



The £5 Billion Performance Problem:

Unifying Data to Unlock the Future of Elite Football

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Introduction

Football has always been a game where winning is found in the margins. Titles, careers, and legacies are decided not only by tactical mastery or technical brilliance, but by subtler dimensions of human performance: a single lapse in concentration, a split-second decision under pressure, or the resilience to keep executing when the body is on the brink of collapse. Clubs and organisations have invested billions in narrowing these margins. GPS trackers now measure every sprint to the meter, heart-rate monitors track recovery cycles, and video analysis breaks down positional play frame by frame. On the surface, football seems awash with data. Yet beneath this apparent precision lies a paradox that continues to cost clubs hundreds of millions each year: we are *data-rich, but insight-poor*.

The fragmentation is clear. Physical data sits in one silo, biometric data in another, tactical insights in yet another. Meanwhile, mental performance - the cognitive and emotional readiness that so often defines outcomes - is reduced to anecdotal feedback, informal check-ins, or overlooked entirely. The result is that decision-making is largely reactive. Players are “managed” only *after* fatigue sets in, *after* form dips, or *after* injuries occur. What remains invisible - and therefore unmanaged - is the brain and nervous system’s ability to process, adapt, and deliver under game conditions.

Every coach, sporting director, and medical team knows this gap. The player who looks physically ready but cracks under pressure. The academy prospect who excels in training but shrinks on match day. The squad that collapses under fixture congestion despite “passing” medical protocols. These are not mysterious anomalies. They are signals of a measurable, but currently invisible, layer of performance: the mental operating system that underpins everything.

The consequences of ignoring this layer are staggering. Injury-related player unavailability already costs elite clubs hundreds of millions annually. Soft-tissue injuries, often linked to accumulated stress and fatigue, remove talent from the pitch for weeks at



a time. Mental fatigue quietly erodes tactical execution, shortens careers, and reduces return on investment in both academy development and first-team wages. What gets described as “form” or “mentality” is, in truth, the absence of a unified system capable of anticipating, measuring, and optimising the mental and physical in tandem.

This realisation was at the heart of TrueMind - my work at the intersection of professional football, computational neuroscience, and advanced mathematics. In the lab, I set out to answer a simple but fundamental question: *What if mental performance could be made as tangible as sprint distance, heart rate, or recovery scores?* Over the past 3 years, my research has tested and refined the frameworks needed to quantify resilience, focus, and cognitive readiness in ways that integrate seamlessly with existing physical and tactical data. The outcome is clear: mental performance is not abstract. It can be measured, modeled, and optimised - if you have the right intelligence layer.

That intelligence layer is **Edge**. Unlike traditional analytics, which are siloed and retrospective, **Edge** can ingest multi-layered data in real time - physical, biometric, mental, and game-day outputs - and generate unified deductions. From these deductions emerges a single Performance Index: a dynamic measure of readiness, resilience, and risk. With **Edge**, the scattered fragments of performance are synthesised into clarity. Coaches, medical teams, and decision-makers no longer need to guess at invisible margins. They can see them, quantify them, and act with foresight.

The timing could not be more critical. Fixture lists grow denser, international tournaments stack pressure on players, and the financial consequences of poor availability multiply with each transfer cycle. Clubs can no longer afford to rely on gut instinct or fragmented dashboards. The old paradigm is not only unsustainable; it is actively damaging - to performance, to finances, and to players themselves. The new paradigm is one of integration, foresight, and human-centric intelligence. It is not only about competitive advantage, but also about extending careers, protecting wellbeing, and unlocking human potential at scale.

This whitepaper sets out that vision. It is not an academic paper, but a blueprint for transformation: a call to unify data across physical, biometric, cognitive, and tactical domains into one wholehearted dataset; to deploy **Edge** as the intelligence framework capable of turning fragments into foresight; and to build infrastructures that finally treat athletes not as a collection of parts, but as living, adaptive systems.

The future of performance will not be built on dashboards of disconnected numbers. It will be built on integration - on intelligence that reveals the invisible margins and transforms them into the foundation of the next competitive era in football. TrueMind was the research. **Edge** is the framework. And the time to act is now.



Framing the Problem

Modern football finds itself in a strange position: drowning in data yet starving for insight. Clubs track every sprint, heartbeat, and kilometer. Analysts break down game film until every touch is catalogued. GPS vests, sleep monitors, wellness questionnaires, and medical screenings all flood staff with numbers. And yet, when the decisive moments arrive - whether to start a player, rest them, or prepare them for a specific match - decisions are still reactive. They are often driven by gut instinct, politics, or fragmented views of performance, rather than a holistic, unified truth.

The problem is not a lack of information; it is fragmentation. Performance data sits in silos, each owned by a different department:

- Sports scientists watch over physical conditioning and workload.
- Medical teams focus on recovery and rehabilitation.
- Analysts break down tactical and technical outputs.
- Psychologists, if present, work on resilience and wellbeing.

Each of these perspectives is valuable, but they rarely converge. The athlete is pulled apart into compartments, while the actual lived experience of performance - where physical, mental, emotional, and tactical dimensions converge in real time - remains invisible.

This fragmentation carries an enormous cost. Clubs talk about "marginal gains," but in reality, they are bleeding value through invisible losses:

- A player cleared by medical staff but mentally fatigued underperforms, costing the team points.
- An academy graduate shines in training metrics but fails under pressure on match day, leading to a stalled career.
- A squad rotation decision made on instinct risks a preventable soft-tissue injury, sidelining a key player during a critical stretch.



Each of these examples is often framed as “bad luck,” but in truth, they are systemic blind spots. And these blind spots are expensive. Injury costs alone reach hundreds of millions annually across Europe’s top clubs. Missed performance windows mean lost titles, relegations, and failed qualifications for European competitions, which swing revenue streams by tens or even hundreds of millions. Beneath the headlines, there are also human costs: shortened careers, wasted potential, and declining trust between players and organisations.

For coaches, the reality is frustration. They are expected to make high-stakes decisions with dozens of disconnected dashboards and reports - none of which provide a clear, unified picture. They know instinctively that players are not machines, yet their tools still treat them as such. Decisions about readiness or squad rotation are made under pressure, in the dark, often with consequences that ripple through entire seasons.

For players, the gap is even more personal. Many live with the pressure of “toughing it out,” hiding mental exhaustion or anxiety to avoid being seen as weak. They know their rhythms - when their mind is sharp, when confidence wavers, when resilience dips. But too often, their inner reality is dismissed because it is harder to measure. Players who feel unseen or misunderstood lose trust in the very systems designed to protect them. Performance suffers, but so too does wellbeing.

For executives and owners, the implications are financial and existential. Clubs invest staggering sums into transfer fees, salaries, and academies. Yet without a mechanism to integrate physical, mental, and tactical readiness into a single performance truth, much of that investment remains at risk. Margins at the top are razor-thin: a single bad injury, a poor rotation decision, or a drop in form at the wrong moment can define entire financial years.

The truth is that football has mastered the art of managing parts, but not the whole. The industry has optimised for workloads, drills, rehab cycles, and tactical execution. But the human being - the dynamic living system where body, brain, and emotion converge - has not been fully optimised. And because of this, clubs remain in a reactive cycle: responding to injuries instead of preventing them, analysing dips in form instead of predicting them, and reacting to match outcomes instead of shaping them before kickoff.

Football does not lack technology. It lacks integration. Until we unify the physical, biometric, tactical, and - most importantly - mental layers of performance into one wholehearted dataset, clubs will continue to operate blind in the moments that matter most. The result is that the game is not only leaving performance on the table; it is leaving futures, careers, and millions of dollars at risk.



Sympathising with Stakeholders

At the heart of football is a paradox. It is both the world's most sophisticated sport - attracting billions in investment, the finest medical staff, and innovative technology - and at the same time, it remains governed by incomplete pictures of performance. The data exists, but the lens is fractured. The stakeholders who carry football forward each feel this gap, and each live with its consequences in very different, but interconnected ways.

For coaches, the problem is not lack of knowledge, but too much of it in isolation. They sit at the crossroads of physiology, psychology, tactics, and strategy - yet the information they receive is siloed and sometimes contradictory. A fitness report might say a player is physically clear to start, but the coach senses mental hesitation; another tool might flag recovery risk, yet match-day pressure demands selection. With fractured data streams, coaches are forced to rely on intuition against a backdrop of incomplete facts. The burden is immense: one poor decision could cost a season, fracture a dressing room, or derail a promising career. This constant high-stakes guessing game leaves many feeling they are "managing risk" rather than unlocking potential.

For players, the stakes are more visceral. Careers are short and fragile; every game can shift perception, contract value, or national team call-ups. Yet their inner states - confidence, focus, resilience - are rarely captured as tangible data points. A striker may feel weighed down by off-field stress, but push through to avoid being seen as "weak." A young academy player may oscillate between brilliance and collapse, yet with no shared framework to articulate their inner world, their inconsistency gets judged harshly. This invisibility creates mistrust: mistrust between players and coaches, between players and staff, and even within the players themselves. Many silently carry the weight of performance anxiety, knowing that the current system cannot see them, let alone support them.

For medical, science, and performance staff, the frustration lies in knowing better - but being unable to act holistically. They measure, track, and advise, producing detailed reports on recovery timelines, nutrition, and load management. Yet their input often sits in isolation from tactical, psychological, or organisational considerations. They patch what is broken instead of preventing breakdown. The system keeps them reactive, despite their expertise crying out for integration. They can see when a player's stress is delaying recovery, or when mental fatigue is amplifying injury risk - but they lack the tools and frameworks to make this visible in ways that decision-makers can act upon.

For executives and owners, the picture translates into risk management and capital loss. Clubs now operate as global enterprises where player performance is not just athletic, but



financial - each transfer fee, contract, or sponsorship is an investment tied to fragile human variables. Yet many boardrooms still operate with outdated or incomplete performance intelligence. When a marquee signing underperforms or a key player is injured, the cost is not only immediate in lost matches, but systemic: depreciated market value, disrupted sponsorships, reputational damage, and wasted opportunity. Executives are left frustrated, knowing that billions are being managed with 20th-century thinking in a 21st-century sport.

And above all of these groups is a shared emotional truth: frustration and fatigue. Coaches frustrated by guesswork. Players frustrated by invisibility. Staff frustrated by silos. Executives frustrated by inefficiency. Football is not resistant to innovation - on the contrary, it is hungry for it. But it does not need another isolated tool or another data silo. What the ecosystem is crying out for is a unifying architecture, one that sees the athlete in their entirety - mind, body, and environment - and translates that into decisions everyone can trust.

Until that shift occurs, football will continue to leave performance on the table. And everyone knows it.

Valuing the Problem

Football is more than a sport - it is a global economy in motion. The decisions made on training grounds and in boardrooms ripple outward into billions in market value, broadcast rights, sponsorships, and fan engagement. Yet when the core variable - the human performance of players - remains only partially understood, the costs accumulate quietly, but profoundly.

The cost of injury is the most visible expression of this gap. In the Premier League alone, research has estimated that clubs lose between £20–25 million per season due to injuries. Across Europe's top leagues, that number grows into the hundreds of millions. When a player is sidelined, it is not simply the salary wasted or the transfer fee devalued - it is the opportunity cost of games not won, positions not secured, sponsorship deals not maximised. Every week without a star striker or a captain on the pitch is a week of compounding financial, reputational, and emotional losses. And yet, many of these injuries are preventable when mental load, recovery patterns, and stress states are integrated into performance planning. Without mental data in the loop, the system pays for blind spots with torn hamstrings, stress fractures, and burnout.

Player availability is another silent drain. Studies across elite football show that at any given time, around 10–15% of a squad is unavailable for selection due to injury, fatigue, or



recovery. This translates into diminished squad rotation, tactical inflexibility, and a higher risk of further injuries due to overuse of fit players. For clubs investing tens or hundreds of millions in squad depth, this percentage is not a marginal loss - it is a direct contradiction of the very reason those investments were made. Owners are paying for options that cannot be used, and the return on capital shrinks in real time.

Underperformance is harder to quantify, but arguably more costly. A player who is “fit” but not mentally sharp can change the outcome of an entire season. The striker who hesitates in front of goal, the defender who loses concentration at a critical moment, the midfielder whose confidence has ebbed away after a string of quiet games - each of these moments translates into points dropped. In the ruthless mathematics of football, three points are not just bragging rights; they are the difference between relegation and survival, Champions League qualification and mediocrity, tens of millions in prize money, and cascading commercial impacts. When mental performance is invisible, underperformance hides in plain sight until it is too late.

Staff inefficiency adds another layer of cost. Sports science, medical, and analytics departments are growing, but without integration, they generate more reports than results. Countless hours are lost compiling metrics that never connect, juggling systems that fail to communicate, and sitting through meetings where each silo offers only a fragment of the puzzle. The intellectual and financial cost of this fragmentation is immense. Highly trained staff are left firefighting rather than innovating, and the investment in “high-performance departments” risks becoming little more than optics. Clubs are spending heavily to stay modern, but without unification, the return on these investments is diluted.

The intangible costs cut even deeper. Trust between player and coach erodes when players feel unseen. Young talent is lost when promising academy graduates burn out or fail to transition into the senior game because their inner states were not recognised. Fans grow frustrated when clubs appear directionless or players look lifeless on the pitch. The cultural story of the club - its brand, its identity - begins to fray when performance is inconsistent, and the emotional contract between fans and institutions weakens.

When aggregated, these costs are staggering. Injuries alone drain hundreds of millions across leagues. Underperformance multiplies into billions in lost opportunity and diminished brand equity. Staff inefficiency consumes resources that could otherwise fuel innovation. And the invisible erosion of trust undermines the very fabric of the game.

The truth is stark: football is already paying for the lack of integration. It pays in injuries, in wasted contracts, in underperformance, in fractured cultures, in lost revenues. The cost of not addressing this problem is not abstract - it is *already on the balance sheet*.



The industry now faces a choice. Continue to pay for a fragmented view of performance, or invest in an integrated architecture that makes the invisible visible and the intangible tangible. The future value of football will be defined by which path is chosen.

The Future State: A Unified Performance Era

Imagine stepping into a football club in the near future. The first thing you notice is the atmosphere: calm, focused, purposeful. Every player, coach, and staff member knows where they are, not just physically, but mentally, emotionally, and holistically. Performance is no longer a guessing game; it is a living system.

Player dashboards are no longer fragmented spreadsheets, but living profiles. For each athlete, a unified view of their performance exists: physical outputs, recovery cycles, nutrition intake, sleep patterns, and - crucially - mental states. Coaches no longer wonder if a player is ready; they know. They can see confidence levels, focus scores, emotional load, and resilience patterns mapped in real time. This doesn't reduce a player to numbers - it elevates them to a *whole being*. The data doesn't replace human intuition; it enhances it, giving managers, coaches, and medical teams clarity where previously there was uncertainty.

Injury prevention becomes proactive instead of reactive. Instead of waiting for the inevitable breakdown, **Edge** highlights risks days or weeks in advance. A dip in recovery patterns, a spike in mental fatigue, or an imbalance in movement mechanics triggers an intervention. Medical staff step in before the injury, not after. Clubs retain availability across the squad, lineups remain stable, and talent fulfills its potential. The financial drain of injury diminishes, and the human toll of rehabilitation is spared.

Decision-making evolves from subjective to symphonic. Tactical meetings are informed not just by who is "fit," but by who is "ready." Imagine a coach selecting a lineup knowing not only who is physically sharp, but who is mentally primed for high-pressure moments. A defender stepping into a Champions League knockout game is chosen because their resilience index is peaking; a striker is rested midweek because their focus is in a trough and risking frustration on the pitch. These micro-decisions, made consistently, compound into macro advantages across a season.

Young players are nurtured with precision. Academy graduates are no longer pushed through a pipeline where success or failure feels like a coin toss. Instead, their mental profiles are tracked alongside their technical development. Coaches know who thrives under pressure, who needs resilience building, and who requires support in transition moments. This reduces dropout rates, preserves talent, and creates a more humane



pathway from academy to first team. The long-term value for clubs is immense, and the personal outcomes for players are transformative.

Staff roles transform from firefighting to foresight. Analysts, sports scientists, and medical staff no longer spend hours reconciling fragmented data. **Edge** integrates the streams, runs predictive models, and surfaces insights in real time. Human experts are freed to do what they do best: interpret, innovate, and care. The performance department becomes less about “managing problems” and more about designing futures. Clubs shift from being reactive institutions to proactive ecosystems.

The culture of the club deepens. When players feel seen as whole beings - not just assets - the trust between players, coaches, and management strengthens. Fans see the difference on the pitch: more consistent performances, fewer injuries, clearer identities. They sense it in the narratives too: players staying longer, developing more fully, clubs operating with integrity and vision. Football’s cultural and commercial stories align once again.

In this future, performance is not defined by guesswork, tradition, or luck. It is defined by clarity. By integration. By a wholehearted view of the athlete and the organisation. Football becomes not just faster or fitter, but *smarter* - a sport where every layer of human potential is recognised, measured, and elevated.

This is the era we are stepping into. An era where football stops leaking value into blind spots and instead channels its immense resources into creating the fullest expression of performance. Not only is this possible - it is inevitable.

How We Achieve It: **Edge** at the Core

Football today sits at a crossroads between tradition and transformation. Clubs have invested heavily in performance infrastructure - GPS tracking, nutritionists, psychologists, sleep specialists, recovery units, and medical staff. Yet despite this abundance of expertise and technology, outcomes remain fragmented. Decisions are often based on partial data, department silos, or gut feeling rather than on an integrated, systemic view of the athlete. **Edge** is designed to resolve this tension. It acts as the *central intelligence* - the unifying operating system that ingests, interprets, and translates multiple streams of data into clear, actionable performance insights.

Edge begins with integration. Every club already generates vast amounts of information: physical training load, biometric signals from wearables, medical records, injury logs, nutrition data, match statistics, wellness questionnaires, and - most often ignored - mental and psychological measures. Traditionally, these data live in silos, scattered across



platforms and staff members. Coaches may have one dashboard for physical readiness, analysts another for match-day data, psychologists their own files for wellbeing, and medical staff their own reports for injury. Rarely are these perspectives unified into a single, coherent narrative of performance. **Edge** solves this by acting as the connective tissue, centralising all inputs into one living model that sees the athlete in totality.

But centralisation alone is not enough. What makes **Edge** powerful is its ability to *deduce patterns across categories that humans could not easily perceive*. For example, a small dip in cognitive sharpness, when overlaid with GPS sprint-load data, hydration status, and sleep variability, might reveal a 15% increased risk of muscular strain within 72 hours. Equally, it may highlight that an athlete's resilience is being tested not on the pitch, but in their off-pitch life - identifying when stress patterns overlap with physical fatigue. These deductions allow interventions to happen *before* injuries, burnouts, or performance drops manifest. Instead of firefighting, organisations gain foresight.

Consider the scale of this shift. Injuries cost clubs millions each season in lost availability. A torn hamstring is not only a blow to a player's career trajectory but also to a club's finances, match performance, and long-term planning. By surfacing correlations between the physical and the mental, **Edge** can reduce injury incidence, preserve player availability, and extend careers. It reframes performance not as crisis management, but as a system of proactive stewardship.

The human layer remains central. **Edge** is not designed to replace coaches, psychologists, or medics; rather, it is designed to *amplify their capacity to see, decide, and act*. For a coach, it becomes a decision-support tool - providing evidence for when to push a player harder or when to pull them back. For a psychologist, it contextualises a player's mental state against physical fatigue and recovery, allowing interventions to be timed with precision. For the medical team, it identifies leading indicators of injury risk, giving them the opportunity to adapt training or recovery protocols. For the player, it becomes a mirror: a holistic reflection of their development, resilience, and readiness.

At the organisational level, **Edge** represents a new operating model. Clubs often talk about alignment between departments, but struggle to achieve it because each group works with its own limited view of the data. **Edge** changes that dynamic. By creating a shared performance architecture, it ensures that all stakeholders - from coaching to medicine to management - are working from the same reality. This coherence reduces miscommunication, eliminates duplicated efforts, and sharpens strategic decision-making.

More broadly, the implications extend beyond football. The same logic that unifies mind, body, and data for elite athletes can apply to workforce performance in corporations, to



health optimisation in public institutions, and to resilience training in schools and academies. Football, with its high stakes and high visibility, simply provides the proving ground. Success here demonstrates what is possible in any domain where human performance matters.

The promise of **Edge**, then, is not only more data or better dashboards. It is the shift from reactive to predictive, from fragmented to integrated, from siloed expertise to systemic intelligence. It is about ensuring that every decision made in pursuit of performance is informed by the full reality of the human being - mental, physical, emotional, and tactical. And it is about making this intelligence usable, so that insights translate directly into better outcomes on the pitch, healthier athletes, and more resilient organisations.

In short, **Edge** is the central nervous system of performance. Without it, clubs will continue to operate like bodies without coordination - muscles firing, organs functioning, but no single intelligence orchestrating the whole. With it, football moves into an era where human potential is optimised not by chance, but by design.

Call to Action: Building the Future of Performance

The evidence is clear. The costs of fragmented performance models - injuries, burnout, shortened careers, and lost potential - are unsustainable. Clubs, leagues, and institutions are leaving millions on the table each year while athletes pay the price with their bodies and futures. At the same time, the market is hungry for innovation. Stakeholders at every level - from ownership groups and federations to academies and athlete representatives - recognise the need for a new paradigm. The question is no longer *if* change is needed, but *who* will lead it.

Edge is not an abstract concept waiting for the future. The architecture is here. The intelligence layer has been designed. The integrations are ready to be deployed. What is required now is alignment - visionary partners willing to step into co-creation and bring this model to life on the ground. This is not a theoretical horizon but a practical reality, one that can be implemented today to transform how clubs see, measure, and manage performance.

We are inviting three types of collaboration:

- **Innovation Partnerships with Clubs & Leagues**

Early adopters will gain first-mover advantage in shaping the future of athlete



performance. By embedding **Edge** into their academies and first teams, these partners will not only protect player availability and extend careers but also set a new gold standard in welfare and performance. These are the organisations that will be remembered as pioneers.

- **Strategic Alliances with Institutions & Policy Bodies**

Public health organisations, federations, and player welfare groups can leverage this model to transform how mental and physical performance data are integrated at scale. From injury prevention to long-term wellbeing, **Edge** offers a framework that aligns with the wider mission of safeguarding athletes and optimising talent development.

- **Engagement with Investors & Visionaries**

Those who recognise the convergence of AI, sport, and human potential have a once-in-a-generation opportunity to back the infrastructure that will redefine performance globally. **Edge** is not just a product; it is a category-defining system with multi-market applications, starting with football.

The call to action is simple but urgent: join us in building the new operating system of performance. This is not about incremental improvements or marginal gains; it is about redesigning the foundation on which the entire performance economy rests.

The future will not be written by those who wait for change to arrive. It will be built by those who are bold enough to align vision with action, intelligence with empathy, and innovation with responsibility. We believe football can be the proving ground - the stage where the world first sees what is possible when the mind, body, and data converge.

If you are a leader, a policymaker, an investor, or a practitioner who feels the weight of the current system's limitations - and the promise of what could be - then we invite you: step forward. Help us build a future where performance is not extracted from athletes but elevated with them.

The world of elite football is ready for **Edge**. The margins that once hid in the shadows - the unseen drops in focus, the invisible accumulations of stress, the early warning signals of injury - are now ready to be seen, measured, and acted upon. For decades, clubs have invested billions in the pursuit of marginal gains, yet continued to lose value through the blind spots of fragmented data. The costs have been immense: players sidelined when they could have been protected, careers shortened before their peak, squads



underperforming despite state-of-the-art infrastructure, and institutions bleeding capital while leaving potential on the table.

Now, a new paradigm is possible. The intelligence exists to unify body, mind, and game into one coherent whole - transforming uncertainty into foresight, and potential into performance. **Edge** does not replace the intuition of the coach, the expertise of the medic, or the experience of the player. Rather, it amplifies them, giving each stakeholder the clarity they need to act with confidence. It makes performance visible in its totality, not as fragments, but as the living system it truly is.

The implications reach far beyond injury prevention or tactical refinement. This is about redesigning the foundations of performance itself - building clubs that are more resilient, players whose careers are extended and enriched, and organizations that can convert investment into sustainable success. It is about protecting wellbeing as much as winning matches, ensuring that human potential is not extracted and depleted, but cultivated and elevated.

Football stands at a threshold. The old paradigm of silos and reactivity is exhausted. The new paradigm of integration, foresight, and wholehearted intelligence is not just desirable - it is inevitable.

TrueMind is building the prototype of **Edge** right now. This paper is not a thought exercise; it is a statement of material intent.

Onwards

If you would like to play a part in shaping the future of performance in elite sport, as an innovation partner, organisational stakeholder, or investor, contact **Ben Hawkes**, Chief Commercial Officer, on ben@truemindedge.ai