An Investor's Guide to Artificial Intelligence Strategies

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Plotinus Asset Management

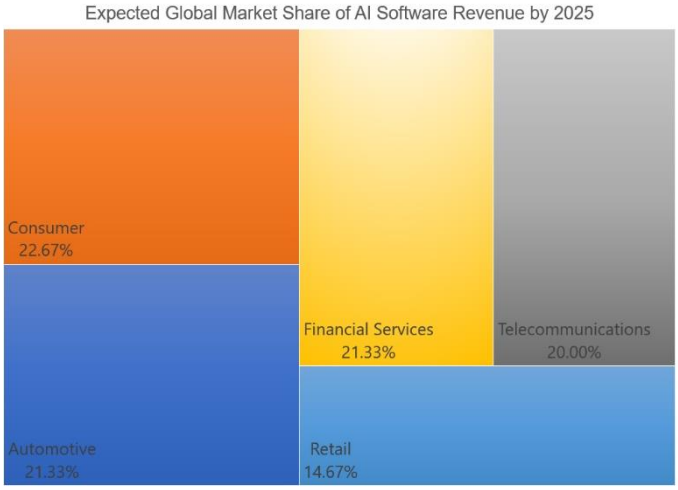
Defining the New

"Almost always those who, being little committed by prior practice to the traditional rules of normal science, are particularly likely to see that those rules no longer define a playable game and to conceive another set that can replace them."

Thomas Kuhn

Artificial Intelligence in finance is new. For those interested in informing themselves on the discipline, useful texts are in short supply. In many cases they are either academic in style, boring to the point of tears, laboring technical language in an effort to make it sound more meaningful or worse still, a regurgitation of selfsame language in a jargon laden 'knowledgeable' article purporting to understand the technicalities and wonders of artificial intelligence via some hastily condensed versions of the academic material.

Most investors are already aware of the key areas which are set to benefit most from the explosive growth of AI usage, from the perspective of VC style investments, but less so when it comes to the benefits from AI when it is directly deployed in active asset management



Source: Chart Plotinus Asset Management, Data Tractica

Understanding the usefulness of artificial intelligence in asset management is not going to be assisted by bandying around LASSO, NLP, DL, SVM, ANN, CA, EA/EGA[1] or any other such

[1] All of the acronyms describe what could be termed commonly used AI techniques.
LASSO, Least Absolute Shrinkage and Selection Operator Regression
NLP, Natural Language Processing
DL, Deep Learning
SVM, Support Vector Machines
ANN, Artificial Neural Networks
CA, Cluster Analysis
EA/EGA, Evolutionary Algorithms/Evolutionary Genetic Algorithms
While there is clearly a purpose in forming both conceptual and educational frameworks to 'teach' AI techniques, the specificity of the use of any technique in asset management does not make for a useful discussion in general terms. The application of off-the-shelf AI software to investment decision-making in the search for the magic

acronyms. An investor interested in learning about AI in asset management is not doing so for academic purposes; they are doing so in order to garner sufficient information to be able to make an informed decision on the merits of allocating to such a strategy.

Thus, it is necessary to provide definition to the use of AI in asset management by application (the practical) rather than by a technological (more theoretical) framework.

In this paper we hope to address the following points in a manner relevant to the perspective of an investor.

1. How to define an Artificial Intelligence Strategy
2. What differentiates this approach from quantitative strategies?
3. Concerns with regards to fund-manager selection
4. Fear of the unknown
5. Assessing long-term vulnerabilities

How to Define an Artificial Intelligence Strategy

What is an artificial intelligence strategy? This may seem like too obvious a starting point but given the newness of the field and the necessity to help differentiate it from simply, the use of artificial intelligence, it requires definition.

An artificial intelligence strategy is where AI technology is applied to trading, in other words Artificial Intelligence Trade Decision-Making.

> "The question is, is this reflecting an actual change or is it just the natural progression of gaining access to better machinery accompanied by cosmetic rebranding?"

The origins of this approach are technological. There is a subtle but important distinction to be made between using technology to solve a pre-established question and providing a solution to a question one has not clearly recognized is there, until the solution illustrates it. Innovation has an elegant way of making discovery and success look like a foregone conclusion.

The world of finance is no stranger to the application of technology nor inspirational insight to generate competitive edge, so what if anything makes artificial intelligence different?

AI as we have already mentioned, is a broad-brush term. When one studies the current investment management landscape the terminology is seeping in many areas to describe

formula is as useful as dice, tea leaves or chicken bones. The plane to which the term AI can be attached is vast which makes for much confusion. In this context we are of the opinion that definition by practical application is the most helpful from an investment perspective.

anything from the back-office, to improved execution, to market-making, to Robo-Advisory. The question is, is this reflecting an actual change or is it just the natural progression of gaining access to better machinery accompanied by cosmetic rebranding?

The clunky (and not so marketable) algorithmic portfolio design and construction became (the more slick sounding) "Robo-Advisory" which in turn is fast becoming the more fashionable "Artificial Intelligence Powered". What has changed beyond computational improvements and the packaging?

Dynamic portfolio construction is not a new idea but one that some advocates believe can be made better, more efficient etc. This illustrates an example of a pre-existent question which can then help be solved by improved technology. In the case of Robo-Advisory, to genuinely describe it as being artificial intelligence powered, one would have to show how the technology was creating an inventive new approach to dynamic portfolio construction, which was able to be validated using the traditional metrics that guide the discipline, not just helping improve or hone what already is being done.

In Artificial Intelligence Trade Decision-Making, as one would expect, the trading system works in an entirely automated fashion. This, however, does not make it distinctive, as this is a common feature of many systematic approaches. What makes the difference is how it is arriving at those automated decisions, this is dependent on a more fundamental definition, that of intelligence.

Definitions of intelligence tend unfortunately to fall into what one might call the trap of logic. The word intelligence is described in the Oxford English Dictionary as:

the ability to learn, understand and think in a logical way about things; the ability to do this well

The precept for measuring intelligence is thus measuring the ability to think/understand logically.

Logic in turn (as per the Oxford English Dictionary again) is:

sensible reasons for doing something

Already you can see where these definitions are taking us. We are stacking up more and more terminology, effectively the '*règle de jeu*', the strictures by which intelligence can and will be measured. This is a pre-ordained schematic not unlike Kuhn's "Normal Science"[2] which is in need of some fresh inspiration.

Step back a moment and think contextually in terms of the field of operation we are examining – trading. More specifically, trading in an Artificial Intelligence Trade Decision-Making system. Trading is an area which some might consider a form of madness rather than one of logical rational thought. With its cycles of boom and bust, euphoria and dissolution, layers of behavioral and emotional components, its bubbles, etc. it cannot be comfortably defined as sensible, particularly when one considers that one's perspective on any given trade is inverted depending on which side of that trade you sit.

[2] Thomas S. Kuhn, The Structure of Scientific Revolutions.

Thus, one must be careful to not misplace the definition of artificial intelligence that belongs in more static or rule-based fields of operation and think that it can simply be universally transferred into investment management.

An artificial intelligence strategy must be built with the market in mind and its approach must reflect the nuances of that market. The AI system behind it must therefore have a “feel” for the market, a learned, sensory appreciation for it rather than a pre-ordained equation, logical sequence or academic financial model on which it based to subsequently be tinkered with by practitioners who understand experientially how models don’t work.

What differentiates this approach from Quantitative Strategies?

Artificial Intelligence Strategies deserve a definition to themselves because they do not emanate from a quant heritage, they are a new development, emanating from the creation of the technology which they then apply to the field of finance without the preconceptions of a heritage.

This is what makes Artificial Intelligence Trade Decision-Making such an exciting field: it is fresh and is creating new alternative investment opportunities at a moment when seeking new sources of yield is of paramount concern for most investors.

Differentiating AI Trade Decision-Making from AI Assisting-the-Process

	AI Trade Decision-Making	AI Assisting-the-Process
Strategy Type	Artificial Intelligence	Quantitative Management
Heritage	Technology	Finance
Style	Systematic	Systematic
Approach	New	Traditional
Use of AI	Innovation	Improvement

Source: Plotinus Asset Management

The Potential Benefits of an Artificial Intelligence Strategy over Other Alternative Investments as Illustrated by the Plotinus 2π Strategy

	Plotinus 2π	L/S Equity Hedge Fund	VC Fund	Real Estate Fund
Fully Liquid Investment?	Yes	Possibly	No	No
Marked to Market Daily?	Yes	Possibly	No	No
Exchange Tradable Instruments?	Yes	Yes Probably	No	No
Easily Benchmarked?	Yes S&P 500	Yes Differing HF Indices	Possibly Esoteric Benchmark	Possibly Esoteric Benchmark
Transparent Risk Management?	Yes	Possibly	Possibly	Possibly

Source: Plotinus Asset Management

"AI assisting the process is not the same as AI Trade Decision-Making"

It is frequently and incorrectly assumed that because artificial intelligence strategies are systematic computer-driven approaches, utilizing mathematical and scientific methods in the attempt to create winning strategies, that they are therefore quantitative strategies. This assumption though understandable, fails to recognize an important distinction between the two.

Artificial intelligence is an evolution of technology and it is likely being deployed in some form by many if not all of the major quantitative managers. This though is to continue to improve and develop new opportunities within these pre-established investment processes. In essence this is a form of continuity which should be defined as AI assisting-the-process. A quantitative strategy as understood, remains a quantitative strategy regardless of the specific technologies being used to assist it. AI assisting-the-process is not the same as AI Trade Decision-Making.

Quantitative strategies, are around a long time and have at this stage a longstanding pedigree, allowing them to be placed into subsectors that help define them, such as statistical arbitrage, equity market neutral, macro/global asset allocation, systematic CTA and risk premia. Investors are familiar with these subsectors and the kind of strategy types that each subsector offers. They understand the various investment processes involved and how to assess the risk/return merits

The coherent thread linking these subsectors is that all use computer driven systematic approaches. The way in which this approach is driven, differs from manager to manager, be it intensive machine learning, capitalizing on rapid analysis of mispricing or factor investing. When we consider the evolution of quantitative strategies, it parallels the development in technology as its progress has been applied continuously to assist these investment processes in some cases for over 40 years. Now is no different, when AI (as a further technological development) is deployed in this context it is to improve upon the pre-established process of a strategy within its subsector.

Concerns with Regards to Fund-Manager Selection

Many potential investors find this newness a daunting prospect. How can investor confidence be built around a strategy type that lacks the kind of investible pedigree that more familiar investment approaches automatically have? For example, staff with a combined 60 years of experience at some leading investment bank or hedge fund is not necessarily a good yardstick by which to measure the potential benefits of a new strategy approach that begins life beyond the pale of finance, the very origin of which is innovation from outside of the industry to inspire new ways of gaining an investment edge.

A common first question is, what is the artificial intelligence component that makes this any different than some already existent approach? In other words, how does it work, or why does it work? Such skepticism on the investor's part is well warranted, and in fact the response of the AI manager is crucial in terms of assessing how selectable a manager is.

"Have we not arrived at the point where human decision making in these systems has long been relegated to irrelevance? "

An investor's skepticism should be met with a resonance on the part of the manager. We would go so far as to say that at the core of a successful artificial intelligence approach there must be a deep human skepticism and self-critical thought. It is this relationship between the human managers and the AI technology they are deploying that defines an AI strategy. That is key.

Why might one ask, is a human component even relevant? Have we not arrived at the point where human decision making in these systems has long been relegated to irrelevance? This is where investment reality starts to distinguish one form of artificial intelligence from another.

Blind, unexplained adherence to the actions of machines does not make a good investment strategy for investors. The "it has superior thinking of which we mere mortals have no comprehension" might be the route to garnering believers in the god of technology but it will not help the wary investor appease their fear of the unknown blow-up around the corner, no matter how good past returns may be.

Warning Signs

It is particularly important not to be distracted by a universal sounding version of artificial intelligence. There is no one-size-fits-all approach. There is no generic AI in investment management and if that is what one is being presented as an investor, then it is highly recommended to stay clear of it. Promises of easy solutions belong in the realm of theory, not the practical world of investment.

Beware, when an artificial intelligence system is right and the human manager's explanation to the "Why is that?" question is, "I don't know". To take an analogy, this is the equivalent of having walked out quite far on a frozen lake.

The unknown generates fear. The duration of all previous success up to a point cannot allay the fear generated by the not knowing why this success has been the case. In fact, it compounds it.

To return to the analogy, the longer the duration of unexplained success, the farther you have walked out across the ice. The problem is you do not know if you are at the beginning of a new ice age (the knowledge of which would eliminate all fear and allow for bold striding across the lake), or alternately that a heat wave is at hand, or simply, all things being equal, the ice thins the farther you go away from the shore.

Confidence

Although the lineage of artificial intelligence can be traced without difficulty to the 1950's one should be aware that outside of AI assisting-the-process, the lineage of AI Trade Decision-making is inevitably a short one. In fact, it cannot be otherwise, this is a consequence of newness and is an inherent risk that must be factored in when adopting an AI strategy. This risk inclusion must form part of the manager selection process whilst being carefully weighed up against the benefits of early adoption, what clearly can mitigate this risk for an investor is the strength they experience from the manager.

With investment management comes significant responsibility. The analogy of the lake is used here to illustrate that there are serious consequences if the ice breaks.

Artificial intelligence used in other circumstances would not evoke such an analogy, in the case of its application in e-commerce, for example, getting things wrong is part and partial of how the overall benefit of using AI works. Hence in that case the lake becomes an inch-deep puddle, and the cracking of the ice would be irrelevant.

Ideally the artificial intelligence manager is a hybrid between the human and the technological, humans using assistive technology to their benefit. It is important to remember that finance is a human construct that is meaningless at a machine level. In addition to positive returns, investors need to be provided with explanation, and the building of confidence and trust, not sterile outputs. This is the human side of the management role, in addition to stimulating creative, innovative investment ideas founded on solid research and development that exploit the technological advantages of AI.

The world is changing. Artificial Intelligence is the next threshold moment in the development of technology. Across all sectors of industry this technology is transforming the way business is done.

Plotinus provides investors with the opportunity to avail of AI technology and bring an AI Strategy into their portfolio.

Plotinus

Asset Management

Plotinus Asset Management serves qualified investors with financial approaches that exploit artificial intelligence. It provides investment advice and fund services to institutional investors and private clients.

Plotinus Asset Management is a Cayman Islands registered fund manager established to deploy the proprietary AI trading technology of Plotinus Ltd. It is registered with the US Commodity Futures Trading Commission as a Commodities Trading Advisor and as a Commodities Pool Operator. The firm is a member of the US National Futures Association.

plotinus.ai

Plotinus Ltd is a Northern Ireland-based AI advanced technology firm founded in 2013 with the support and backing of Invest Northern Ireland, a UK Government Regional Development body, and the EU European Regional Development Fund.

Fear of the Unknown

Unintelligibility

Quantitative strategies provide a road map for investors interested in investing in artificial intelligence strategies. The stereotypical image of the quant was once that of someone so steeped in financial rocket science that it would be impossible for them to explain the complexity to the average sophisticated investor. That said however, it is not difficult to grasp the concept of 'pairs' behind statistical arbitrage, for instance, investors got it conceptually without needing to delve into the complexity underlying much of its modelling.

Hence the fear of not being able to comprehend artificial intelligence technology should not be a deterrent for interested investors. The AI manager must be in a position to be able to explain, in investment terms, what lies behind the investment process at a conceptual level.

Furthermore, the perception of a black-box mentality that alienated some potential investors from quantitative managers, also provides guidance for artificial intelligence managers. AI has the potential to create opacity to the power of 'n' and it is vital that AI managers do not make the same mistakes by maintaining the black-box mentality, instead opting for explanation and clarity.

Concerns and Worries

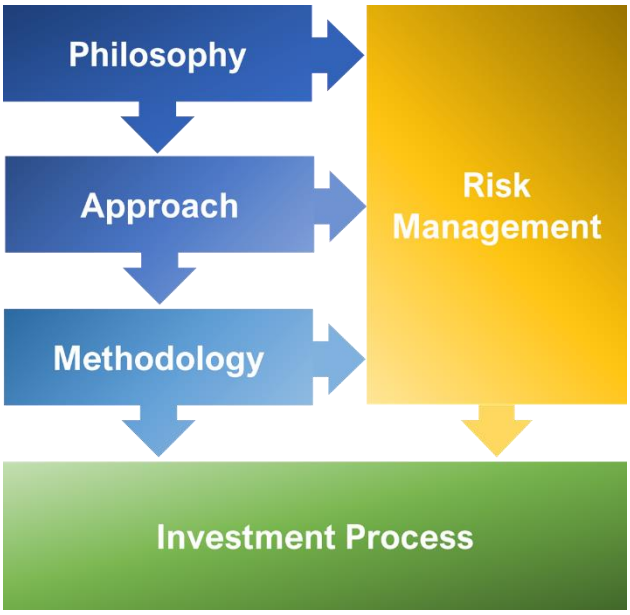
The concerns with regards to investing in an artificial intelligence fund are two-fold.

The first are those pertaining to any new fund type. It has not been tried out before, hence there will be uncertainty over sustainable returns, stability of the investment style and its long-term strengths.

With artificial intelligence however there is second potential layer of fear, perhaps not as tangible as the first set. In this case it does not pertain to asset management but to AI more generally. There is a disquieting sense of a loss of control when faced with the prospect of a machine making the decisions.

This is a matter of trust; it does not magically appear. A systematic approach to decision making can be experienced as being threatening. It is often through the "what if something goes wrong?" that this sense of threat is expressed, however in reality, the threat is not so much that something might go wrong, but more the sense of letting go of control. Human beings are severely error prone but much of this error proneness is blurred by subjective judgement. At the core that subjectivity requires the maintenance of being in control, even when this is illusory and potentially detrimental, giving oneself a false sense of comfort or confidence. Hence surrendering decision making control to a machine, for some, goes against one's subjective "better" judgement and requires a human leap of faith.

A New Approach – A Familiar Framework



The suitability of an Artificial Intelligence Strategy can be assessed by a prospective investor using well understood investment criteria which can be applied to any investment strategy

Source: Plotinus Asset Management

Assessing Long-term Vulnerabilities

A major source of concern for an investor with regards to a new approach is its sustainability. One wants to see as an investor that there is a repeatable process involved which will be able to offer returns in a continuous way over the long-term. With regards to an artificial intelligence strategy, this has two aspects that must be considered. One pertaining to the strategy itself and the second pertaining to the investment manager.

The Strategy

The classic questions of philosophy, approach, methodology and risk management must all be answerable. The real strength of an artificial intelligence strategy is the extent to which it can comprehensively meet the investor's requirements in response to questions about these four areas. They are the skeletal framework for any successful investment strategy regardless of the techniques being applied to achieve that goal. An AI strategy that illustrates its deployment in the context of this framework, allows for an investor to assess its merits from an investment perspective not from a technological one. This is very important, because this is where the technology's use as an investment strategy either makes sense or it does not, thus answering the investor's key question, "Is this worthwhile investing in?"

The Investment Manager

The investor should expect an artificial intelligence manager to provide a new source of returns through the innovative application of this leading-edge technology. Beyond this, the key components are thoughtfulness and vision. This is where one can filter out a clever, from a deeply-considered approach. It is not sufficient to use an AI strategy just because it appears to work, without evidence of what it means or might mean when it does not work. The allure of new technology fades quickly in the light of disappointing performance. The manager must illustrate to investors the solidity of the approach in which the AI is deployed, to engender the confidence to invest. It is the depth of the manager's understanding of error and their forward thinking on how long-term performance can be protected and sustained, in a word, their vision, that inspires that investor confidence.

A manager must have a comprehensive response as to how they are dealing with not just the development of the strategy, but how at a broader level, they are dealing with the specific future uncertainties that pertain to artificial intelligence. How for example are they dealing with data, what are the future potential vulnerabilities of that data? Are they taking into consideration future regulatory or usage restrictions that might cause their strategy to become defunct, not because of the fault of the strategy but because for example, a data usage problem? Big data and alternate data may on initial hearing seem like the great sources from which edge will be almost mystically be gained, but investors should be wary of magical answers stemming from a cauldron approach to AI. The more data you dump into the cauldron the better the answers will be… These are some of the considerations that the investor should be aware of in assessing the durability of an artificial intelligence strategy.

"…there clearly are potential latent problems in yield offering alternatives which involve long lock-up periods and valuations that are difficult to determine. This is one area where artificial intelligence strategies have something different to offer. Where the technology is deployed in liquid exchange traded instruments, both the need for long lock-ups and opaque valuation surprises are eliminated"

Conclusion – An Opportunity Not to be Missed

Artificial Intelligence Trade Decision-Making presents investors with a new alternative investment. It is necessary to emphasize that it is not just another subset of quantitative strategies. It is something distinct with different advantages and applications, not as a challenger to these pre-established approaches but as something new that can be used to complement traditional strategies.

This is particularly relevant now as investors review portfolio allocations in light of 2020, which for many will be defined by the unprecedented effects of the coronavirus pandemic and the clear disappointment with how some investment strategies have performed. Take for example in the quant space; equity market neutral, risk premia and macro/global asset allocation[3] which one might have expected to help mitigate losses, benefit from the turmoil, or manage volatility.

With increasing pressure on the search for yield, many institutional investors are having to search beyond their usual approaches and are expanding the size that alternatives can occupy in their portfolios. This is in keeping for example with the large increase in inflows to VC funds over the last few years.

However, given the general uncertainty of the outlook in the aftermath of the coronavirus, and the very varied global, regional and sectoral economic outlooks, there clearly are potential latent problems in yield offering alternatives which involve long lock-up periods and valuations that are difficult to determine. This is one area where artificial intelligence strategies have something different to offer. Where the technology is deployed in liquid exchange traded instruments, both the need for long lock-ups and opaque valuation surprises are eliminated.

A recent McKinsey survey found that 66% of respondents across all sectors experienced revenue increases this year as a result of AI adoption[4]

The rapid permeation of artificial intelligence technology into so many business sectors is well noted. When for example high-profile investors like Mark Cuban focus on AI adoption, this perhaps shines a more general light on it and helps reinforce the perception that a watershed moment in business is taking place and that the astute should get on board before missing out. There are inherent benefits for early adopters of successful technological advancement. However, as time passes those opportunities are fast disappearing.

[3] According to Aurum's October Hedge Fund performance report YTD quantitative hedge funds were down -8.47%, with Equity Market Neutral the worst performing at -16.49%, Risk Premia at -11.52% and Macro/Global Asset Allocation -8.42%.

[4] McKinsey Analytics, The State of AI in 2020, Nov 2020.

Fortunately, investment management is one area where opportunity is still ripe. As a result of its need for necessary caution, the industry is naturally skeptical and is slower than others to engage with the novel, waiting to do so only when time has been taken to prove and become convinced of its value.

This means that although artificial intelligence strategies still have a mantle of newness, they have also had to prove their mettle over years, in tried and tested investment metrics. The result of this is that AI managers that are capable of passing the rigors of the manager selection process, are battle hardened and substantive, and are only coming of age now after several years of existence. Most have spent this time stealthily under the radar as they moved through the stages (more familiar to the tech start-up) from concept, through intensive R&D to the next (and distinctive stage), a chrysalis of active trading to emerge as ready-to-fly managers. It is this grouping that stand to capture the attention of investors who are suddenly awakening to enormous potential of AI in general and seek its opportunities in investment management.

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Plotinus Asset Management is happy to discuss how we invest and explain in detail our investment methodology, please feel free to contact us to schedule a conversation.

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