative assets, the use of multiple external asset managers is becoming common; some firms outsource all asset management to outsourced chief investment officers (OCIOs). In the front office, outsourced trading and third-party research and alternative datasets and research products are being used to help cover private credit, private debt and alternatives. Outsourced trading is also predominant, as sell-side traders move away from traditional trading desks, while specialized outsourced trading firms take on the responsibilities of buy-side trading desks.

Outsourcing across financial services was already in full swing before COVID-19, but the pandemic has accelerated the trend. Against a background of thin asset management fees, tight markets and rising operational/regulatory costs, buy-side firms have moved ahead smartly, taking advantage of distributed technology advances, cloud venues and operational business process outsourcing (BPO). The chief goal for asset managers, RIAs and institutional investors is optimal risk premia for their clients. All else is secondary. If outsourcing is the optimal path for buy-side firms, they will follow it.

Growth in demand for transition management

Historically, demand for transition management trading and risk management solutions came from asset owners (such as pension funds, insurance firms, endowments and foundations). In the past few years, however, there has been strong growth in demand for transition management solutions from investment managers making large, complex rotations into new allocation strategies and facing the ongoing pressures of ESG-compliant investing.

Providers of transition management services and solutions are working to modularize elements of the transition process and offer them separately to mutual funds. Some of the service modules offered include project management, portfolio risk management and specialized execution point solutions for derivative, forex and fixed-income trading. Some firms are also working to provide best-of-breed solutions for the most challenging trade workflows.

We believe that an increase in demand for transition management solutions will be driven by the iterative, trial-and-error process of ESG investing, as regulators and authorities have yet to establish unified standards around how ESG compliance should be assessed. We also believe that institutional investment flows will transition increasingly to asset managers that can prove quantitatively performance linked to ESG criteria.

More holistic transaction cost analysis

Larger asset managers and traders are demanding more granular and holistic TCA. When margins were high, gains in basis points of optimized TCA were less of a priority. In a market environment of tight margins, however, more granular transaction cost attribution analysis can provide useful insights into the integration between the various trade cost trade-offs that underlie the headline performance numbers for volume weighted average price (VWAP) or implementation shortfall.

Granular TCA may also help to explain how a trader's work to minimize bid-ask spread costs may ultimately lead to much higher costs related to information leakage, such as impact cost or adverse selection cost. Transaction cost attribution analysis can also help investment managers better understand the performance impact of various 'maker-taker,' 'inverted,' 'dark pool' or other incentive economic structures used in trading.

Holistic TCA is required, as costs related to information leakage can far outweigh traditional bid-ask spread transaction costs, which are only the tip of trading costs. When investment managers are making large, multi-day trades, minimizing information leakage costs is paramount. As a result, the clock on TCA needs to start when the trading team first receives the order information from the portfolio manager. The analysis also needs to run all the way to the trade settlement date to enable full analysis of any potential securities' price-reversion costs.

When firms are trying to understand granular and holistic TCA insights, data visualization tools are essential. Increasingly, TCA vendors are using data visualization dashboards and applications to help traders see what is usually hidden from view. When integrated with execution management systems, data visualization tools can also help to provide a valuable trade cost and performance feedback loop intraday.

Easier access to performance attribution analytics

Investment managers are increasingly looking for easier access to performance attribution analytics with the help of web-based portals and integrations with a wide range of workflow platforms. Breadth of asset-class coverage and robust multi-currency measurement and attribution are in high demand among many investment managers, as institutional investors want to track performance and alignment with investment manager-stated styles and charters.

Easy access to a wide range of out-of-the-box attribution models, and to the performance data being analyzed, is key for asset managers that invest across regions, asset classes and investment strategies. Most performance attribution vendors provide basic additive models for equities, but not all can provide security-level and sector-level fixed-income attribution, for example. Robust data access is also a key element of the solution. Vendors must be able to pull in elements such as pricing data, security data, transaction data, position data, valuation data, indices, benchmarks and exchange rates quickly and easily through dashboards or other data visualization tools.

Increasingly, support services are ranking high in firms' vendor-selection decisions. Asset managers often need help validating their investment process for clients. Performance attribution support services can help managers integrate attribution analytics to give clients a more accurate and transparent representation of how portfolio alpha is generated.

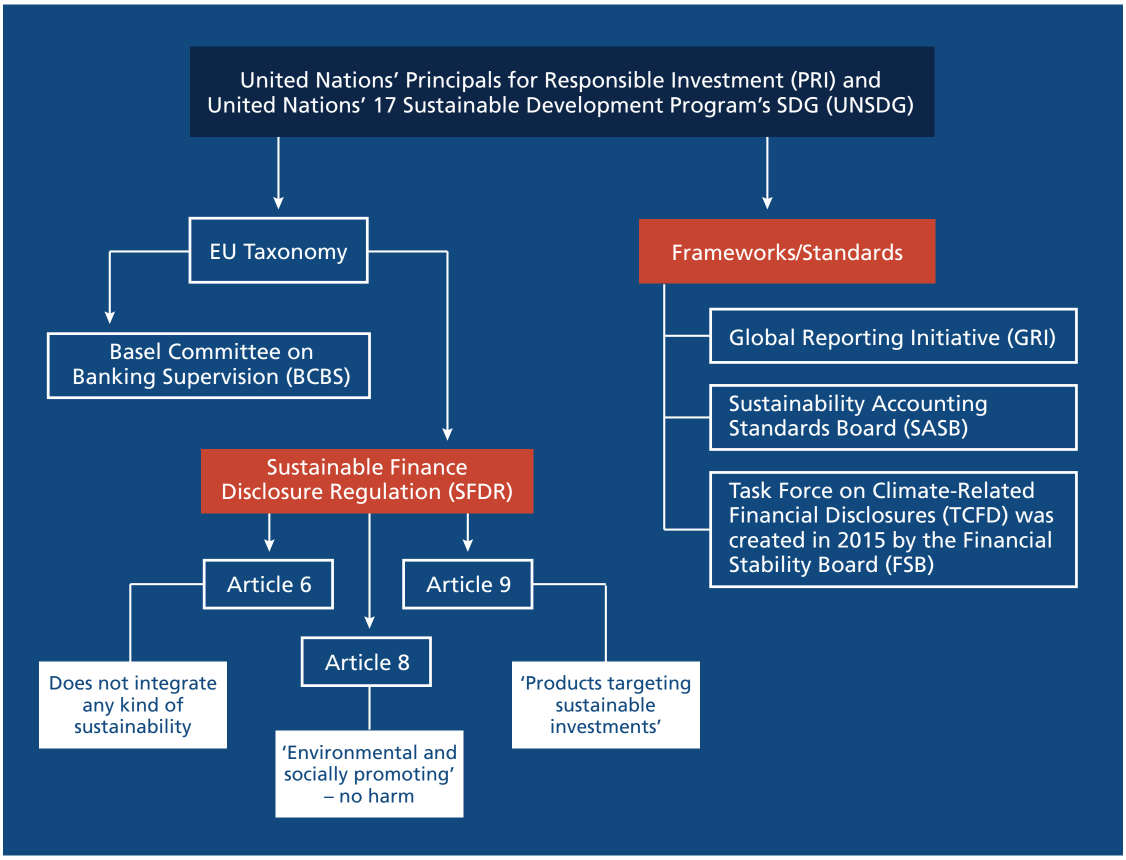
The growing importance of ESG

ESG concerns have become ever more important across asset owners/investors globally. The EU taxonomy for sustainable activities is spearheading the change, but target market criteria from Markets in Financial Instruments Directive (MiFID) and regional jurisdictions (notably those in Japan, Oceania and Asia-Pacific) are following closely. In all likelihood, the Fed, the Securities and Exchange Commission (SEC) and the Commodity Futures Trading Commission (CFTC) will soon also be adhering to the guidelines, and may have to implement accelerated plans to avoid losing ground.

ESG has risen quickly as a major risk class and must now be fully addressed in investment portfolios, loan books and all financial holdings. The dual influences of investor activism and increased regulatory compliance, both current and upcoming, are making ESG a top priority for all investment managers.

The number of current ESG regulatory frameworks and bodies is considerable across corporations, banks and investment managers. To present these factors in a relatively simple way, Figure 3 uses the UN's Sustainable Development Goals (SDGs) and Principles for Responsible Investment (PRI) as anchor points, but concentrates and outlines the current path for investment managers that need to adhere to the EU taxonomy, and specifically the Sustainable Finance Disclosure Regulation (SFDR). Assets in all portfolios are currently under the scrutiny of the EU taxonomy and the SFDR, and all funds must meet the scrutiny and challenges of ESG assessment. All asset managers/owners will be affected.

Figure 3: The path to the SFDR



Source: Chartis Research

The EU taxonomy with the SFDR is already in effect, with the UK, Hong Kong, Japan, Singapore and Australia all following suit and adhering closely to the same SFDR framework. Phase 1 of SFDR, initiated in March 2021, requires reports at an entity level, and Phase 2, extending into 2023, will drill down to a per-position level, demanding quantitative metrics for each asset. Throughout 2022, 2023 and beyond, the SFDR will be the highest priority across banking capital markets, on both the buy-side and the sell-side.

ESG and sustainable investing is the top priority among all classes of asset owners, from retail wealth management to the largest institutional investors, including pension funds, insurance companies, endowments and sovereign wealth funds, and spreading into real-estate, exchange-traded funds, mutual funds, UCITs[3] and all investable assets. No fund will be able to be marketed or sold, or access clients, without an approved/audited ESG assessment.

ESG investment analysis must be quantitative and ESG models need accurate and reliable data. Without proper data, portfolios will be improperly labeled and liable for regulatory fines and even shutdown. Present ESG data providers are well developed but data is still at a nascent stage, as is the maturity of market and fundamental financial data. Progress is positive but it must be recognized that the normalization, standardization and lineage of ESG data is at best in early to mid-development. At this point, no one source can be treated as the single best option, and accuracy is best achieved through consensus and by triangulating data sources. Investment managers need to understand the upcoming regulations/frameworks and the ESG vendor landscape.

Better collateral management is vital

The optimization and efficient use of collateral is increasingly becoming a cost-saving issue for buy-side, sell-side and insurance asset management firms. Using expensive collateral leaks returns from asset management portfolios and at certain concentration levels it can trigger greater initial margin pledges at central counterparties (CCPs) and clearing houses. Accurately maintaining notional collateral amounts, compressing where possible, and using the cheapest methods to deliver collateral are key functions that buy-side asset managers require to be able to track pledged collateral digitally.

In addition, Uncleared Margin Rules (UMR) for Phase 5 asset managers (those that hold $50+ bn in uncleared derivatives), which came into effect in September 2021, and Phase 6 asset managers (those holding $8+ bn in uncleared derivatives), which came into effect in September 2022, are causing buy-side firms to establish collateral management processes/systems to handle the Standard Initial Margin Model (SIMM).

In an interesting development, blockchain repo tracking solutions are entering the marketplace, as the ability to use cheapest-to-deliver accepted collateral with the ability to substitute collateral quickly when recalled is critical. Traditional methodologies for tracking collateral can be cumbersome, and at times monitoring the best revenue optimization of outputted collateral can prove too much of a challenge. Blockchain solutions have the potential to solve these revenue leakage areas.

Technical trends

A move to APIs, componentization, microservices and software as a service

Competition among investors only accelerates the need for investment managers to get an accurate, comprehensive hold on their portfolios and risk-performance levels, to ensure secure, cost-efficient lifecycle management.

In today's markets, without a superior modular foundation for the investment lifecycle, firms have no chance to analyze profitability and risk realistically, and to examine portfolio investments comprehensively. Given the demands of markets, clients, internal committees and regulators, a lack of proper line of sight of investments and operations will squeeze out any profitability, and is more likely to signal the beginning of the end for the firm.

The good news is that the componentization of Investment Book of Record (IBOR) microservices is readily available and mature enough to allow a modular, future-looking, scalable investment management infrastructure.

Of course, differing assets under management (AuM) -styled investment management firms must

[3] *Undertakings for Collective Investment in Transferable Securities.*

always match their firm and investment mandates to the appropriate technology value chain. But this does not necessitate a major capital investment in large-scale technology. Today's FinTech advances in hosting, outsourcing and cloud structures offer a wide set of appropriate tools that are viable competitive and economic options.

Investment managers are tracking new investment trends diligently, but shakeouts continue to occur when faulty investment models miss the mark or the front office does not have the tools/data to move quickly. This can happen up-front in portfolio construction, when investment managers are unable to match timely economic/market events with portfolio rebalancing/adjustments, or when they are penalized by key clients due to fails or missed account allocations.

Fundamentally, the front office needs/wants three basic views of its portfolios and data:

- Projected valuations of cash and positions.
- Real-time valuations.
- Settled valuations.

All other analytics pertaining to performance and risk can be derived from this primary aggregation. They can be built out using APIs and microservices and by establishing a componentized, modular IBOR ecosystem.

In attaining this structure, the FinTech landscape is readily available. However, investment management firms must match their firm and investment mandates to the appropriate technology value chain. Again, this does not necessitate a major capital investment in large-scale technology. Today's advances in FinTech in terms of hosting, outsourcing and cloud structures offer a wide set of appropriate tools, and firms can find the right solutions with due diligence and stringent vetting of vendors.

A note on the cloud

Just a few years ago, buy-side firms tended to avoid the cloud, asserting that 'it's not secure', 'my data needs to be on my site' and 'my intellectual property will be compromised'.

Buy-side firms have now 'leapfrogged' those on the sell-side in leveraging cloud benefits, especially as the sell-side has retracted from being the technical apps provider for the buy-side. As investment managers have increased the sophistication of their investment lifecycle, they have turned to FinTechs to provide viable solutions, embracing cloud technology where appropriate.

Hosting is the primary use of the cloud by most technology providers, followed by infrastructure as a service and managed services. UIXs may have been rewritten in HTML but much of the hard-core processing is still not cloud-native. For the most part, however, this is not an issue, and the core parts of the investment lifecycle are being incrementally reengineered for rapid scalability, multithreading and microservice modularization. Core legacy components are extremely complex, however, and rewrites are costly and a lower priority until no other path is possible.

However, the major push of new buy-side cloud apps is to leverage multi-tenancy. Given that there are more than 10,000 investment managers with more than $100 trillion in AuM, economies of scale and efficiency come into play, whereby many investment managers can be multi-tenanted within one application. Most investment managers can now use a secure multi-tenant investment management suite of products.

FinTechs building cloud-native multi-tenant applications will be able to provide cost-efficient, secure investment management services to most buy-side firms. This FinTech initiative is still in its early stages, mainly due to the complexity of the full investment lifecycle. On the surface it might appear simple, but when considering aspects of collateralization, funding and hedging, multiple years of industry knowledge is required for true production engineering. Progress is being made, but much of the investment lifecycle still depends on tried and tested development from incumbents.

6. Buyside50 2022 rankings

Rank	Company	HQ
1	Bloomberg	US
2	State Street	US
3	FIS	US
4	MSCI	US
5	S&P Global Market Intelligence	UK
6	SS&C	US
7	BlackRock Solutions	US
8	Amundi	US
9	Adenza	US
10	Northern Trust	US
11	Moody's Analytics	US
12	LSEG	UK
13	FactSet	US
14	Numerix	US
15	Broadridge	US
16	Murex	France
17	TS Imagine	US
18	Confluence	US
19	SimCorp	US
20	ION Group	Ireland
21	FINBOURNE	US
22	Qontigo	US
23	MarketAxess	US
24	FlexTrade	US
25	Quantifi	US

Rank	Company	HQ
26	CME Group	US
27	Adroit Trading Technologies	US
28	Tradeweb	US
29	Enfusion	US
30	Tourmaline Partners	US
31	Linedata	US
32	OpenFin	US
33	BNY Mellon	US
34	Virtu	US
35	Glue42	US
36	SAS	US
37	Rimes Technologies	US
38	JUMP Technology	US
39	Nasdaq	US
40	Beacon Platform	US
41	SEI	US
42	Finastra	UK
43	Acadia	US
44	CloudMargin	US
45	ISS LiquidMetrix (Deutsche Borse)	US
46	Cassini Systems	US
47	Intellect Design	India
48	MathWorks	US
49	SmartStream	US
50	RiskSpan	India

7. Buyside50 2022 category winners

Category award	2022 winner
Overall winner	Bloomberg
Chartis categories	
Breadth of Functionality	FIS
Depth of Functionality	State Street
Technology and Techniques	TS Imagine
Differentiated Capabilities	Beacon Platform
Customer Satisfaction	BlackRock Solutions
Market Presence	Bloomberg
Industry categories	
Investment Lifecycle – Alternatives	Allvue
Investment Lifecycle – Crypto	SS&C
Investment Lifecycle – Derivatives, Commodities	Adenza
Investment Lifecycle – Equities	State Street
Investment Lifecycle – Fixed Income	BlackRock Solutions
Investment Lifecycle – Hedge Funds	Broadridge
Investment Lifecycle – Insurance/Pension Funds	Clearwater Analytics
Investment Lifecycle – Overall	SS&C
Solution categories	
Algorithmic Trading	J.P. Morgan
Artificial Intelligence – Investment Lifecycle	Boosted.ai
Buy-side Asset Liability Management	Moody's Analytics
Buy-side Cash Management/Treasury	Kyriba
Buy-side Client Reporting	FactSet
Buy-side Sales Client Enablement	Seismic
Client Relationship Management	Tier1 Financial Solutions
Collateral Management	CloudMargin

Category award	2022 winner
Collateral Management – Enterprise	Adenza
Collateral Management – Optimization	Cassini Systems
Compliance Monitoring	SteelEye
Conduct and Controls	Broadridge
Corporate Actions	FIS
Data Analytics	S&P Global Market Intelligence
Data Management	GoldenSource
EMS	Bloomberg
Environmental Social and Governance – Analytics	MSCI
Environmental Social and Governance – Climate	ISS LiquidMetrix (Deutsche Borse)
Environmental Social and Governance – Overall	S&P Global Market Intelligence
Environmental Social and Governance – Physical Risk	Jupiter Intelligence and Cervest
Environmental Social and Governance – Primary Data Provider	Bloomberg
Environmental Social and Governance – Private Company Coverage	Dun & Bradstreet
Environmental Social and Governance – Transition Risk	Moody's Analytics
Evaluated Pricing and Data – Alternatives	FactSet
Evaluated Pricing and Data – Commodities	LSEG (Refinitiv)
Evaluated Pricing and Data – Credit	BondCliQ
Evaluated Pricing and Data – Fixed Income	Bloomberg
Evaluated Pricing and Data – OTC Derivatives	Bloomberg
Front Office Research	Bipsync
Front Office Risk Management	Qontigo
Front Office Technical Integration	OpenFin
Fund Accounting	SimCorp
Fund Accounting Outsourcing Provider	SimCorp
Fund Administrator	SS&C
Fund Management Outsourcing Provider	SEI

Category award	2022 winner
Fund Outsource Asset Servicing Provider	BNY Mellon
IBOR – Component	FINBOURNE
IBOR – Enterprise	Rimes Technologies
IT Integration	ION Group
Investment/Market Risk – Analytics	Qontigo
Investment/Market Risk – Commodities	Quantifi
Investment/Market Risk – Credit	S&P Global Market Intelligence
Investment/Market Risk – Managed Service	Numerix
Investment/Market Risk – Real-time	Bloomberg
Investment/Market Risk – Structured Products	Numerix
OMS	SS&C
Operational Risk and Process Control	Broadridge
OpsTech: Buy-side Reconciliation	SmartStream
Outsourced Trading	Tourmaline Partners
Outsourcing – Asset Servicing	FIS
Outsourcing – Front Office	State Street
Outsourcing – Middle Office	Amundi
Outsourcing – Risk as a Service	MSCI
Performance Attribution	Confluence
Performance Attribution – Equities	FactSet
Performance Attribution – Fixed Income	Moody's Analytics
Portfolio Management – Overall	BlackRock Solutions
Regulatory Monitoring/Reporting – Asset Managers	Bloomberg
Regulatory Monitoring/Reporting – Hedge Funds	Duco
Regulatory Monitoring/Reporting – Private Equity	FIS
Regulatory Monitoring/Reporting – Wealth Managers	Riskalyze

Category award	2022 winner
Risk and Finance Integration	State Street
TCA	ISS LiquidMetrix (Deutsche Borse)
Trade Surveillance	Nasdaq SMARTS
Transition Management	BlackRock Solutions

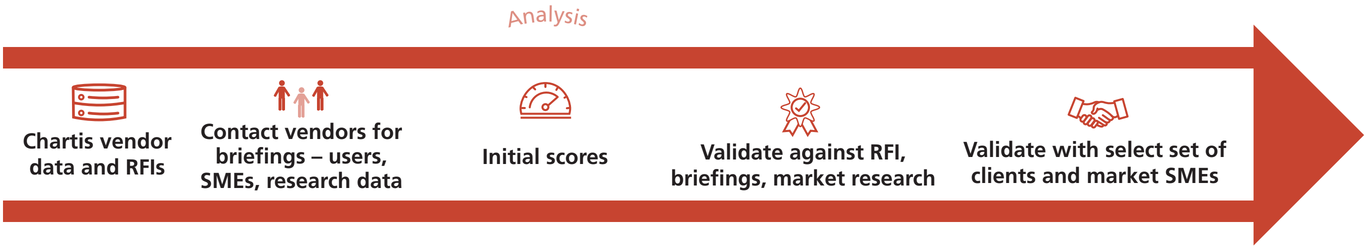
Rising Stars	
	Adroit Trading Technologies
	AlphaSense
	Arboreal Risk Advisors
	Baton Systems
	BestEx Research
	Bipsync
	Black Swan Group
	BMLL
	Cervest
	Clarity AI
	Clear Street
	CloudAttribution
	Comarch
	Elwood Technologies
	Finadium
	FinFolio
	FinX Capital Markets
	FORM3
	FundCount
	FundGuard
	Glue42

Category award	2022 winner
Rising Stars	
	Hazeltree
	HedgeGuard
	InvestCloud
	JUMP Technology
	Jupiter Intelligence
	LayerOne Financial
	LiquidityBook
	MAIA Technology
	Margin Tonic
	OpenGamma
	Orchestrade
	Proof Trading
	Regnology
	Spacetime.io
	TORA
	TransFICC

8. Appendix A: Buyside50 – methodology

We employ a multi-step process for our research and analysis for the Buyside50 (see Figure 4).

Figure 4: The Buyside50 research process



Source: Chartis Research

Scoring criteria

We use five scoring criteria for the Buyside50 ranking (see Table 1). These cover service providers that address multiple aspects of the investment management lifecycle, and service providers that specialize in specific functionality for the buy-side.

Table 1: The Buyside50 scoring criteria, with definitions

Breadth of coverage	• The breadth and coverage of a vendor's solution services across the buy-side investment management lifecycle. Incorporates front-to-back applications/services – including trading, portfolio construction, portfolio management, portfolio processing and analytical techniques – TCA, risk, performance attribution, collateral management and technical architecture evaluation and components.
Depth of functionality	• Review of service providers' submitted product/services for overall completeness, functional thoroughness and enterprise market suitability. Includes how updated functional releases keep up with market needs/demands, and incorporates regulatory demands.
Technology and techniques	• A measure of the technology platform and modernization of platform infrastructure scalability, as well as optimization and alignment with market demands. Includes user interfaces and connections with other investment management modules.
Strategy and innovation	• Enabling strategy. Evaluates the effectiveness of a particular firm's strategy in enabling its applications and services to be delivered into the market. Includes an overall measure of how innovative the organization is in terms of its investment management services offered.
Market presence	• An overall measure of a service provider's market presence, product coverage, specific targeted markets, new/developing technologies and new/developing market functional requirements, both present and anticipated.

Source: Chartis Research

9. 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

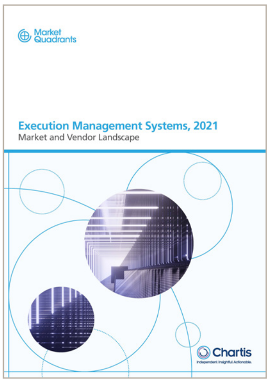
Our unique focus on risk technology gives us unrivalled knowledge of the institutions and vendors in the sector, as well as those looking to enter it. Through our industry experts, Chartis clients can tap our insights to gain a much deeper understanding of their competitors and the strategies they should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

10. Further reading

ESG Data Aggregators and Scorers, 2022: Market and Vendor Landscape



Execution Management Systems, 2021: Market and Vendor Landscape

Outsourced Trading Solutions, 2021: Market and Vendor Landscape

Algorithmic Trading Solutions, 2022: Market and Vendor Landscape

Key Trends 2021: Buy-Side Q3/Q4 Review

RiskTech100® 2022

For all these reports, see **www.chartis-research.com**