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Separating the Wheat from the Chaff

by Jonathan Neitzell

The growth in available data and potential from analytics and artificial intelligence (AI) technology increases both the opportunity – and the challenge – for asset managers, investor relations professionals, and corporate management teams. Analytics can influence corporate decisions in product management, capital allocation, and how equity shareholders impact share pricing.

The size and scope strains comprehension:

- Approximately 20 billion Internet of Things devices are now online. By 2025, the number is expected to rise to 75 billion devices.
- There will be 4.8 billion internet users by 2022, up from 3.4 billion in 2017. 80 percent of data will be unstructured by 2025.
- More stored data has been created in the last two years than in the history of mankind prior to that point.
- Financial services firms are increasingly using this data to predict business model outcomes and set equity prices. We continue to hear these statistics, but our eyes often gloss over given the challenge of understanding the disciplines required to integrate all this data.

Five skills and tools are needed to unlock the value of this data and use it to our advantage:

1. Business knowledge of where value is created for the end customer.
2. The devices and sources of data and their biases.
3. Statistical and mathematical approaches to calculating what is known, and properly de-risking what is not.
4. Technology software and architecture requirements.
5. Cultural and organizational awareness and mutual respect for blending those respective skills into tangible workflow.

Thankfully, just as we saw with public cloud adoption, new “no code” tools and services are becoming available to make the scale and transparency of technology magic available to the business user who understands the core value proposition. Massachusetts Institute of Technology (MIT) calls the knowledge made possible by this technology “shared intelligence.”

Early adopters have the opportunity to separate from the pack as Amazon did with its public cloud computing service and successful e-commerce businesses. The COVID-19 pandemic creates a further imperative to take action on these types of opportunities.

OUTLAW BLIND BIAS: INVEST IN PROCESS

The Importance of Storytelling

Even with advanced technology that can synthesize and deliver quantitative data in actionable formats, further context and understanding of qualitative data and process feedback loops must be understood and assessed. As Nobel prize winners Daniel Kahneman and Amos Tversky, were quoted in the book, “The Undoing Project,” by Michael Lewis, *“No one ever made a decision because of a number. They need a story.”*

Call it the “human experience side” of AI if you like. To ground us in reality and reasonable expectations, it helps to reflect on the early pioneers of behavioral economics, which is the study of psychology as it relates to the economic decision making processes of individuals and institutions.

What researchers in this area found was fascinating. Within studies on highly educated, scientifically disciplined professionals holding doctorates in medicine and statistics, Tversky and Kahneman found that most people walk around with mental heuristics (habits) including availability, representativeness, and anchoring. Their research indicated that all humans are prone to using recent

availability or representativeness of personal experience to extrapolate probability, and our expectations can be anchored by the order in which we receive information – a humbling and troubling proposition. Many of us have seen this play out in corporate life, where diversity and meritocracy of ideas are often undercut by narrative shift, hindsight bias, and the poisoned wells of personality politics burying minority viewpoints calling for objective decisions.

Their groundbreaking findings were published in 1974 in a paper called “Judgment Under Uncertainty: Heuristics and Biases”. Today, coupled with the birth and global domination of software, we increasingly look to technology for answers to protect us from misjudgment. However, there is a bit of humor here. As the proliferation of technology solutions further affirms, we need context and process to make the path realistic.

As the famous poem, “The Rime of the Ancient Mariner,” points out, a resource without calibration is nearly useless. “Water, water, everywhere, Nor any drop to drink...,” poet Samuel Taylor Coleridge wrote. *Kahneman and Tversky found by testing their highly educated subjects, that being surrounded by numbers alone is not enough to make it relevant to our decisions – it must digested into our daily workflow.*

To underline this point, Paul Slovic – a psychologist and a peer of Kahneman – decided to evaluate the effect of information on decision-making. He gathered a group of professional gamblers and tested them with horse races over four rounds. Slovic told them the test would consist of predicting 40 horse races in four consecutive rounds. In the first round, each gambler was given five pieces of information about each horse.

One might believe years of jockey experience was a key performance indicator (KPI); another might want horse top speed;



Business KPIs: A Universal Language

HYPOTHESIS (BURNING QUESTION) FORMATION	KPI	Data
- How can we move beyond static assumptions built on assumptions in fixed models, with few if any updates between public data releases?	- Average spend p/transaction	- Credit card transactions
- How can we remove key variables from what is unknown in the stock price?	- Number of transactions	- Email receipts
- How can we put ourselves more in the operators seat, and ask more detailed specific questions based on data vs. generic uninformed "how's the quarter"?	- Same store sales	- Web Traffic/Scraping
- What does management think of their own operational metrics, and the health of their business?	- Churn	- Supply Chain data
- What names should be focused on...what would a data driven process surface as warranting attention for inflections?	- New customers	- Public municipal records
- What can be inferred from share shift, churn, and pricing changes?	- Repeat customers	- SEC filings
	- Share of wallet	- Natural Language Processing
	- Market share	- Lat/Long Geo data
	- Cohort spend over time	

Source:
Anduril Partners

and so on. Industry examples of these types of KPI calculations are shown in the chart above, "Business KPIs: A Universal Language".

In addition to picking winners, the experts were asked to indicate their level of confidence in their choice. In the first round with five pieces of information, they proved to be 17% accurate, substantially better than the 10% calculated chance prior to receiving their information. Their confidence was cited at 19%, relatively in line with the outcome. They were then given ten pieces of information in the second round and so on until they received forty pieces of information in the final round. Interestingly, while their predictive ability flatlined at the 17% accuracy level, their confidence continued to rise with the additional information to expect a 34% hit rate!

This example shows significant ramifications in our human ability to use raw information often driven by a fear of missing out (FOMO) and untested assumptions. When blending qualitative and quantitative inputs, senior voices must be aware of the dominant heuristics and bias that may be present and must create pathways and processes for feedback loops to encourage input coming from junior employees, minority voices, and introverted personalities.

Failure to include these additional inputs may be a travesty and lost opportunity for organizations who desire to grow and improve.

Unless we have a disciplined consistent process with feedback loops, we risk simply cherry-picking inputs (whether qualitative or quantitative) to enhance our confirmation bias – leaving us both dangerously confident about our choices AND potentially blind to more optimal outcomes and solutions.

APPLYING PROCESS IN FINANCIAL WORKFLOW

Can You OODA?

Thankfully for those with humility and a desire to drive consistent outperformance, the concept of feedback loops have become increasingly prevalent to digest and filter the mountain of data resources from noise into insight. As an example of applied process amidst an ever acting and reacting competitive environment, the U.S. military recognized that excellence in process may be one of the few sustainable areas of persistent advantage.

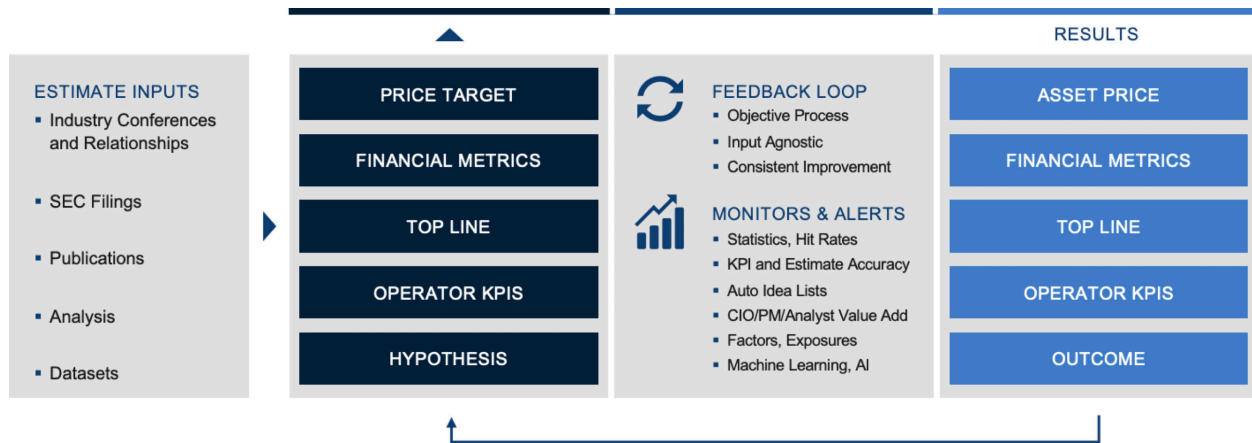
Based on this realization, strategy tactician John Boyd created a straightforward framework called the OODA loop, which stands for Observe, Orient, Decide, and Act. Now considered a foundational doctrine, it suggests that regardless of the backdrop, one must quickly and accurately:

1. Observe (ingest data)
2. Orient (solve for key performance indicators – KPIs)
3. Decide (agree on primary objectives)
4. Act (able to execute)

This framework hypothesis suggests the team most successfully cycling through this framework will learn and win while opponents are choking on the noise and confusion of exponential information growth. Process matters!



Fusing Data, Discipline and Technology



Source:
Anduril Partners

For integration into our daily workflow, how can we integrate qualitative (human experience) and quantitative inputs into “shared intelligence?” The chart above, “The Fusion of Data, Discipline, and Technology” demonstrates how an asset management group might add specificity to an OODA loop concept, driving decisions on which allocations to purchase, how they integrate as a portfolio, and how they might assess attribution and error rate per input function step – a historical “holy grail” challenge.

On the left in the diagram we have inputs such as SEC filings, internal or external analysis, industry relationships, and qualitative experiences. In the next column there are functions within systems that will change through manual or automated updates to reflect the changing reality of the world around us. These input names may change based on the business model, but for financial services groups, this drives top and bottom line changes to forward estimates and areas we believe to be operational KPIs to the asset related business model. This is then reviewed based on portfolio risk parameters that may be as simple as a gut feel (how most of business is actually done) or as complex as mathematical factor models.

These steps culminate in a buy or sell decision and then the forward performance of the asset begins to show actual

outcomes. If our effort has been recorded in software, now the magic begins – we can check our initial assumptions against actuals and run feedback statistics, error rates, and increasingly complex machine learning on this real-time and growing resource of training data and intellectual property. This allows data and institutional learning to become integrated as a tangible asset we can build and grow.

TURNING QUESTIONS INTO PREDICTIONS

Peeling Back the Veil

In a moment of stark honesty, most organizations will admit they have never actually drawn out their decision process. The few that have done so may offer a flowchart to demonstrate that they have a process.

However, if the inputs are not touching software and creating a time series of quantified changes, the effort is incredibly prone to narrative shift, hindsight bias, and lack of objectivity. Consequently, the ability for feedback loops or incremental learning will be severely compromised. It has been said, if software is eating the world, models will run the world. *For those humble, confident, and willing to be held accountable, the tailwinds of technology can harness this tremendous potential* in transparency, scale, and continued improvement on behalf of your stakeholders.

One of the largest shifts we are likely to see in team discussions during the next five years is toward analytics and data-influenced decisions. To do this, we must take our qualitative, thematic questions and turn them into key performance indicators – hypotheses which can be quantified, tested, and predicted. This process entails integrating the personal experiences of business users and operators and attaching their primary metrics to data consistently available.

For the financial industry, analysts might answer questions about a company's equity value by inferring revenue growth based on KPIs such as new customer growth, average spend per transaction, share of industry sales, and cohorts changing purchasing locations between physical and virtual storefronts. These may be seen within transaction records, email receipts, web traffic, or natural language processing queries of customer social media comments.

These discussions are often the same across corporate, private equity, and public equity uses, making a focus on defining, tracking, and predicting KPIs an increasingly universal language. Corporate intelligence and investor relations groups are likely to be a vital



bridge between planning for resource allocation and explaining these key components to stakeholders.

ESG: MAKING GOOD INTENTIONS REAL THROUGH GREAT PROCESS

Do you have a disciplined process to “Observe, Orient, Decide, and Act” within the ESG secular wave?

ESG (Environmental, Social, and Governance) and sustainable investment is a rising focus across the asset management and capital allocation communities, but what does that really mean? We are early in this journey of quantifying many qualitative efforts, and this is an example of a where a realistic framework might coalesce good intentions with good discipline.

Standard-setting bodies such as MSCI are issuing ranking systems such as risk factors (or bond ratings) in specific categories. They are increasingly joined by broker dealers and boutique research companies to create a wholistic, consistent, and transparent framework for these metrics.

A Clearer View: ESG Scorecard

Country	Sector	Industry Group	Industry
Type to search in list	Type to search in list	Type to search in list	Type to search in list
<input checked="" type="checkbox"/> (All) 2 values <input checked="" type="checkbox"/> UNITED STATE O... <input checked="" type="checkbox"/> CANADA	<input checked="" type="checkbox"/> (All) 1 values <input checked="" type="checkbox"/> Cons Dics	<input type="checkbox"/> (All) 5 values <input checked="" type="checkbox"/> Consumer Durables ... <input type="checkbox"/> Food & Staples Reta... <input type="checkbox"/> Food Beverage & To... <input type="checkbox"/> Retailing <input type="checkbox"/> Technology Hardwar...	<input checked="" type="checkbox"/> (All) 3 values <input checked="" type="checkbox"/> Household Durables <input checked="" type="checkbox"/> Leisure Products <input checked="" type="checkbox"/> Textiles Apparel & Luxury Goods

	Average	Median
Environment Pillar Score	3.11	3.00
Social Pillar Score	5.24	5.40
Governance Pillar Score	6.18	6.10
ESG Score	5.11	5.20

ESG Score is the sum of Score *Weight across all three pillars. It is then adjusted for industry and then converted to a letter rating

Ticker	Weighted-Average Key Issue Score...	Final Industry-Adjusted Compan...	ESG Rating (ESG)	Environmental Pillar Score (ESG)	Social Pillar Score (ESG)	Governance Pillar Score (ESG)	Environment Pillar Score Quartile (ESG)	Social Pillar Score Quartile (ESG)	Governance Pillar Score Quartile (ESG)	Supply Chain Labor Standards Score Quartile (ESG)
ABC	5.30	6.80	A	2.80	5.70	7.30	4	1	1	1
DEF	4.10	3.20	BB	3.90	4.00	4.70	3	3	4	3
HIJ	5.20	7.10	A	2.60	5.80	7.00	4	1	1	3
KLM	5.20	6.80	A	3.00	5.40	7.40	4	1	1	1
NOP	5.20	6.40	A	0.30	5.80	6.90	4	2	1	1
QRS	4.70	4.10	BB	0.00	5.80	5.30	4	2	2	1
TUV	5.50	6.90	A	4.60	4.00	7.60	3	4	1	3
WXY	5.70	8.50	AA	3.50	5.00	7.50	4	2	1	1
ZAB	5.30	6.80	A	4.70	5.00	6.90	2	1	1	1
CDE	4.70	5.40	BBB	4.50	4.40	5.40	3	3	2	1
FHI	5.10	5.00	BBB	5.10	4.80	6.00	2	4	1	1
JKL	5.50	7.30	AA	2.40	5.90	6.20	3	1	1	1
MNO	5.60	8.20	AA	5.50	5.70	5.30	2	1	3	1
PQR	4.20	1.80	B	1.90	4.70	4.50	3	4	4	3

Source: Anduril Partners and Equity Data Science (EDS)

How can shareholders and corporates aggregate all these disparate inputs and clarify relative peer group rankings?

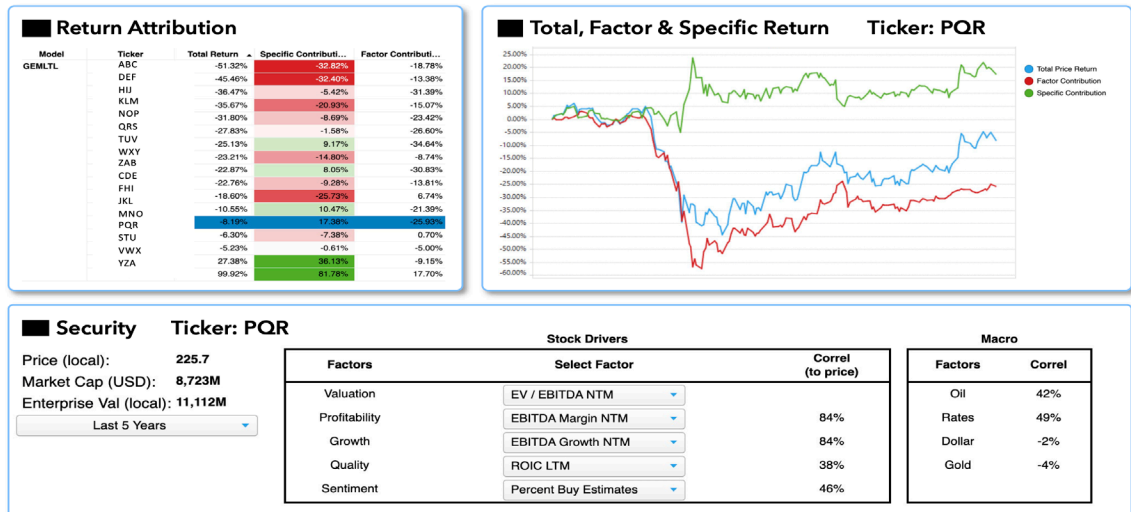
There will be an increasing number of ways to address this, but with the diagram above, “A Clearer View: ESG Scorecard,” we provide example of an aggregation platform with a dashboard that allows for granularity in setting the exact criteria each organization wants to use for individual scores in each category of ESG. It then rolls those inputs into a total firm ranked score, and can include internal rankings or qualitative conversation notes. This methodology provides consistent, scalable, real time alerts, and a transparent process to stakeholders. Corporations and large foundation allocators can also use this with ownership data to see what the ESG scores are for each aggregated investment fund and see which institutions are really putting their money where the claimed priorities are.

WHAT IS DRIVING THE STOCK?

Here we are going to tackle one of the holy grail interest points across communities – why a stock is trading where it is! We are familiar with valuation factors such as EBITDA, Return on Invested Capital, and how important positive Wall Street “buy” rankings might be. For those unfamiliar with risk model factors from Barra or Axioma, these are basically mathematically calculated relationships to certain thematic styles such as growth, value, leverage, size and others. One of the easiest ways to understand this is to think of it like nutrition labels. The impact of a food (or asset) really depends on the build of macronutrients. *Using factor analysis, we can decompose what is driving asset pricing similar to how we can deconstruct a soup into nutrition macros such as protein, carbohydrates, and fats.* In the chart above, “Factor and Fundamental KPI Example,” a company is compared to a group of its peers. While the stock was down 8.19 % in this example, style factors negatively impacted its peer group by 25.93%, and the company actually recovered 17% due to company-specific tailwinds.



Factor and Fundamental KPI Example



Source: Anduril Partners, Equity Data Science (EDS) and MSCI

Fundamentally, we can see that EBITDA margins and growth have an 84% correlation to stock price, demonstrating explicitly what shareholders care about most, with significant ramifications for capital allocation decisions. Think of how powerful this is to know when meeting with management or shareholders – and this can be explicitly and empirically answered, along with exact correlation of whether the stock has been most influenced by sales growth or margin expansion. This adds tremendous granularity when coupled with asset management investment discipline criteria or executive team capital allocation planning for M&A, buyback, or dividend policy.

Water, Water Everywhere, Yet Not a Drop to Drink...

We have now discussed use cases through several components of a decision workflow, but there are limitless examples, and we all weight input contributions uniquely, and often for different strategy durations. Like being surrounded by ocean water and dying of thirst, we will struggle to benefit from resources without a process to convert our potential into our daily workflow. So, in our



next segment we will begin blending these components into an integrated proprietary decision.

BLENDING INPUTS INTO A SYSTEM WITH FEEDBACK LOOPS

How do we blend all these inputs of different types into a system with feedback loops?

Using financial services as an example in the diagram below, “What to Do With All the KPIs,” these various languages, inputs, and disciplines form a Tower of Babel challenge of often speaking past each other. In fact, these are often in the form of printed reports physically carried to decision meetings.

As such, using static siloed Excel and PowerPoint as primary communication and decision vectors within working groups and committee meetings are falling woefully short as the physics of connected digital business and what-if analysis accelerates. The difficulty is this data comes from multiple, ever updating sources, expressed in languages including fundamental business model KPIs focused on a spectrum of duration strategies (solving for today

What to Do with All the KPIs?

INTERNAL INTELLIGENCE	MARKET DATA	RESEARCH DATA	ALTERNATIVE DATA
Analyst Estimates	Estimates	Factor Models	Credit Transaction Data
Price Targets / ROI	Valuation	Accounting Flags	Web Traffic
Conviction	Analyst Changes	Shareholder Activity	Email Receipt
	Corporate Fundamentals	ESG (ISS)	NLP Scores



IDEA GENERATION PORTFOLIO CONSTRUCTION RISK MANAGEMENT

Source: Anduril Partners and Equity Data Science (EDS)



or next year), technology requirements, math and data science integrity, historical and peer valuation, and risk factor influences.

There are several critical challenges here:

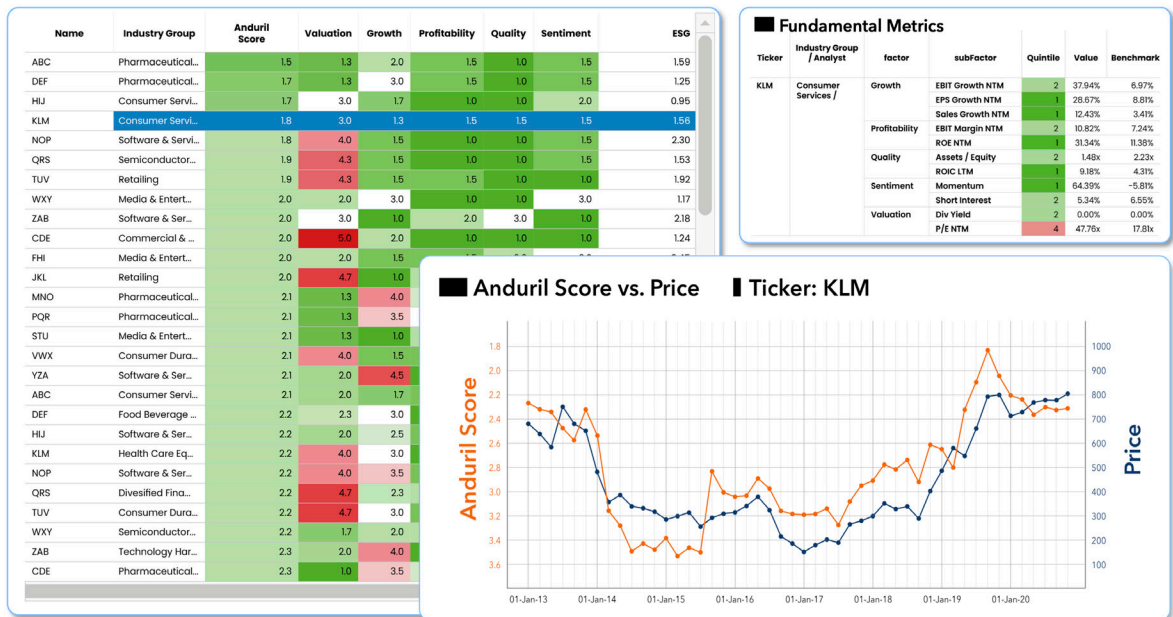
1. These inputs are like trying to compare apples, oranges, and pears.
2. Per our example on the horse races, academic research shows after a certain level of inputs, analysts flatline their predictive ability (overwhelmed).
3. There are almost no transparent or consistent feedback loops without a software system for tracking and monitoring.

We love to talk about ML/AI opportunities, but those don't exist until one has the data in a system with feedback loops.

BRINGING IT HOME AND UPGRADING YOUR ROAD MAP

For those interested in taking tangible steps to begin their journey in "data driven decisions", there are growing options to leverage both technology and qualitative-seasoned business acumen within process-driven software. Successful software will seek to integrate corporate intelligence and financial workflow decisions with inputs from fundamental front line business views, statistical probabilities,

Single Pane of Glass



Source: Anduril Partners and Equity Data Science (EDS)

real time nowcast data, internal analysis, and risk management into proprietary expected outcomes.

While this can be developed from scratch internally, increasingly these low to no code capabilities have already been developed from vertically focused vendors. In the view developed for the asset management diagram above, “Single Pane of Glass,” this allows nearly real-time integration of both existing and emerging priorities like ESG scores right into category rankings from classic financial workflow like demand-prediction, valuation, relative growth, profitability, quality, and sentiment. This example rolls up into proprietary rules-based rankings scalable across all global assets in a consistent way.

In conclusion, beware wandering in an ocean of point solutions and puzzle pieces which can be expensive and confusing. *Anduril Partners – in conjunction with its software partners – have created out of the box frameworks and roadmaps which can guide your journey and cut time to value from years to hours.* Reviewing these integrated solutions are a great conversation starter for asset managers, investor relations professionals, and corporate management teams – how are you ranking and prioritizing your core key performance indicators and decision processes? If this is only being done through lip service, there are bold new tools available for your transition to a process-driven approach.

READY TO GET STARTED?

Anduril Partners is eager to help our client understand their data and develop KPIs. We welcome a conversation. Don't hesitate to reach out to us.

Email us at info@andurilpartners.ai or visit www.andurilpartners.ai/contact.