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## Including Investment Process Technologies within Operational Due Diligence

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The Chartered Alternative Investment Analyst (CAIA) curriculum outlines operational due diligence steps that allocators should take to ensure that equity asset managers in whom they invest have the necessary processes and infrastructure in place to run their funds appropriately and effectively. Although not specified by CAIA, critical technology infrastructure has traditionally included (1) an accounting system, (2) an order management or trading platform, and ideally (3) a data warehouse. (The latter can maintain a comprehensive database of a firm's past and present securities, trades, prices, values, exposures and research for portfolio assets as well as potential trade ideas.) These infrastructure tools represent basic structural requirements for a fund manager to avoid the unrewarded and unintended risks that can result from sub-optimal record-keeping and related operational oversights or errors.

While most fundamental active equity managers have seen moderate enhancements to

this key infrastructure, they have not changed the investment process itself meaningfully in decades, beyond leveraging more research sources, primary data sets, and occasional new features and functions in Bloomberg and Microsoft Excel. Portfolio managers and analysts generally (1) establish an addressable research universe or sector, (2) engage in fundamental due diligence, and (3) size positions on a stock-by-stock basis according to expected reward, level of conviction, and/or valuation metrics. They then measure results at a high level via P&L performance that fund administrators and accountants often help compute for them.

In recent years, an increasing number of technology vendors have introduced purpose-built, front-end solutions for portfolio managers to bring more versatile, efficient, precise, and information-rich methodologies to the investment process itself. These systems help provide a scalable framework to filter more

precisely an appropriate addressable research universe, engage in intellectually rigorous security selection, establish optimal position sizes in relation to the overall portfolio, and measure risk exposures within that portfolio. These approaches to security selection, portfolio construction, analytics, and risk measurement – and the behaviors tied to them – enable much more data-centric and evidence-based practices, in many cases providing a “quantamental” overlay to a fundamental investing technique. This overlay can create the much sought-after “edge” or marginal information advantage that so many in the investment management business seek.

Importantly, unlike Microsoft Excel, these applications are buttressed by time-series databases coupled with refined informational dashboards, making key outputs measurable – and in turn providing a feedback loop for investment managers to continually refine their process. These tools apply intelligence and evidence-based inputs (i.e., data science) to security selection and portfolio construction – and as such have been shown to be alpha-enhancing relative to approaches that lack their comprehensive ex-ante and ex-post portfolio insights.

Investment allocators should become aware of these process enhancements and determine whether their current and prospective managers are making active use of such decision engines, analytics frameworks, and feedback mechanisms to bring systematic, rules-based logic to all their investment and trading choices.

The appropriate analogues for many of these systems are flight computers or chess programs, which take an enormous number of input variables and calculate as outputs optimal decisions for the user to make. However, these financial technology (or “fin-tech”) portfolio management platforms indeed go further, by providing reports and dashboards that enable (and emphasize in some cases) learning from one’s mistakes as well as successes. The systems provide investment teams comprehensive data sets geared toward reinforcing what PMs and analysts do well while also suggesting avoidance of what they do poorly.

As asset flows continue to swing towards passive investment vehicles, pressure will mount on active managers to leverage more process-centric methodologies to improve their alpha generation and resulting returns. A few investment savants may still use a “finger-in-the-wind” or back-of-envelope approach, and outperform their peers and/or relevant indices, but such individuals are likely to remain a tiny minority. It is important to recognize that, indeed, no human brain can compute key actionable outputs from thousands of inputs – and fluctuating ones in many cases – to reach an optimal decision. Nor is it common that instinct alone leads to a truly optimal determination.

All this said, a caveat or two are appropriate. No single silver bullet – technology- or data-wise – exists to enhance manager performance in perfect form. Accurate and appropriate fundamental research and due diligence are still required. The platforms we discuss in some cases have a “garbage-in, garbage-out” element to them, for instance, necessitating appropriate price targets or a trading pattern that proves repeatable.

Additionally, the fact that the data sets the systems generate are often substantial implies that someone on a PM’s team other than the PM – possibly an outside consultant – may have more time and mental capacity to distill the most actionable information from the large volume of data output available. And of course, the PM will have to apply that actionable information to his or her process in a regular, repeatable, and systematic manner. Not all managers prove behaviorally adept at this. But none of this means that CIOs and PMs should let the “perfect” be the enemy of the “substantially better.” These process improvement solutions have, in fact, moved the performance needle for hundreds of firms.

We estimate that between 500 and 600 managers use at least one of the investment process systems outlined. Given a universe of more than 8,000 equity asset managers globally, this implies that only a minority leverages any of these applications currently.

As noted above, the platforms we cover in depth by no means comprise a complete list of fin-tech solutions for the buy side. However, our emphasis here is on the primary front-end, PM-centric tools that directly enable enhancing a fund’s investment approach. They are focused and refined technologies targeted at alpha generation, as opposed to (1) the all-encompassing market data platforms provided by the likes of Bloomberg, FactSet, Thomson Financial, and S&P/Capital-IQ (the “Big 4”, so to speak), or (2) the infrastructure tools that address accounting/P&L analysis, order management, data warehouse development, and portfolio monitoring.

To be fair, the Big 4 offer some of the investment process functionality described below, but fall short of a comprehensive feature set. For their part, the aforementioned basic infrastructure systems one might regard as necessary “plumbing” to run an equity fund business comprehensively. Examples are: Barra/MSCI for factor risks and analytics, MiK for data warehouse/reporting/portfolio monitoring, EzeCastle or MiK for order management (OMS), and Advent Geneva for accounting. Each is an example of a best-of-breed product for the noted function, but other vendors such as Indus Valley Partners and BlackRock’s Aladdin are seeking to develop more all-encompassing solutions that speak to a wider range of infrastructure “check-boxes.”

The tools and processes below help enable more process-centric techniques for a manager’s fundamental investment program. These approaches complement a comprehensive and repeatable due diligence methodology effectively, and therefore help enhance alpha generation when weaved effectively into a firm’s behavior.

### **Stock Screening**

While a fundamental manager may have a deep expertise in understanding the value of a specific company or theme, often the challenge is in finding which subset of companies to investigate more deeply. Screening frameworks comprise the tool to assist. Once managers have identified a tradable universe (i.e., region, sector, market cap, CEO type, etc.) they can further focus their efforts by screening within that universe for ideas with a higher probability of success.

There are tools the “Big 4” data vendors offer that represent an initial layer to this type of screening, but often they lack the ease or dimensions needed to give this process repeatability

and scale. This is where platforms like Equity Data Science (EDS) can play an appropriate role, in assuring all historical and projected valuation, fundamental, trading, and other relationships make for the most compelling “outlier” research ideas. EDS’s “quantamental” platform has helped its users identify the increasingly rare inefficiencies in the broader universe where, as a starting point, favorable data point to the greatest ROIs on one’s research time. Only then can a PM start his due diligence on individual companies/securities most confidently and productively.

The notion is to present instances where there is a statistical alignment of stars, so to speak. This might imply for a particular stock an analyst is evaluating for the long side of the book, for example:

- A low relative valuation (and versus companies with similar financial profiles outside the specific sector in question);
- Improving fundamentals (sales, EPS, ROIC, etc);
- Upside revisions in earnings estimates;
- Margins with upside potential relative to historical levels;
- Declining short interest;
- Low relative crowdedness;
- The beginning of a shift from value holders to growth investors;
- Improving sector fundamentals;
- Positive correlation to a market-based factor that is coming into favor, such as a certain market cap levels or interest rate sensitivity, etc.;
- Sell-side ratings that imply room for numerous upgrades;

EDS can show all of these kinds of measures on one screen, with graphical illustrations and color-coded and Z-score-derived quintiles for appropriate quantifications. In so doing, the platform provides an abundantly clear picture that helps users identify the increasingly rare inefficiencies in the broader universe. This means users can quickly see where as a starting point, favorable data point to the greatest ROIs on one’s research time. Only then can an analyst or PM start his or her due diligence on individual companies/securities most confidently and productively.

The EDS platform has been in development since 2013, and currently has multiple customers. Having such a comprehensive, efficient, and versatile screening and portfolio ranking tool brings data science capabilities to fundamental managers, helping them significantly increase productivity and generate alpha. The key is being able to assess and integrate a variety of information quickly in order to make critical investment decisions. Where the system is in use at its current clients, it effectively replaces a dedicated data analyst and rudimentary, non-database-linked screening tools (most often Bloomberg data pumped into Excel).

While all the fundamental and market-centric data that analysts and PMs need exists in a Bloomberg or a FactSet, it is the optimal presentation of this data, coupled with critical calculations (e.g., regression and correlation analysis), that allows for substantial time savings and efficient information digestion on the part of a user. Showing all critical elements and calculations in one dashboard makes EDS a much more elegant approach to leveraging such an overlay. Unlike other fin-tech platforms, EDS has no manual data input requirement and encourages ever-increasing usage, because more time with it equates to limitless comparative, precise, and profound insights into one’s portfolio and wider idea universe.

#### **Key attributes and use cases include:**

- Offering rapid and complete data perspectives based on both historical and projected data, including predictive, cross-sectional valuation analysis and regressions, ownership and liquidity trends, sensitivity analyses, correlation screens, and key information for event monitoring and preparedness (cross-sectional analysis implies a PM can look at metrics across multiple sectors, comparing a company in one sector to all other companies that share similar valuation and market-based measures regardless of sector).
- Saving substantial analyst time and effort that might otherwise be spent manipulating, regressing, and/or rank-ordering valuation, attribution, correlation, performance and risk metrics in Excel, all to get the same answer a dedicated platform like EDS provides with a single mouse-click or pre-loaded view.
- Ranking a fund’s active portfolio by assets demanding the greatest attention or actionability, providing an organized daily workflow whose main purpose is to create immediate responsiveness and thereby maximize alpha generation.
- Determining the most appropriate price targets and projected valuations, so that PMs can increase their conviction using evidence- or historically-based data constructs to pinpoint the most likely future valuation parameters.
- Providing an overall technical and fundamental score that is statistically appropriate and unbiased – for both the entire portfolio or an individual idea – and at a higher level a perspective highlighting whether the exposures the PM has are consistent with the fund’s strategy or positioning.
- Measuring potential event risk, by enabling clients to understand quickly and visually the current trend in analyst revisions or surprises, as well as performance going into events such as earnings or analyst days.
- Engaging in correlation analysis, so users can understand factor relationships (such as stock movements vs. interest rates), which can provide both the raw material for idea generation, and a clearer picture of the market environment.

## Portfolio Optimization

Once a PM recognizes a new idea as a valuable addition to the portfolio, he or she needs to incorporate it into the context of the larger book. In so doing, there are numerous variables to take into account, such as risk impacts, timing, and concentrations within the portfolio. Perhaps the most consistently underappreciated task is to assess the “value” of each position relative to its peers – that is, the position size decision.

Too few portfolio managers take more than a “finger-in-wind” approach to position sizing, but where the mean industry batting average from security selection resides in the 50% range, it is only overweighting winners, or improvement of slugging percentage, that leads to outperformance.

However, analysts that “grow up” as stock pickers do not readily develop the knowledge for appropriate portfolio construction, and most firms take an overly simplistic approach to position sizing based purely on relative conviction in their funds’ assets. An optimal portfolio maximizes returns while minimizing risk, and realizes the efficient frontier from a risk/reward perspective. If a portfolio manager has rank-ordered the book appropriately, he or she will have enhanced alpha generation to the greatest degree possible.

An appropriate rules engine would give a precise rank-order for active and potential assets that maximizes the transfer coefficient between idea quality and position size. Such a platform would optimize portfolio construction by synthesizing expected returns, self-determined portfolio rules, and qualitative asset-specific factors to generate an “optimal position size” for each asset in the book, such that return is maximized and risk is minimized.

The reason to optimize the sizing of positions in a portfolio is to reduce “slippage”, or the gap between potential portfolio returns based on expected risk/reward ratios and other key criteria at the portfolio and individual stock level, and the portfolio returns generated from having sub-optimal position sizes that fail to account for the projected varying stock-to-stock opportunities ex-ante. Notably, as security prices fluctuate, so do their expected returns (assuming static price target and probability inputs), and in turn their optimal position sizes. Indeed, as wind direction or speed changes, a flight computer re-calculates the appropriate altitude and direction for an airplane, so that analogy serves well for a rules engine for volatile asset markets.

By making such adjustments, portfolio managers are, in effect, on an ex-ante basis, maximizing their returns and minimizing risk – and doing so using their own assumptions. The key idea is to rank order all sources of alpha in terms of maximizing alpha generation for the overall portfolio – in short, align asset quality (or risk-adjusted upside) with its rank in the roster of assets. Ideally the system would even permit this ranking against a broader idea universe. Alpha Theory is one such platform that more than 70 fundamental-oriented hedge funds and mutual funds with aggregate AUM > \$125B use and which has generated statistically significant available performance gain.

These type of systems have found several interesting conclusions from its data studies that analyze the aggregation of its clients’ performance records. First, portfolio optimizations have outperformed the HFRI Equity Hedge Index every year since they’ve started collecting historical data. Of course, it helps that

those willing to optimize in a systematic manner also tend to represent fund managers that believe in process and discipline. These firms’ process orientation goes hand-in-hand with software that serves as a disciplining mechanism to align best risk/reward ideas with rankings in the portfolio.

Second, they found that price targeting improved forecast accuracy. Some investors chafe at price targets because they smack of “false precision.” However, these investors may be missing the point. The key to price targets is not their absolute validity but their explicit nature – which allows for objective conversation about the assumptions that goes into them. Said another way, the act of writing down the targets/scenarios forces self-evaluation and more contemplative reflection.

Further, they have found that disciplined usage of portfolio optimization indeed reduces portfolio slippage. The vendor’s research suggests not only that adoption of the application by itself led to improved performance, but actual usage intensity further enhanced results. (Usage intensity in the company’s study was determined by [1] recency of price targets, [2] percentage of assets with price targets, and [3] login frequency. In short, higher usage scores resulted in higher return on invested capital.) Finally, comparing users’ optimal versus actual returns showed improved batting average, better size-based slugging percentage, and higher total returns.

Allocators for their part like to see approaches that are systematic, scalable, logical, and repeatable – and this method of portfolio optimization checks all of those boxes.

### Post-trade Reflection via Attribution and Analytic

Many investment professionals fail to understand with a meaningful level of depth what they do well versus what they do poorly. Attribution and analytics tools can offer comprehensive feedback loops to confirm perceptions about past performance successes and mistakes, as well as highlight new learnings. Asset managers can also see what their basic risk profiles may be, by highlighting beta, sector, country, and other exposures – and/or “mismatches” on each side of their books in cases of long/short equity funds. (Mismatches for a long/short portfolio imply that the portfolio is not positioned neutrally across key exposure criteria. A beta mismatch, for example, implies that the beta on the long or short side of the portfolio is meaningfully higher or lower than the opposite side.)

Vendors such as LightKeeper, Novus, or Essentia Analytics – which between them have roughly 300 clients – can reveal most findings a PM or analyst might want to know, as well as basic risk exposures. For instance, is one’s fund better/more accurate in this sector or that, this region or that, the short side or the long side, with this analyst or that one, over shorter or longer time frames, with different trading patterns, factor exposures, etc.? Most PMs who dig in will see layers of actionable output they had not appreciated before, and clearly such learnings can be valuable if the managers apply them on a go-forward basis in practice, in an effort to improve batting average and slugging percentage.

The three vendors noted offer elegant portfolio analytics and reporting systems that take all of a fund’s historical trading or P&L data and build a data warehouse via a process known as “extraction, translation, and loading” (ETL). The ETL process creates a versatile and flexible time-series database from which

the platforms can present comprehensive attribution analysis via reports and/or dashboards. As is the case with many tools in this universe, ETL goes a significant step beyond Excel, as a purpose-built application is synthesizing and packaging structured data (versus unstructured) to present key dynamic, actionable insights. From these insights, both portfolio managers and investor relations/marketing staff can understand the factors that have driven risk and return – or alpha generation.

With all the permutations of reporting output, investment professionals at a fund (or investors in it) can readily answer thousands of possible questions. But at a basic level, these may include what performance was by sector, market cap, analyst, liquidity, time frame, long positioning, short positioning, individual position, geography, etc. Users can evaluate and compare batting average and slugging percentage, top winners versus losers, various performance periods, drawdowns, and any variety of rank-orders appropriate for analytical purposes. Basic factor/scenario analyses and risk assessments are also possible, where a PM can see exposures in the portfolio to different common thematic macro or micro risks as well as price reversions. Evaluating “what if” scenarios can be an important part of a manager’s risk mitigation approach – although not all PMs make use of this either because they do not know how or they do not have time.

Charts and graphs are available for most permutations of data output, and the output can usually also be displayed across a variety of device types. Additionally, the vendors can generate reports (via email and as PDFs or spreadsheets) at any time interval for users to digest all relevant information.

The ROI case for an analytics and attribution system is based on a few obvious foundations. First, anyone at a fund would need to spend a substantial quantity of time working with spreadsheets to populate the same information offered in ready point-and-click form by LightKeeper, Novus, or Essentia. Having time series data offers much more functionality and ease-of-use versus spreadsheet aggregation and data manipulation. Second, having comprehensive awareness of exposure levels to different factors or potential price movements can be helpful on an ex-ante basis. Third, the lessons any PM can draw from the limitless permutations of data are valuable on an ex-post basis, as clearly a fund wants to keep doing more of what it does well and do less (or none) of what it does poorly. Fourth, having ready data sets to present to fund investors and prospective investors is important, and many elements from attribution and analytics systems go logically into a fund’s standard PowerPoint pitch for allocators.

A few factors that differentiate the vendors in this group are worth noting. Novus is differentiated in the service it provides to allocators, which comprise roughly half the company’s client base. Because the company is providing attribution analysis to individual managers on the other side of its business, it can readily offer narrower or tailored versions of the same data sets to the investors in its fund clients. Allocators can obtain via their Novus dashboard a detailed sense for the degree to which their managers overlap or correlate with one another, and the risks inherent in the portfolios or styles of the managers. Many endowment, foundation, and pension clients leverage the Novus dashboard to obtain a cross-sectional view of many of their managers.

For its part, Essentia Analytics takes a heavily consultative approach to a PM’s investment process, by walking PMs through presentations that make clear the most actionable information culled from the volume of data the platform offers. Essentia highlights these signals on a quarterly basis, and offers to “nudge” its clients when they are following what was shown to be an inappropriate or poor-performing pattern in the past. This could mean the software flags a manager making a trade in a sector in which they have had a sub-optimal past performance, or suggests exiting a position over a shorter versus a longer time frame when that has proven successful in the past.

Finally, LightKeeper and Essentia both make use of trade-level data, while Novus uses P&L-based data to analyze key patterns and attribution.

### **A Note on ‘Big Data’**

There are a number of vendors offering substantial, marketplace-centric data sets and even outsourced analytics services to the buy side. These include but are not limited to: Yodlee, Second Measure, Discern Analytics, Thinknum, AlphaSense, Dataminr, Kensho, Indico, 1010data, M|Science. We could write an entirely separate and lengthy article on these so-called “Big Data” providers, but it is fair to say that none of these data sets represent a singular foundation for a rigorous and repeatable security selection or portfolio construction process. Our view is that fund managers can harvest the lowest-hanging fruit on these fronts from the aforementioned approaches for screening, attribution, and optimization – and this is appropriate to do as a first step in enhancing a firm’s fundamental investment process.

This said, some of these vendors’ data sets may offer alpha-enhancing opportunities on regular enough occasion when used with complementary due diligence activities, so as to form a potentially optimal mosaic. However, this can require context, experience, and often a human overlay to make the data truly actionable. The right unique or insightful information can be alpha-enhancing, although the validity of each data set depends heavily on the investment sector, the accuracy of the data, the specific methods being applied, and sometimes even the computational power of the firm buying the data in cases where it is “raw” or unstructured. (And this is before even noting the specific predictive power of information with regards to asset values.)

These solutions are therefore often best assessed by sector specialists with a technical or quantitative aptitude to determine how much ‘signal’ the data provide and the duration that signal is available.

### **Conclusion**

Most active managers can improve their investment methodology – and resulting alpha generation and returns – meaningfully by taking a more process-centric approach. This starts with an awareness of the best-of-breed data/technology platforms, many of which we addressed in this review. But it truly culminates with the active integration of such tools to provide investment professionals with “intellectual leverage”, as this lets them maximize impact from their fundamental research skills on the portfolio’s final return, and in turn that of their investors.

*\*All views presented in this article are of the author's, and should not be considered an endorsement by the CAIA association.*

## Authors' Bios



### **Dana Lambert, CAIA, CFA**

Dana Lambert, has had a 23-year career in the institutional equities business, with five years in sell-side equity research and more than 15 years as a portfolio manager at hedge fund and mutual fund firms.

Dana spent his sell-side years at Schroders and Lazard, and spent ten years helping manage small-cap funds for value firm Royce & Associates.

Most recently, Dana headed client relations at Alpha Theory, where he helped more than 100 equity long/short and long-only managers re-construct their funds using the most logical, systematic, and repeatable approach to position sizing and portfolio optimization available. In surveying the landscape, he found too few active managers making use of the investment process tools and techniques that can most help their performance.



### **Rayne Gaisford**

*Olive Street Advisors*

Rayne Gaisford founded Olive Street Advisers after more than a decade of experience in hedge fund management, including tenure with Balyasny Asset Management, Plural Investments, Folger Hill Asset Management and Pequot Capital.

Rayne is a strategic and systems-oriented thinker. He has designed, managed and overseen the build-out and ongoing improvement of multiple data, trading, risk and portfolio management infrastructures, providing information delivery solutions for fund principals, investment teams, IR teams and middle/back-office functions.

Rayne is a regular speaker at industry events and conferences; including events coordinated by: MSCI/Barra, Citibank, Bloomberg, BattleFin, RiskMinds and Risk.net to name a few.