

Thinking
Ahead
Institute

**Going above and beyond:
stronger investment theory and practice**

Pre-publication version 1

Overview

We argue in this paper that there are significant limitations to mainstream investment theory and how it is used in investment practice. This creates significant issues for the decision making of our investment institutions (asset owners and asset managers). It creates challenges for those providing investment education like the CFA Institute and business schools and related issues for investment professionals with respect to their training, development and practice.

We suggest that mainstream theory makes insufficient allowance for the investment industry's inconvenient truths - principally real-world behaviours and the impacts of institutions, governance and regulation. There are large variances of practice from what rational 'econs'ⁱ would pursue. In addition group decision making further departs from rational economic assumptions. As a result investment decision making relies heavily on accepted and established practice ('folklore'ⁱⁱ really) which is essentially backward looking.

We identify a stronger investment model that incorporates these stronger-practice organising principles:

- Stronger governance practice captured in mission clarity, values and beliefs, and the synchronisation of principles, governance, business model and investment framework
- A stronger framework for value creation, risk, long-horizon investing and sustainability
- Stronger portfolio construction practice: factors and buckets as classifications ranking ahead of asset classes; portfolio quality rating of multiple criteria ranking ahead of optimisation.

We apply these stronger-practice principles to the investment model, cultural model and business model for both asset owners and asset managers. We promote a complexity framework as superior to one based on mainstream theory, allowing us to go *above and beyond* current practice. It also fits well with the multiple circumstances of the investment industry.

1. Limitations of mainstream theory

The aftermath of the global financial crisis has resulted in mainstream finance theory being seriously challenged. In our view poor theory and questionable practice contributed, alongside a number of other factors, to the destruction of considerable economic wealth in that crisis. Not surprisingly, we think the search for better theory and accompanying practice is an important one.

The most significant limiting factors in mainstream finance theory are:

- The unrealistic ambition that still grips the academic world to build an elegant unified theory for investing when complexity is innate to the system
- The reluctance when building the foundations to investment thinking to acknowledge that the system's features have significant subjectivity and ambiguity, and no amount of data analysis can overcome this property of the systemⁱⁱⁱ
- The reality that institutional behaviours matter and so understanding the impact of the incentives and behaviours driving institutions is critically important^{iv}.

We define mainstream or prevailing finance theory as the theory taught at major universities and business schools. It is part of the core CFA curriculum^v and is what appears in major journals.

The basics of investment finance theory can be distilled down to a number of axioms: equilibrium, rational expectations, complete information, representative agent; and some connected theories: market efficiency, capital asset pricing model (CAPM), mean variance optimisation, alpha-beta separation.

The strength of any theory depends on its ability to predict real-world outcomes. Therefore the big issues lie simply with the multiple shortcomings when it comes to putting such axioms and theory into practice. The most obvious issues are these, all visible in today's investment environment:

- Financial crises are not recognised as theoretically possible
- Theory assumes all representative agents view risk the same way, whereas in practice all agents differ in their view of risk; in particular if risk is defined as impairment to mission, one especially important concept, its nature is highly sensitive to investors' specific contexts
- Markets (and economies) provide very incomplete information
- Markets embody many behavioural inefficiencies
- Theory fails to account for the influence of group decision-making dynamics (the role of institutions) or ethics
- Mean-variance optimisation depends on assumption robustness and treating risk as volatility, both of which are highly dubious.

The full list of issues is beyond the scope of this paper but our long paper gives more detail^{vi}.

This has left the investment industry in a bad place. It has had a theory which has been rich in ambition but poor in substance. That said, the problem is not so much that mainstream practice is using bad theory but that mainstream practice is not relying on any accepted theory. We observe that investor practice has increasingly become removed from the investing theories. The beta of CAPM is rarely considered, mean-variance optimisation has shrunk in significance, alpha-beta separation is increasingly rejected by leading practitioners.

In the place of operating through theory, investing is making its way under the guidance of accepted practice and the dominant paradigm that is driving practice is backward-looking 'folklore'. The definition here of 'folklore' is *the established and accepted way things are done*. We assert that an industry which makes its way by reference to such loose foundations will struggle.

Having reviewed mainstream finance theory and other theories and framework thinking that challenge, supplement, and to some extent replace the mainstream (see long paper), we conclude that a new coherent framework to understand and interpret the intellectual debate is needed. We believe that not

only do we need to embrace a new mind-set that the world isn't machine-like, but investors also need a new set of principles and tools to handle more realistic descriptions of the world.

2. Alternative investment theory

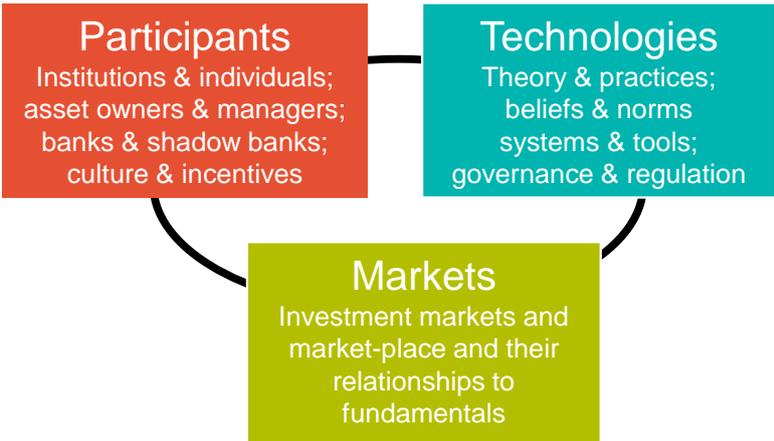
What might stronger theory look like? We advance the case for a complexity (or 'ecosystem') framework in which multiple organisational, technological and market-related strands are recognised, strong beliefs are in place to support its dynamic properties, the nature of the inter-connections are identified, and diverse theoretical disciplines provide the deeper understanding needed.

The arguments about alternative theory are necessarily detailed (see long paper). We take a succinct approach in advancing the complexity framework as a foundation of better theory on the basis of the argument that complexity is both a high-level [more general] formulation (that is helpful) and a widely-drawn systemic framework (that is also helpful). Hence we see the framework as going *above and beyond* mainstream practice in a way that fits the multiple circumstances of the investment industry.

The merits of such a framework are that we can study the components of the system and observe how the system-level behaviour emerges from the interactions between those components. A complex system is a system where *"the whole is greater than the sum of the parts"*. Complex systems exhibit emergent properties arising from the interactions of the agents that cannot be deduced simply by aggregating the properties of the agents.

We postulate that financial markets are obvious examples of complex systems. There are many types of agents (investors, intermediaries, and regulators), using the existing technologies (the theory we are discussing, governance and regulation), and who meet in markets (exchanging securities) and marketplaces (for products and talent). Please see Figure 1 for a simple illustration. A fuller description is in the long paper.

Figure 1. Investment industry as a complex adaptive system



The interactions of the participants, technologies and markets are two-way. This introduces a reflexive quality to the system that involves the fundamentals in markets affecting and being affected by the actions of the investors themselves. This factor is at work in the issue of markets never quite reaching an equilibrium – the investors revise their view of equilibria on some continuous basis, and so the

Panel: stock market volatility and complexity

More than 30 years ago, Robert Shiller* showed that stock prices moved too much (he suggested 5 to 13 times too much) to be justified by variation in subsequent dividend payments. In other words, changes in price cannot be fully explained by changes in fundamentals, which seriously challenged one of the central tenets of mainstream investment theory - market efficiency.

Not that long ago on 24th August 2015, global stock markets experienced one of the worst days since the global financial crisis, following China's "Black Monday" when Shanghai's main share index closed down 8.5%. Investors around the world attributed the sell-off mainly to the increased risk of a Chinese economic hard landing.

The wild intraday swings were interesting from a complexity viewpoint. The Dow Jones Industrial Average, which tumbled as much as 6.6% early in the day, ended the day off "only" 3.6%. Did anything fundamental happen during the day that led investors to believe maybe things were not nearly as bad as previously thought just a few hours ago? Probably not. Instead, we believe this showcases the limitations of mainstream investment theory in interpreting and understanding real-world phenomena in financial markets.

A complexity world-view would start with the assumption that there exists significant variation in beliefs arising from uncertainty about future conditions (eg interest rate rises, China, emerging markets, commodities, world growth outlook). This is in sharp contrast to a mainstream position where everyone has the same complete information and understanding and makes rational decisions. As a result, when fundamentals change, for example in this case evidence of slowing growth in China, investors cannot agree on how to correctly price such an event.

This is sometimes referred to as pricing-model uncertainty. The market is volatile until a new consensus is reached on relative and absolute prices. Before the consensus is reached, mistakes will be made and sometimes these mistakes are correlated. That would explain the spike in intraday volatility when investors were searching for a consensus. Again, this is in stark contrast to a mainstream view where the size of market moves is driven by rational, instantaneous reactions to new exogenous information.

Reflexivity is an important additional element of complex financial markets. Financial markets can affect the fundamental values they are supposed to reflect. From this perspective, the Chinese stock market crash could indeed create a wealth effect that acts as a headwind to the real economy, a linkage that is missing in the mainstream field. Another key concept is positive feedback, the self-reinforcing asset-price changes in financial markets. The presence of both positive and negative feedback can be seen as a defining property of complex systems. The equilibrium in mainstream theory is only compatible with having negative feedback. But the real-life financial market exhibits results from the interaction of both forces. When negative feedback is the dominating force, financial markets can indeed converge to a temporary equilibrium. In that sense the equilibrium-heavy mainstream finance theory is just a special case of complexity finance. On the other hand, excess volatility or even bubbles and crashes are entirely possible when positive feedback is dominant.

* Shiller, R (1981). "Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends?", *American Economic Review*, 71, pp. 421-436

system never rests. This also gives rise to one of the few axioms that is present in investing – that past performance is no effective guide to the future. The underlying return-generation mechanism from the past will always change and therefore not explain the return generation of the future. This significantly limits the power of empirical methods in developing investment theses and has implications for the significance of big data applications that we refer to below. In the side panel, we show an example of

how complexity theory can provide a better interpretation and understanding of the behaviour of financial markets, focusing on market volatility.

Complexity theory with its high-level formulation has the flexibility to draw on other theory and research disciplines, notably:

- Management science including game theory and network theory
- Evolutionary biology and neuroscience
- Anthropology and behavioural economics.

This mirrors a wider trend in the commercial and business environment that benefits from applying diverse thinking, other disciplines and perspectives.

The place of digitalisation and big data must command some attention in this list too. While investment has been slow to undergo a digital revolution, the signs are that this field is gathering significant pace. Evidence for this lies in big data applications to financial forecasting, algorithmic trading, personal financial planning and macro-economic analysis.

That said we should recognise certain special factors that may limit its impact. The inferential power of empirical methods has been very low due to the high noise environment combined with the reflexivity in the system which renders the past as an imperfect guide to the future.

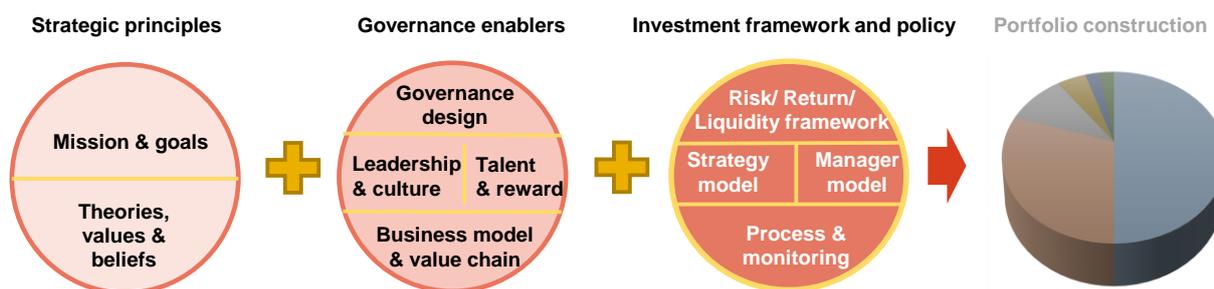
Will increased range and depth of data-sets improve matters? This will remain a challenge we think, in part because of current biases and the limits to stability in the system. Most financial economists and many investors act as if the stability and inferential power are unrealistically high. In other words, there isn't enough proper recognition of ambiguity in the system. The testability of any investment thesis is low and the empirical discussion part is often done in a highly selective fashion. As an example, we are still reeling from the role of mispriced structured products such as CDOs and CDSs in the global financial crisis.

Big data will have significant impacts if we can link the step-up in data sources with a step-up in explicit models of reality. If big data is applied to lighter understandings of reality, then we will encounter major issues in data mining and contribute only minor understanding to the field.

Notwithstanding these issues, we can expect scenario analysis and other modelling methods to increase their influence on investors. Agent-based modelling (ABM) in particular is increasingly needed. The complex financial system that needs to be analysed and understood exhibits considerable physical and economic interdependencies, while decision-making processes are substantially decentralised. That character is neatly matched by the advancing computational power and the level of granularity of the data that can be captured. This makes a bottom-up modelling approach feasible and an improvement on prior modelling approaches. Unlike any conventional equilibrium model, agent-based models do not impose order or design on the market from the top down. Instead, they use a bottom-up approach which assigns particular behavioural rules to each agent. This allows ABMs to take input from a variety of fields mentioned earlier, in particular behavioural economics, game theory and network theory.

3. Stronger practice

Figure 2. Investment organisation process map



The critical challenge we face in investing is successful practice. Building strong practice starts by looking at the strategic and operating components of investment organisations as set out in the 'process map' in Figure 2. This framework is similar between asset owners and asset managers with four discs describing the end-to-end and inter-connected actions of each institution. The first disc from the left speaks about the need to have strategic principles as foundations for any organisation. This starts with a clear strategic mission, the stakeholder map (essentially the parties who are intended to benefit from the mission) and the goals associated. The principles extend to the theory we can rely on and the beliefs and values that are fundamental to any organisation.

These then drive the enablers of the organisational machine and its ways and means to mission success. These are ways of working – principles, process, resources and structure; and means of achieving goals - talent and reward, culture and leadership, business models. There is the mix of internal and external resources to get the work done in the business model of the asset owner – the value chain. The business model for an asset manager mostly concerns the product mix, their value chain and distribution model, and the features that characterise the set of value propositions that deliver value to the clients.

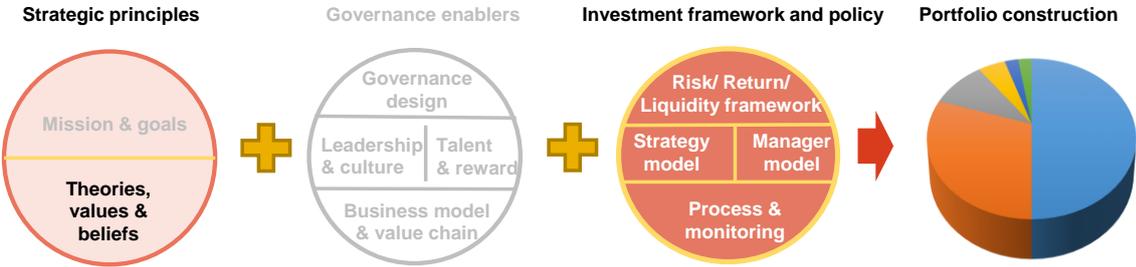
The investment framework and policy comprises the thinking and processes that generate portfolios. This disc contains the key investment decisions that need to be implemented: this varies by investor but includes strategic asset allocation, dynamic asset allocation, portfolio construction, manager selection, all within a risk-managed framework. How that discussion is facilitated within the organisation has become increasingly important. It calls for leadership skills of the highest order. We suggest the Chief Investment Officer (CIO) has a critical role to play in both asset owners and asset managers as well as advisors and fiduciary managers in:

- leading the process of forming, maintaining, socialising and evolving beliefs
- defining the framework
- holding the organisation's investment team to account in their respective portfolios.

These three activities have become a key function for CIOs to play in the shaping of the investment process in their own organisations. As a side-comment we feel this leadership role has got somewhat lost with the passage of time.

As shown in Figure 3, the three main parts of a typical investment process need to be seen together where investment beliefs and values are starting points. They segue into the framework and policies which are in turn stepping stones to portfolio construction where individual critical judgement kicks in. The Appendix contains a case study example of this structure of investment process.

Figure 3. The end-to-end investment process



All investment organisations own the first step of the process (strategic principles), this would be very hard to outsource. Investment framework and policy and portfolio construction can be insourced or outsourced in large part. Portfolio managers have responsibility for building the portfolio guided by the framework and policies. The CIO, insourced or outsourced, is the person who ensures the quality, robustness and holistic nature of this sequence.

We consider now what are the critical features of stronger practice in the beliefs system.

3.1 Stronger investment beliefs

We believe a coherent set of strategic principles is critical to generate successful outcomes and meet the mission. Within the strategic principles there should *in theory* be a role for a solid theoretical framework describing how the investment world works and guiding investors’ actions. But *in practice* that framework is very limited for the reasons discussed earlier. This puts beliefs and values in the key position to act as the replacement for that theoretical framework in this sequence.

NEST - the UK’s prime DC investing institution - has a view of the situation that illustrates elegantly the important role of investment beliefs^{vii}.

“Investment theory and practice have evolved considerably over the last fifty years. Despite this there is no generally agreed objective framework for investors that adequately describes how to view capital markets, or how to apply these insights for investment purposes.” ... “Investment beliefs accept this reality and are established by investors to provide them with focus and assist effective decision making in a complex environment.”

Investment beliefs are high-level principles and subjective thinking that guide the investment organisation to certain types of decisions and content. They normally encompass the full spectrum of investment issues: mission, goals, risk, time horizon, alpha, beta, smart beta, governance, sustainability and other areas. They should be broad in recognising multiple strands and deep in recognising complex investment features. They lie at the intersection of investment thinking and organisational culture, leadership and process and include the unique context parameters of the enterprise as much as the investment content.

Strong investment beliefs are accurate, documented and validated and need to be consistently applied in the decision-making process at all levels. The best investment beliefs are smart (reflective of good insight) and edgy (reflective of competitive positioning).

The process of developing shared beliefs involves considering something inherently abstract (“soft”) and codifying it in a clear and more tangible form (“hard”). Investment beliefs are inevitably subjective and as a result may differ across team members in the organisation. So achieving a level of alignment is one of the key criteria for success here; that is, the members of the organisation need to be aligned in supporting the adoption of certain beliefs. We suggest that in practice this is more about a settlement than a consensus.

Putting beliefs into action is the acid test of course. Good belief systems will be translated into actual strategies, policies and decisions. Using them in practice requires some discipline but the outcomes of aligned and actionable beliefs are more coherent decisions.

Asset owners, particularly some of the larger ones, have made progress with their investment beliefs notwithstanding the cultural and behavioural challenges of group deliberation and decision-making that make success difficult.

On the other hand, asset managers have had issues with their investment philosophies and beliefs. Notably, there is evidence that less attention is now given by asset managers to their investment philosophies and beliefs relative to a decade or two ago. This is probably caused by the increased product specialisation and appetite for alpha-focused investment mandates. In that environment, the mandate and benchmark given to asset managers define much of the investment philosophy and it may be that these benchmarks constrain the development of smart and edgy beliefs as a result. Business objectives and product mixes may or may not be in sync with sound investment philosophy.

The panel below presents a short case study of how CalPERS, a leading US pension fund, has strengthened its investment belief system^{viii}.

Panel: investment beliefs – the approach used by CalPERS

- Ten core investment beliefs ‘owned’ by board and staff developed in highly intensive change process using strong alignment/socialising principles
- The core beliefs were succinct, the sub-beliefs were smart and edgy
- Investment theory is unsettled, so strong thinking and judgements were key
- Focus, coherence and time-efficiency are achieved in decisions which are complex, sensitive and have competing issues
- The framework also helps integrate different parts of governance – members of the board, the executive team as well as a variety of investment service providers
- In addition, it helps decisions to be subject to greater transparency for the benefit of beneficiaries and stakeholders
- CalPERS’ focus on beliefs has resulted in particular attention on two hard-to-settle areas – risk and sustainability.

3.2 Stronger framework

Let's turn to the next step of the investment process in Figure 3 – investment framework and policies. Our focus here lies on the foundations of practice that are central to all investment funds: value creation and risk; long horizon investing and sustainability. In each area we start by presenting some belief statements (in italics) that are assembled for illustration.

Value creation

Value creation starts with aligning passive portfolios to institutional missions and goals.

Further value can be created (and destroyed) by departing from these passive portfolios both from alpha (stock selection) and beta (asset class selection) positions.

Active management is a highly competitive activity but worthwhile in certain areas; successful use of active management requires skilful selection of skilful portfolio managers or outside firms.

The idea that value can be created by asset owners in appropriately designed passive portfolios is not a common perception. But the central premise of investment funds is that they have a mission to meet certain stakeholder goals and that risk bearing is integral to that mission. So identifying the ideal risk amount is intrinsically a value-creating decision and increasingly asset owners use the reference portfolio concept to do this – the passive liquid portfolio mix of equities and bonds that carries appropriate risk levels as decided by the asset owner board. In setting the risk preference over time, many funds may view a dynamically-changing risk exposure as optimal^x (see panel on mission impairment).

Investing passively in line with the reference portfolio is consistent with beliefs that markets are largely efficient and difficult to out-perform. Although markets are generally competitive and adaptive, they are not always completely efficient, providing legitimate reasons for exploiting market inefficiencies. However such opportunities will decay rapidly in a market that works as a “search engine” for profitable opportunities. In the market when defined as an ecosystem we will experience the coexistence of the creation of the new alpha opportunity and the decay of the old alpha opportunity, which encourages investors to be dynamic in their active management.

Inefficiency represents the necessary condition for active management, but for sufficiency there have to be the internal skills to successfully exploit it. Here the difference between asset owners and asset managers comes up. For the asset manager their business is mostly premised on ability to out-perform benchmark indices. For the asset owner the value creation is drawn wider into multi-asset portfolios where stock selection and asset-class selection are involved and the added value may either reflect direct decisions or outsourcing decisions through manager selection.

We conclude that stronger practice in value creation:

- starts with strong investment content that pinpoints market efficiency and inefficiency and the consequent opportunities for passive and active management
- incorporates strong investment-context beliefs derived from self-knowledge on internal ability to exploit market inefficiencies after costs, reflecting how their ability compares with others
- ends with disciplined implementation aligned to beliefs in which the organisational settings of mission, enablers and investment policies are in sync.

Panel: risk as mission impairment

In TAG's 2012 publication "The wrong type of snow" we suggested that the risk event that we should be most concerned with in risk management is the one that leads to a permanent impairment in the investor's mission.

Mission in this context is the multi-period and multi-stakeholder value-creation proposition. Mission success depends on a certain amount of wealth being created over time and wealth creation requires investment risks to be taken – with exposure to economically justified risk factors. Taking this investment risk, however, introduces the possibility of mission impairments – most often this is that the assets are insufficient to meet actual or projected liabilities or wealth targets.

Through the journey plan, commonly defined as the route by which investors intend to progress to mission success, there are both within-horizon risks (where poor outcomes compared to expectations along the journey plan lead to a requirement to adapt) and end-of-horizon risks (where shortfalls indicate mission failure). In dealing with within-horizon risks, an important concept is introduced – the adaptive buffer.

Adaptive buffers have both financial and non-financial aspects. For example, financial capital is clearly critical for an investor to produce results and ultimately secure a mission success. Most investors operate with certain financing expectations and the issue is how the financial inputs (e.g. sponsor support for a DB pension fund) can be increased given poor outcomes. Non-financial adaptive buffers include human capital, governance capital, political capital and emotional capital.

Risk

Risk is multi-faceted and unique to each investor.

Risk is mostly about impairment to the mission and much less about volatility and tracking error.

Risk is the fundamental building block to return; investors should take on risk they are capable of managing to achieve the returns their mission requires, this involves diversification across the portfolio and across time.

The central element of investing is achieving success with a unique fund-specific mission which specifies the stakeholders and time horizons that need management. Risk is particularly concerned with the chance that mission goals will not be met (more on this in the panel). The definitions used in mainstream finance are narrow and cannot reflect any mission-specific issues beyond basic risk preference.

This dimension of risk with respect to its uniqueness to each investor is essentially a widening of the risk concept relative to the restricted version in mainstream theory.

In addition, the risk concept needs deepening. This is a formulation that picks up a number of more complex elements – fatter tails (extreme events happen more than expected), non-stationary time-varying aspects, asymmetrical distribution where the nature of risk can only be described by considering the whole return distribution (see long paper).

But there is also the need for a lengthening of the duration of the risk. While mainstream finance risk is calculated from measures that are daily or monthly, longer term risk is really about periods as long as decades and consistent with missions that are multi-decade in nature.

In addition when we see risk in the context of mission success we must understand it as a multi-period concept. Our focus on portfolio diversification and portfolio quality must be complemented with time diversification where risk management planning is critical. This risk planning (sometimes referred to as

'journey planning') is determining the pace at which investors plan to achieve their missions given the time horizons that matter and conditioned by the progress they make. Optimal time diversification of risk requires a levelling of the money-weighted risk exposures over time. The risk management plan sets out a trajectory for the size of the risk budget over time focused on achieving the mission and managing the risk of mission impairment. The choice of risk measure for the risk budget will reflect the particular mission (and volatility is wildly inappropriate, we have advocated separately in 'Wrong Type of Snow' for using Continuous Value at Risk in many circumstances).

The risk management plan is developed through understanding which risks matter, defining the minimum-risk position if possible, understanding risk capital/buffers and limits. Such thinking can be translated into the creation of a time series of reference portfolios that define the low cost simple strategies over time and set the accountabilities of investors for value add.

There is one other critical aspect of this multi-period framework. This is dealing with turbulent market conditions ('fat tail risk/extreme risk/power law risk') and market regime changes. In a complex world, these suggest particular opportunities for varying the risk allocation over time and tail hedging.

Armed with suitable beliefs and skills, the investment tools available and worth considering are:

- Tactical asset allocation which gives opportunities for managing time varying volatility by disciplined views of valuation
- Systematic management of risk which would be based on market signals, particularly from volatility, and
- Tail risk management which would essentially reduce portfolio risk when downside tail risk increases and correspondingly increase portfolio risk in the upside circumstance.

Tail risk management becomes particularly necessary if there are vulnerabilities to downside outcomes which is the obvious state of DB funds in their mature phases and DC participants in their decumulation phases. This vulnerability is of course exacerbated by fat tail and extreme risk conditions.

We strongly believe that these time diversification issues need further work.

We conclude that stronger practice in considering risk:

- starts with strong investment-content beliefs that are centred around a framework for risk
- incorporates strong investment-context beliefs derived from self-knowledge on internal ability to exploit risk, reflecting how their circumstances compare with others
- ends with disciplined implementation aligned to beliefs with respect to risk measurement, management and governance.

Long horizon investing and time horizon

The time horizon of the investor (long or short) reflects their mission and organisational context.

Long-horizon investors have flexibilities that short-horizon investors don't have, and can exploit premia from their longer horizon.

Long-horizon investing typically involves a greater capture of return from income than from future sale price.

Behavioural issues make long-horizon investing difficult to execute successfully and require a particular mind-set.

Short-termism carries widely discussed inefficiencies: principally mispricing, excess volatility, pro-cyclicality and corporate myopia. In addition, short-termism appears to add to systemic risk. The possible benefits of long horizon approaches reflect these points: principally wider flexibilities to do more diverse things than short-term investors, particularly in illiquid areas and to exploit the short-term investor's risk aversion.

The subject of long-horizon investing has many elements and mixes issues of institutional design, market efficiency and behavioural finance. The time horizons of liabilities and other commitments in many investment institutions are very long, stretching over multiple decades, and provide the organisational context to long-horizon investing. A long-horizon investor as defined by context can choose to adopt both long- and short-horizon investing. The choice will be exercised by reference to the organisation's mind-set and considerations of comparative advantage.

With regard to market efficiency, the key belief concerns the time-varying nature of the risk/return trade-off. This will reflect the relative sizes and preferences of various participants in the market ecology, including regulatory environment. These factors are not stable over time because of behaviour. When fear rules the day (often referred to as 'risk-off'), investors attempt to reduce the holdings of risky assets which, in extremis, becomes a flight to safety. As all sales require a corresponding buyer the reduction of holdings either requires a long-term buyer with liquidity, or position sizes are reduced by a falling price rather than actual sales. This shows up in periods of financial distress, causing a distortion in the risk/return relationship. In extreme cases, the risk/return trade-off can turn negative. When greed rules, there is a herd-like move in the opposite direction ('risk-on') with risk increased by leverage. Again valuations may depart from normal pricing ranges.

These regimes imply there is potential value to be added at times of extreme valuation. The long-horizon investor can be dynamic to exploit good judgement with respect to prospective risk/return views. In short, there is a reasonably wide-held belief that markets have a macro-inefficiency in their long-term expectations caused by these herding behaviours, which has a natural corollary in short-term mispricing. The herding shows up in short-term momentum and long-term reversion to mean.

The behavioural elements to this market structure are all too apparent. The long-horizon investor must be a disciplined contrarian with all its attendant pressures when others are exploiting a trend. This requires the right mind-set. While long-horizon investors should benefit from lower turnover and lower associated costs, a bias to action is a common behavioural counteracting force.

Mind-set is clearly an issue for individual-level thinking but the organisational-level mind-set is particularly critical requiring clarity of goals, long-term culture and effective governance oversight. Organisations need to institutionally-embed long-term practice to secure sustainable success. This is in effect putting the organisational settings into sync. Experience suggests this is far from an easy task.

Such alignment provides the means by which success can be delivered in the major long horizon categories: particularly systematic factors, thematic factors, illiquidity, value investing and engagement

with investee companies. All these are areas where the additional flexibility of the long horizon circumstance added to the mind-set is very likely to produce a long horizon return premium.

We strongly believe that the issues surrounding successful implementation of long-term mandates need further work.

We conclude that stronger practice in long-horizon investing

- starts with strong investment-content beliefs on the long-horizon opportunities
- incorporates strong investment-context beliefs derived from self-knowledge on mission and organisational context including mind-set and how it compares with others
- ends with disciplined implementation aligned to beliefs.

Sustainability

Managing sustainability considerations, including ESG factors, is essential to long-horizon risk control; it may also be needed to manage stakeholder requirements for responsible investing.

Managing sustainability considerations can be a source of investment edge by exploiting long-horizon changes to investment circumstances, often in ESG factors, that may well materialise in future pricing.

Sustainability considers investment factors over different time horizons and the linkages between the long and short term. A strategy with good sustainability is expected to perform well in the short and long term; by contrast a strategy with poor sustainability might well have good short-term performance at the expense of long-term performance.

An example to illustrate the concept is the well-documented tendency of corporations to meet earnings guidance from a financial trade-off derived from cancelling long-term investment (eg R&D). This device involves corporations with excessive focus on “managing the numbers” boosting their short-term earnings (and hence stock performance) at the expense of the long-term performance. Such an example creates a non-linearity in which a succession of short-term optimisations with this trade-off is sub optimal to long-term performance^x. Often investors challenge long-termism with the concept that the long term is the sum of optimal short-term periods, this example shows that this thinking is flawed. Long-term strategy is different from the sum of short-term strategies, a factor central to sustainability.

In this context sustainability is a financial factor often, but not exclusively, involving ESG factors that enables long-horizon investors to manage longer-term risk. But ‘sustainable investing’ combines this long-term financial orientation with an ancillary non-financial component reflecting the stakeholder responsibility of the asset owner for their ownership interests. We might use the term here ‘responsible investing’ to make sure the portfolio avoids harmful assets (suitably defined) or is positioned to limit reputational risk (suitably assessed). In essence, this is the asset owner taking a pro-social stance to support its legitimacy in front of its members and other stakeholders and arguably for reasons of enlightened self-interest too.

There is a critical connection to be made between financial and extra-financial considerations. A tangible example is in the stranded-assets discussion and investing in fossil-fuel companies. Stranded assets are referred to as ‘extra-financial’ considerations where the ‘extra’ prefix defines something

beyond finance. The impacts on the environment of these assets are considered as responsibility factors and are in this context non-financial in nature; but, by changing the context (horizon), a link can be made to financial considerations through a belief that the future return will be affected by the impacts of stranding.

Extra-financial here includes factors that can be stretched through uncertain conjectures into longer-term financial factors. Investment in BP in the run-up to 2010 is held out as an example of this. BP's short-term period-to-period share performance was strong on top-line operating performance through lowered safety spending, but its long-term performance was ultimately handicapped by a safety accident that left certain assets stranded. This has this extra-financial dual structure in combining an issue of responsible investing with long-term financial performance.

We conclude that stronger practice in applying sustainability:

- starts with the investment beliefs
- incorporates sustainability for reasons related to long-term investing and responsibility
- ends with disciplined evaluation of the progress towards mission having regard to the investment time horizon and stakeholder map concerned.

3.3 Stronger portfolio construction

Working from the foundational theory and beliefs into portfolios requires a set of organising principles which primarily concern asset classification and assessment.

The regular classification adopted in the past and consistent with mainstream theory was by reference to asset classes and was heavily reliant on quantitative methods. These methods have become progressively discredited because they have proved inconsistent and ineffective in practice.

The merits of using risk-factor classifications have become increasingly evident. The risk factors commonly include equity, credit, term, inflation, currency, insurance, illiquidity, systematic and thematic factors although each investor may build their own set from their beliefs. While the framework introduces more subjectivity it more accurately captures the core principle that risk is the fundamental building block to return. While asset classes have the merit of clear taxonomy and historical record, they have the handicap that each asset class is fundamentally a mix of risk factors that needs to be fully understood.

This creates an ordering issue in which asset classes have a neatness to them which is helpful to the classification process, but risk factors as classes have superior explanatory power which is helpful to the selection process. This suggests that in stronger-practice portfolio construction risk factors should come ahead of asset classes, but both should figure.

The portfolio-construction principle in stronger practice is to assess and create an ordering of *portfolio quality* in multiple dimensions. The portfolio quality is assessed through a multi-dimensional range of desired characteristics:

1. adherence to intended total risk (fund-specific) and good diversification
2. good risk/return trade-off measured by expected net returns allowing for risks
3. liquidity and flexibility

4. edge, resources, scalability, simplicity, cost
5. sustainability.

The portfolio quality principle involves finding the portfolio that has the best quality in these five dimensions, something approaching a balanced score-card assessment.

The portfolio quality discipline can exploit capital efficiency. If the use of leverage enhances the portfolio quality then the discipline will support its usage. Investors are increasingly aware of the benefits and dangers in leveraging positions in this context because they can look carefully at the consequences for risk – which with leverage are highly material.

The risks and time horizons for this assessment are fund-specific in accordance with the beliefs discussions above.

On risks: the returns are always driven by the factors at work in the risks taken; and ‘optimal’ portfolio construction is about risks that can be managed and do not unduly threaten the mission; this is often referred to as a return-driver/risk-factor framework. The fund-specific view of risk looks at issues like differences in short-term and long-term risks and deeper components of risk: examples include extreme risk/bad times/liquidity crunch risks. Funds differ in their appetites and tolerances for such risks. This fund-specific view of such risks needs exploration through scenario analysis, altogether an extremely challenging area for funds.

On time horizons: some further consideration is needed to explore the sustainability in different outcomes. That is the extent to which short-term outcomes could potentially affect long-term outcomes, discussed above.

We conclude that stronger practice in the portfolio-construction process

- starts with the investment beliefs
- incorporates dual classification of asset classes and risk factors
- ends with disciplined selection by reference to portfolio quality measures.

3.4 Stronger practice – a summary

Key messages	Stronger investment practice features
<p>Stronger governance</p> <p>In the absence of reliable investment theory, there should be stronger application of <u>values and beliefs</u> in the investment process</p>	<ul style="list-style-type: none"> ▪ Beliefs to become a larger part of investment process ▪ Competitive investors have beliefs that are smart and edgy and deeply socialised ▪ Asset managers need to strengthen their organisation-wide beliefs relative to product-specific beliefs

Stronger framework

Value creation via passive and active management

- Disciplined implementation needs to be aligned to strong beliefs in both investment content pinpointing market efficiency and investment context derived from self-knowledge and knowledge of others

Risk has multiple facets in which impairment to the mission stands out (therefore is unique to each investor); risk is the fundamental building block to return and has across portfolio and across time components

- Risk is unique to each investor based on organisational, technical and behavioural factors
- The mainstream practice version of risk needs widening, deepening and lengthening
- Risk management across portfolios requires portfolio diversification ('portfolio quality'), risk management across time requires time diversification ('risk management plan' quality)

Long-horizon investors possess flexibilities that short-horizon investors lack; they frame the investment's return more by its ongoing income than its end price

- Long-horizon investors need to be disciplined in mind-set and dynamic in action to exploit good judgement with respect to prospective risk/return views
- Asset managers can exploit long-horizon investing in well-designed long-horizon mandates

Sustainable investing should become embedded (long-term investing that is efficient and inclusive to all stakeholders)

- Asset owners approach sustainability from two directions: for long-term investing efficiency and for responsibility
- Asset managers approach sustainability for long-term investing reasons; for reasons of client mandate; and for reasons connected to their own values

Stronger portfolio construction

Investment classification emphasises risk factors

Investment selection determined by reference to portfolio quality and risk management plan

- Portfolio quality is determined over multiple dimensions reflecting unique asset owner characteristics
- Risk budget size is determined over time by reference to the risk management plan
- Asset managers should engage with asset owners to contribute to their portfolio quality

4. Implications

The actions required in stronger investment practice include, but are not limited to, building a strong and effective investment beliefs system, firming up the end-to-end investment process where CIOs

need to play a vital role in adopting the stronger investment framework and portfolio construction practice detailed in the paper. These actions can also be assisted by a checklist shown as below.

Process	<ul style="list-style-type: none">• Are there clear decision responsibilities and accountabilities relating to decisions?• Were beliefs developed in an engaged process from diverse input and result in settlement and subsequent alignment?
Quality	<ul style="list-style-type: none">• Are the beliefs smart (with deep insights) and edgy (with competitive positioning)?• Do portfolios conform to the three stronger-practice organising principles?<ul style="list-style-type: none">○ framework for risk and value creation; long horizon investing and sustainability○ adopting factor classification○ portfolio quality assessment
Review	<ul style="list-style-type: none">• Have the beliefs, processes, outcomes and performances been reviewed versus comprehensive benchmarks and KPIs and with attribution?• Is there forward looking review, within the investment function and through oversight?

The arguments for revisions to investment theory and practice are strong ones and call for adaptive responses by our investment institutions. We suggest the changes may be far-reaching for the individual investment professional too. The role of those responsible for educating our professionals is critical here. In particular the CFA Institute as the largest investment education and credentialing organisation has a particularly large-scale challenge to meet.

The idea of going *above and beyond* – higher level in theory and beyond accepted norms in practice – establishes the key goals of the stronger practice model. The tests of this lie in the check-list which has application to asset owners in particular but also asset managers in most respects.

In a paper titled “Are your interests aligned or maligned?”^{xi}, Towers Watson explored the issues surrounding alignment of interest between asset owners and asset managers. There are further practices for asset managers to ‘go above and beyond’ in adapting their business model to the revised asset owner world described. The two asset manager imperatives are: the syncing of mission, investment philosophy and culture with business principles; and the partnering and engaging they must practice with client asset owners to understand their place in the asset owner’s line-up and contributing to their objectives.

In syncing, we suggest asset managers that are driven by client interests must be clear about the value add that their products can support and allocate focus and resourcing accordingly. The ‘professionally-focused firm’ described in the parallel culture research^{xii} is an exemplar of these syncing features in connecting a client-centric mission with the deeply-held system of investment beliefs and values; and including both the employee value proposition that attracts, retains and

develops talent, and the client value proposition in all products and services. With respect to products it is critical that those which don't stand a realistic chance of adding value (using the firm's belief system) should not figure in their business mix. This is arguing strongly for asset managers to reject the product proliferation route to success.

In partnering with asset owner clients, asset managers can play a number of roles – be it as providers of mandates with specialist and outcome orientations or providers of value-adding intellectual property. The spectrum is wide, from being an outsourced CIO to being a component supplier. In the outsourced area, the role is very much to be a partner in the fulfilment of client goals. But even as a component supplier, asset managers need to be partners to recognise the diversification and value added in the specific asset owner context.

There is a mandate that has been referred to as an 'embedded partner'^{xiii} or engaged partner in which the asset manager provides a wider reach with access to investment tools, thought leadership on the investment world-view, scenarios and themes; idea sounding boards and innovation platform, and joint research projects. The embedded partner model can build significant synergies for the asset owner and worthwhile business for the asset manager.

5. Conclusion

The ideas mapped out in the paper suggest that the gap from current practice to effective practice is a large one. We suggest that institutional responses should be substantive. They also need to be holistic to reflect the multiple inter-connected challenges of investment theory, governance and management theory, culture and leadership involved. This provides a link to the desirability of the 'coping strategies' taken from a parallel study^{xiv} which we recommend investors adopt. These strategies work in tandem with the stronger investment practice we are presenting:

- Achieve organisational coherence and consistency in narrative by having extreme clarity and alignment of mission, enablers, policies
- Develop self-understanding and focus on internal capabilities and comparative advantage
- Develop understanding of others (meta-understanding) in the context of competition and achieving comparative advantage
- Build adaptability into governance and strategy and recognise the de-merits of overly-complex portfolios and the merits of simplicity
- Build stronger culture to support competitive edge and adaptability
- Build investment edge through investment intelligence – adoption of strong investment practice tied to the disciplines of beliefs, frameworks, processes and measurement.

Today's investors are operating in an extraordinarily volatile, uncertain, complex and ambiguous – "VUCA" – environment. In stark contrast to that challenging situation, the theoretical foundation to guide investors' actions is unhelpfully weak due to various reasons cited in this paper. In response to that, we urge investors, both asset owners and asset managers, to recognise and embrace the

complexity in the investment system – moving above and beyond the status quo of current practice to one where extreme investment intelligence can emerge.

We believe adopting this stance will lead to a more intelligent, purposeful industry with better outcomes all round.

We close with commitments on areas of future research highlighted from this current analysis:

- Long-term investing to be successful must be supported by a mix of appropriate mandates and mind-set; our own experience of this area dates back longer than a decade and we are evaluating the progress made with this model and suggesting some evolution
- The challenges of defining success through the lens of the mission and in terms of meeting multiple outcome goals are not settled; we believe the consideration of optimal time diversification requires further attention
- The power of cognitive diversity in improving collective intelligence leading to better group decision making; we believe it has wide-ranging applications in areas such as investment committees
- Incentive structures in the investment industry, including compensation structures, could be improved to encourage behaviours that improve outcomes and better serve the interests of the end investor.

Towers Watson’s investment process

Towers Watson’s investment process is a continual iteration of five individual steps.

Step 1 is setting the mission – the ultimate goal for investors – by reference to the **theory, beliefs and values** of the fund. This can be a funding level or settlement for a DB pension fund or target income replacement ratio for a DC pension member. This step also includes thinking about the beliefs that will be important throughout the rest of investment process.

Steps 2 and 3 cover the **framework and policy** in the investment process. Step 2 is around determining the pace at which investors are planning to achieve their missions. This includes understanding which risks matter, defining the minimum-risk position if possible, understanding risk capital/buffers and limits, eventually leading to setting out the risk budget and risk management plan. At this step, reference portfolios set the accountabilities of investors for risk management and measuring value add. Step 3 is then about how to spend that risk budget. The key to this step is to balance risks across main liability risks (e.g. interest rate, inflation, currency and longevity) and asset risks (e.g. credit, equity and diversifying strategies).

Step 4 is around **portfolio construction** and the principle is to achieve the mission whilst maximising total net return per unit of risk. Return can be generated from multiple sources: thematic ideas, dynamic asset allocation, best-in-class managers, sustainability issues and customised investment routes where necessary. Cost is also important and can be reduced via channels like smart beta, best-in-class implementation as well as fee negotiation. Risk mitigation comes from removing relatively unrewarded risks, increasing diversity and using multiple lenses (risk premia, themes). Asset class ratings include dimensions beyond risk and return allowing for an overall assessment of portfolio quality.

The role of the last step, step 5, is to ensure that activities through steps 2 to 4 are consistent with step 1, the ultimate mission and the beliefs. Implementation of investment can be highly complex and as a result it is important to measure process as well as outcome.



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Limitations of Reliance

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