The rationale for Trends Investing

Moving beyond story-telling

WHITE PAPER
August 2017

Jeroen van Oerle, Trends Analyst
Steef Bergakker, Trends Analyst & Portfolio Manager
<table>
<thead>
<tr>
<th>Contents</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Executive summary</td>
<td>5</td>
</tr>
<tr>
<td>The quest for alpha</td>
<td>7</td>
</tr>
<tr>
<td>A trends investing toolset</td>
<td>13</td>
</tr>
<tr>
<td>Portfolio implementation</td>
<td>20</td>
</tr>
<tr>
<td>Thematic examples</td>
<td>24</td>
</tr>
<tr>
<td>Conclusions</td>
<td>26</td>
</tr>
<tr>
<td>Appendix A</td>
<td>28</td>
</tr>
<tr>
<td>Sources</td>
<td>39</td>
</tr>
</tbody>
</table>
Introduction

- Everybody loves a good story. Trends investing derives an important part of its appeal from story-telling. However, a solid investment strategy needs more than a seductive narrative. In this paper we set out our trends investing philosophy and aim to lay the foundation of a conceptual and analytical framework for trends investing that moves beyond mere story-telling.
Executive summary

Understanding the dynamics of secular change and especially the behavioral biases that businesses and people display in dealing with this change, helps in recognizing predictable patterns that can be systematically exploited by investors. This paper explores the rationale for trends investing and outlines Robeco's approach.
What is trends investing? | Before we can explain the trend approach to investing, we have to define what a trend is. We define a trend as a profound change of the prevailing secular or, more specifically, economic status quo, which generally challenges incumbent companies and business ecosystems to stay in control of their market positions. At the same time, the trend provides opportunities for new and upcoming companies and business ecosystems to establish new markets or conquer existing markets.

The trends we identify can be characterized as high-level secular changes that, usually, play out over long time frames. These trends are driven by either sociodemographic shifts, government policies, technological innovation, or a combination of those three. Examples are, respectively, population aging, renewable energy policies and increasing digitization of products and services. The next step is to translate the identified trends into a portfolio of companies that are not only significantly exposed to those trends, but also well-positioned to create economic value from them. It is essential to examine monetization dynamics on top of identifying trends and charting company exposure.

Why use a trends approach? | Understanding the dynamics and processes of secular change and their monetization implications, can give trends investors an analytical edge. In addition, and importantly, systematic expectation biases in situations where change follows a non-linear trajectory, often as a result of trend changes, lead to predictable behavioral patterns that can be exploited by trends investors. These analytical and behavioral insights are sources of alpha generation unique to a trends investing approach.

A trends approach also adds value by abandoning restrictive regional or sector classifications. Trends often extend over multiple regions, sectors and business ecosystems. Furthermore, starting with the identification of trends as a first step in the investment process allows for a more useful allocation of resources. Instead of requiring coverage on all regions and all sectors, more than 30,000 stocks worldwide, full attention can be allocated to a universe that consists only of those securities that have a close connection with the identified investible trends.

Our approach towards trends investing | This whitepaper formalizes the Robeco Trends Investing process that has evolved over the past decade. We dig deeper into the sources of trends investing alpha, the tools we use to analyze trends and the translation of trends into the portfolio construction process. We aim to provide a better understanding of what aspects are important in trends investing and thus move beyond mere story-telling.
The quest for alpha

Investors can seek an analytical, informational and/or behavioral edge as their source of alpha. Trends investing aims to exploit an analytical edge in grasping the dynamics of secular change and take advantage of the systematic behavioral biases displayed by people in dealing with non-linear growth.
The quest for more accurate expectations | In today’s investment world, the quality or added value of portfolio managers is measured by the extent to which they can generate (positive) alpha in a consistent, replicable manner. Alpha is defined as the difference between an actively managed portfolio’s risk-adjusted return and the return of the benchmark the managed portfolio is compared with.

As active investors base their buying and selling decisions on expectations about future developments, the generation of alpha depends on having more accurate expectations, on average, than 'the market'. The market in this context can be understood to represent the consensus expectations of investors that are reflected in current security prices.

Three generic sources of alpha | How can investors generate alpha? In a landmark paper, Fuller [2000] suggests that there are three sources of alpha:

- Acquiring and using superior (private) information to get an analytical edge
- Using better ways (models) to process information for an informational edge
- Taking advantage of behavioral biases to acquire a behavioral edge

Fuller argues that most traditional investment managers try to acquire superior information, which could then, for instance, be used to make superior earnings forecasts. These types of managers are labeled fundamental managers. Investment managers that strive to use better models to process information in order to generate more accurate expectations are labeled quantitative managers. Finally, investment managers that try to profit from behavioral biases are categorized as behavioral managers.

Alpha is all about performance consistency through time and varying market conditions | The hallmark of true alpha generation is performance consistency through time and varying market conditions. The paper argues that, while all three sources of alpha are valid in principle, the first two, the fundamental information edge and quantitative processing edge, are extremely difficult to consistently take advantage of in practice. While temporary edges from both fundamental or quantitative sources can certainly be achieved, fierce competition is bound to occur sooner or later, eroding the advantage and turning the whole endeavor into a continuous rat race.

In contrast, behavioral biases tend to be much more consistent sources of alpha as they are more or less hardwired into our system and therefore do not change much over time. The problem with taking advantage of behavioral biases is of a different nature: there are many behavioral biases, some of them diametrically opposed in their effect. For instance, both over- and underreaction bias have been documented in academic literature. It turns out that behavioral responses or biases very much depend on the context in which they occur.

Behavioral bias a more consistent source of alpha
The investment game is fiercely competitive. Consequently, it is difficult to hold on to and exploit analytical and/or informational advantages. Behavioral biases, however, are hard-wired into our brains and tend to be a more consistent source of alpha. Here, the problem is to know which behavioral bias is likely to manifest itself in which situation.
Obviously, investors who aim to profit from behavioral bias need to develop a deep understanding of which biases are to be expected in which circumstances.

**Types of behavioral biases** | Given the number of documented behavioral biases, some categorization is desirable in order to simplify matters. Fuller [2000] makes a useful distinction between two broad categories of behavioral biases:

- **Non-wealth-maximizing behavior** - in contrast to the economist’s classification of wealth maximization as rational behavior, people may strive to maximize other pursuits that they deem more important. Agency problems, window dressing or dollar-cost-averaging are well-known examples of non-wealth-maximizing behavior.

- **Heuristic biases and systematic cognitive mistakes** - using mental shortcuts or rule-of-thumb decision making is often subject to bias and may result in incorrectly processing available information. Anchoring, overconfidence, representativeness and saliency are well-documented heuristic biases.

**Four common heuristics and their relation to investment strategies** | For non-wealth-maximizing behavior or heuristic biases to result in mispriced securities, significant chunks of the market must systematically engage in this type of behavior. This condition is more likely to be met in the case of heuristic biases than non-wealth-maximizing behavior, since the vast majority of investors are incentivized to optimize risk-adjusted returns, which seems incompatible with systematic non-wealth-maximizing behavior.

On the other hand, heuristic biases affect the majority of people irrespective of incentives. Consequently, heuristic biases may be systematically exploitable, provided that we understand which biases tend to occur in which circumstances.

**Figure 1** | Heuristics underlying over- and underreaction

<table>
<thead>
<tr>
<th>Over-reaction heuristics</th>
<th>Under-reaction heuristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Representativeness - the tendency to put too much weight on a few recent events as representative for the underlying probability distribution when forming expectations about future events</td>
<td>Anchoring - the tendency to be heavily influenced by previous (quantitative) values when making quantitative estimates</td>
</tr>
<tr>
<td>Saliency - this tendency is closely related to representativeness and describes the tendency to especially put too much weight on recent events if these events are wild or have a high impact, let’s say a shark attack or a plane crash</td>
<td>Overconfidence - the tendency to anchor onto previous values or estimates is reinforced by overconfidence in our own ability in dealing with and knowledge of the subject matter</td>
</tr>
</tbody>
</table>

Source: Fuller; Robeco Trends Investing
Over and underreaction strategies | Value or contrarian investment strategies can be characterized as strategies that aim to exploit overreaction, while momentum and earnings surprise strategies typically fall in the realm of strategies that rely on underreaction as their alpha generation engine.

Circumstances in which over- or underreaction is likely to occur | The key to successful exploitation of behavioral biases is knowing in which circumstances certain biases are likely to crop up. As a general rule, people are not very good at recognizing when changes in their environment represent a significant departure from the status quo or not. As we have seen above, people tend to overreact to recent, high impact events, which may turn out to be unrepresentative noise, but underreact to seemingly small, but significant, deviations from quantitative values people have anchored to. Typical situations where overreaction takes place in financial markets are profit warnings or market crashes, while typical situations where underreaction occurs are accelerating end markets or growing strength of a company’s competitive advantage.

Amara’s Law | In the context of trends investing, people have a tendency to overreact to new, exciting technologies that promise to revolutionize entire industries, especially when the media, acting as huge amplifiers, pick up on it. When these new technologies fail to live up to unrealistically high expectations, disappointment sets in and expectations typically are pared back drastically. However, when these technologies have taken root, overcome their teething problems and customer uptake starts to accelerate, people, in classic under-reaction fashion, are slow to pick up on this new information and tend to be positively surprised by it. This empirical pattern of overreaction to early-stage new technologies and subsequent underreaction to later-stage acceleration of the acceptance of these technologies, is sometimes referred to as Amara’s Law and forms the basis of Gartner’s Hype Cycle, a concept we will discuss in more depth later on.

The challenge of predicting non-linear processes | “Prediction is very difficult, especially if it is about the future” is an often used aphorism stemming from Niels Bohr. Using a slight twist, one could perhaps more appropriately alter the second part into “especially if it is about a non-linear future”. People have well-documented trouble predicting non-linear processes. For example, in a widely cited experimental study, Wagenaar and Sagaria [1975] found that exponential growth in numerical series and graphs is grossly underestimated by most people in an intuitive extrapolation task.

Trends investing: under-reaction strategy
Trends investing, which aims to benefit from the under-appreciation of profound long-term shifts in the prevailing socio-economic status quo, can be characterized as an under-reaction strategy.
The extent of the underestimation was found to be considerable; it was not unusual for two-thirds of the subjects to produce estimates below 10% of the normative value. Surprisingly, they also found that neither special instructions about the nature of exponential growth nor daily experience with growth processes enhanced the extrapolations.

Apparently, we have great difficulty in calibrating non-linear processes, even when we are instructed about their nature or deal with non-linearity regularly. This is strong evidence that conservatism in extrapolation is more or less hardwired into our brains and that underreaction can, at least in principle, be a source of persistent alpha generation, especially when we are dealing with non-linear phenomena. If we want to exploit this behavioral bias, we need to understand and predict non-linear phenomena better than the average investor. In order to achieve that, we use a broad set of models, tools and theoretical constructs. Some of the ones we find most useful will be discussed in a later chapter.

Sources of alpha for trends investing in one graph | Tying all strands together, one can identify two main sources of potential investment alpha stemming from a trends investing approach. First, there is potential benefit in studying the dynamics of secular change and consequently better understanding these change processes (analytical edge). Second, there
is potential to exploit systematic behavioral bias manifesting itself in a tendency to underweight longer term information and to structurally underestimate the effect of compounding over longer time periods (behavioral edge). Both these edges may lead to unrecognized longer term growth opportunities and/or an extension of the competitive advantage period as shown schematically in figure 3.

**Figure 3** Alpha sources: unrecognized longer term growth opportunities

---

**Investment horizon arbitrage**
Underappreciated effects of secular change and under-reaction to non-linear change open up the possibility to profit from systematically unrecognized growth opportunities.

---

**Two types of unrecognized growth opportunities** The analytical insights from studying secular change may result in modeling better informed longer term growth rates. The usual practice is to model a long-term growth rate that is identical or very close to the long-term assumed growth rate of the economy (usually the historical mean). While this is analytically correct for the very long term, growth rates for the more relevant intermediate term (let’s say 10 to 25 years out) may differ significantly from the long-term growth rate of the economy for different industries or sectors depending on secular tail- or headwinds.

The behavioral bias to systematically underestimate exponential or compound growth, can easily result in modeling a ‘fade to the mean’ that is overly conservative; especially when secular tailwinds lead to lots of profitable investment opportunities that can keep growth rates stronger for longer. In contrast, modeling a faster ‘fade to the mean’ may be appropriate for industries or sectors facing secular headwinds.

Whenever we talk about unrecognized growth opportunities, we make the implicit assumption that the growth opportunities exceeding the longer term growth rate can be equated with economic value creation, i.e. Return on Invested Capital > Weighted Average Cost of Capital.
A trends investing toolset is crucial. Without a fundamental toolset, trends investing is reduced to chasing short-term hypes. We aim to create alpha by understanding secular change driven by government policies, technology or socio-demographics. To that end we use academic research, practitioners' inputs and a long-term investment philosophy to bridge theory and practice.
Change has three profound drivers | In the previous chapter, it has become clear that the main sources of alpha generation for fundamental trend investors relate to developing an analytical and/or behavioral edge. An important step in doing so is to look at the drivers of change and determine if these are investible. In this chapter, we discuss these dynamics as well as the toolset we use in order to come to an investment conclusion. We start by discussing the three drivers of change:

- Socio-demographic change
- Policy-driven change
- Technologically driven change

Figure 4 | Three drivers of change

Socio-demographically driven change | This relates to relatively slow-moving and predictable patterns in society’s dynamics and behavior. Especially demographically driven change is captured well in data. Social change is harder to quantify, but moves equally slowly, often alongside generational classifications. There are a couple of examples in this socio-demographic change bucket. Aging is a phenomenon that can be clearly observed in many Western countries, but also in China, Japan, and Thailand. Urbanization is another ongoing sub-theme that can be observed globally. Examples of more socially driven change are gender equality and generational differences regarding technology usage and connectivity.

2 One interesting way to potentially capture these three drivers of change and their differing speeds of change, is Stewart Brand’s Pace Layer model. For more detail, see appendix A.
**Policy-driven change**  | This is not confined to changes on a sovereign level, but also encompasses changes implemented by other regulatory agencies and industry-specific institutions. Once policies have been implemented, the visibility on how these will be executed is often good. However, there are considerable risks in terms of changes in the political landscape, which are difficult to predict a priori. A couple of examples of policy driven change are the increased regulation in many sectors (think of the financial sector, healthcare and car manufacturers) and the re-allocation of assets that we observe in many Western countries.

**Technologically driven change**  | This represents a force that has grown in importance over recent decades. Technology is moving fast and has found its way into the broad economy. The element of speed and extreme specialization make it hard to predict the exact way in which new technology will proliferate. Once a clear winner can be identified, the potential for value creation is often underestimated, which provides opportunities from an investment perspective. Examples of technologically driven change are automation, digitization and hyper-connectivity.

**Monetization is the key to investibility**  | The previously described sources of change are a necessary, but not sufficient, condition to actually make it value-accretive from an investment perspective. Monetization choices and extraneous conditions ultimately define how change will be translated into monetary flows and investment returns. An example of how monetization choices can affect outcomes is the differing paths of East and West Germany after the Second World War. Both countries had similar access to technology, similar population traits and similar infrastructure, yet different choices about the organization of the economy resulted in hugely different economic performance.

Equally, competitive conditions and strategic choices largely determine whether companies can monetize opportunities arising from secular change. Research\(^\text{4}\) has shown that the distribution of equity returns has, historically, been very skewed. Only a tiny fraction of all common stocks produced super returns; the rest just produced mediocrity. Clearly, it matters greatly whether extraneous conditions and/ or deliberate choices allow for or result in monetization. We believe that companies that successfully capitalize on trend shifts have a better shot at making it to the select group of super performers than the modal company.

An important tool we use to gauge monetization is observing shifts in business model success and deployment. From the dominance of large manufacturers in the sixties and seventies (value chains) to the rise of the software giants in the eighties and nineties (value shops) to

---

Equity returns are incredibly skewed

Only a very small percentage all listed equities is responsible for the superior long-term returns of equities as an asset class. For the US, Bessembinder [2017] finds that less than 4%(!) of all common stocks account for the stock market gains. The rest collectively just earns T-bill returns.

---

\(^3\) For criteria defining monetization, see figure 5

\(^4\) “Do stocks outperform treasury bonds?”, Hendrik Bessembinder [2017]
the recent swift ascent of platform companies (value networks), this tells a lot about where and why business success occurred and provides clues to where it will likely move next.

**Naturally, there is often overlap between these categories** | When we observe, for instance, a trend towards autonomous driving via the implementation of increasing levels of advanced driver assistance systems (ADAS), this trend touches multiple buckets of change. The main driver in this trend is obviously technology, but there are also very strong social and regulatory influences that need to line up in order to realize these technical capabilities. People need to be willing to pay for ADAS features and regulators need to change laws in order to allow those technologies to be used on the road. We also observe a change in the monetization of driving, where self-driving technology is likely to allow for different business models to be developed. Think of what carsharing and on-demand service models will do to the traditional valuechains.

**Investment implications differ per change driver** | The above illustration is a clear example of our observation that a trend is often impacted by different drivers of change. Usually, however, we can identify a dominant driver of change. The potential of a particular dominant driver of change to generate alpha differs considerably. We illustrate this in the table below, which includes the sources of alpha previously explained. Technologically driven change is most attractive from an investment perspective. Not only because of the behavioral edge that can be achieved over the broader market, but also as a result of the understanding through a unique toolset that enables an analytical edge to be developed.

**Figure 5 | Drivers of change summarized**

| Socio-demographic change | — Predictable | — Transparent (easily discounted) | — Emerging middle class | Moderate |
| — Ample data availability | — Slow moving | — Aging | | — Analytical edge |
| — Persistence | — Obscured by short term volatility | — Urbanization | | — Informational edge |
| Policy driven change | — Protected regime | — Political risk | — COP21 climate policy | Low |
| — Legally sanctioned | — Capped or subsidised returns | — Increased or decreased regulation in sector | | — Analytical edge |
| — Good visibility ex-post | — Transparent (easily discounted) | — Re-allocation of assets | | — Informational edge |
| Technologically driven change | — Optionality (often underestimated by the market) | — Low visibility on technological path, nor on clear early winners | — Additive manufacturing | High |
| — Winner takes all | — Potential rapid maturity | — Automation | | — Analytical edge |
| — Fast growth | | — Connectivity | | — Informational edge |
| Monetization overlay | — Positive ROE/WACC spread | — Low barriers to entry | — Business model overlay (value chains, value-shop, value-network) | |
| — Big market with high growth potential | — Undifferentiated product offering | — Industry dynamics (Porter’s five forces model) | | |
| — Long competitive advantage period | — Sustaining innovation | — Mix (wide, narrow, niche) | | |
| — Positive characteristics | — Asset intensity | — Cost structure | | |
| — Negative characteristics | Dimensions to look at | | | |

Source: RobecoTrends Investing
Exploiting the behavioral edge resulting from technological change | In theory, the market is unbiased and correct on average. However, a market can reflect biases that turn out to be exploitable. One of these biases relates to the interpretation of growth as a result of new technology. Irrespective of whether the market correctly prices technological change, it experiences periods of over- and underreaction versus the ‘true’ growth path as a result of the inability to process non-linear information. Figure 6 combines a logistic growth function (an S-curve) with a typical over- and underreaction as observed in the market. When growth accelerates, models are often updated linearly instead of taking into account the exponential growth reality. As a result, the market underreacts to the true growth path. Further along the path of growth, again linear thinking is used to extrapolate past numbers. This time, the result is an overreaction because the actual growth part has slowed by then and expectations are too high.

These periods of bias can be exploited in a trends approach by means of using the appropriate tool-set to differentiate from market consensus. Periods of underreaction can be exploited by buying the underpriced securities. In the period towards the observation of the non-linear actual growth it is important to hold onto the securities, as they will likely experience strong momentum once the market starts updating its growth expectations and earnings expectations resulting from that. However, at a certain point in time, expectations are likely to overshoot reality as a result of the extrapolation of a short period of extreme growth. By using base rates and technological diffusion models, one can anticipate when analysts become more positive than can be justified and sell out.

Figure 6 | Logistic growth and unbiased expectations

![Logistic growth and unbiased expectations diagram](image-url)

Source: Robeco Trends Investing
Theoretical models underlying the drivers of change | Our investment approach is research driven. This implies that we apply theoretical frameworks to our analysis in order to chart the most likely path of change and identify the best positioned companies. We will discuss some of those models in short below and more extensively in appendix A. What these models allow us to do, is to categorize sources of change and analyze what we observe by applying this framework to specific situations. We think this results in better estimates for the likely future course of events. We believe that only part of the insights described below are actually discounted in equity valuations, or the thinking of the market in general for that matter. Another side-benefit of using the toolset in figure 7 is that it forces one to think about the bigger picture and the long term, which contrasts greatly to the short-term, often myopic and compartmentalized nature of the investment industry.
<table>
<thead>
<tr>
<th>Model / framework</th>
<th>Change Dynamic</th>
<th>Description</th>
<th>Investment insights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roger’s model of technological diffusion</td>
<td>Technologically driven change</td>
<td>How new technologies / products are adopted throughout an addressable market.</td>
<td>Most new technologies / products are adopted according to an S-shaped diffusion curve, which differs substantially from the often observed linear thinking patterns.</td>
</tr>
<tr>
<td>Moore’s ‘Crossing the chasm’</td>
<td>Technologically driven change • Social change</td>
<td>Why most companies struggle to gain enough critical mass to conquer the mass market.</td>
<td>Gaining critical mass is crucial, but difficult, in order to make the transition from investing to harvesting stage. Once the chasm has been crossed, the underlying trend has been validated and is likely to have seen a shake-out in terms of the companies involved.</td>
</tr>
<tr>
<td>Gartner’s hype cycle</td>
<td>Technologically driven change</td>
<td>Stylized description of the stages that expectations usually move through regarding technological innovations.</td>
<td>Early-stage expectations tend to be over-inflated, get deflated as disappointment sets in and subsequently lag reality as technology starts to deliver after all.</td>
</tr>
<tr>
<td>Christensen’s innovation theory</td>
<td>Technologically driven change • Monetization</td>
<td>Classifies innovation as either sustaining or disruptive. Describes the forces driving change dynamics.</td>
<td>Disruptive innovation tends to favor startups/new entrants while sustaining innovation tends to favor incumbents. This line of thinking must be translated to the underlying stock selection process as well.</td>
</tr>
<tr>
<td>Porter’s Five Forces model</td>
<td>Monetization</td>
<td>Identifies and describes the five forces that shape and determine competitive conditions in an industry.</td>
<td>Snapshot of the basic attractiveness of an industry at a given point in time. Useful in combination with Christensen’s theory of disruption which better captures the dynamic evolution of competitive conditions over time.</td>
</tr>
<tr>
<td>Business models</td>
<td>Monetization of secular change</td>
<td>Three generic business models with three idiosyncratic profit models and characteristic sources of competitive advantage.</td>
<td>Change in business models has been a far greater source of disruption than new technology historically. There has been a noticeable change in business models from value chains to value networks. The latter is where we believe to be most value-added.</td>
</tr>
<tr>
<td>Centralization followed by de-centralization pattern</td>
<td>Monetization of secular change</td>
<td>Early-stage new technology tends to lead to a concentration of resources to a few centralized places. As technology matures, resources tend to become more modular, more de-centralized and more do-it-yourself suited.</td>
<td>Vertically integrated business configuration is best suited for early-stage technologies. Profit pools tend to migrate to performance defining components or subsystems as modularization and production chain fragmentation sets in.</td>
</tr>
<tr>
<td>Demographic analysis</td>
<td>Demographically driven change</td>
<td>How the composition of a population is likely to change as a consequence of fertility/death rates/migration trends. Trends in urbanization, schooling, internet penetration etc.</td>
<td>Likely future demographic composition of population may provide insight into changing economic/social behavior. The typical period for these insights to materialize is long-term, which research found to be less than optimally discounted for by the market.</td>
</tr>
<tr>
<td>Political analysis</td>
<td>Politically driven change</td>
<td>Watching political developments and looking for common threads or coordinated efforts.</td>
<td>Convergence of political thinking may lead to wide-ranging changes in terms of treaties, regulatory oversight or policy guidelines. Although the predictability of politically driven change is low, the investment impact can be substantial.</td>
</tr>
</tbody>
</table>

Source: Robeco Trends Investing
Portfolio implementation

After identifying the dominant trends that can be monetized from an investment perspective, the next step is to build a portfolio. This step clearly separates active from passive management.
The portfolio implementation step is often skipped | Identifying the trends and dominant drivers of change is half of the equation. The portfolio construction step, including bottom-up analysis of the underlying stocks that have good exposure to the top-down trend, makes up the other half. This view is not necessarily shared within the asset management industry as there are many different approaches to portfolio construction. On one end of the investment product spectrum, portfolios are created on a sub-trend level. On the other end of the product range, the integrated portfolio approach can be found. This is summarized in figure 8.

Figure 8 | From trend selection to portfolio construction

The maturity of the underlying change determines the portfolio approach | Figure 9 has important implications for portfolio construction in a trend approach. The Gartner hype cycle is an interesting tool that is very helpful in analyzing the technological diffusion path and, on top of that, provides insights into the best strategy from a portfolio construction perspective. In the first two stages of the hype cycle (technology trigger and peak of inflated expectations) it is often not yet clear who the winners will be as a result of the newly introduced technology.
As the investment community gets excited about a particular trend and the media pick it up, momentum in the names exposed to it increases and companies enter the stage where the tide raises all boats in the sense that every company that can be associated with the trend increases in value. Expectations about the future are very positive and the overreaction in terms of growth expectations and earnings estimates can result in bubble-like valuations.

**Figure 9 | Portfolio construction combined with hype cycle**

<table>
<thead>
<tr>
<th>Time</th>
<th>Short-term overreaction</th>
<th>Long-term underreaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>Basket approach</td>
<td>More concentrated</td>
</tr>
<tr>
<td>Trigger</td>
<td>Picks and shovels</td>
<td>Long-term winners</td>
</tr>
<tr>
<td>Peak of</td>
<td>Investment chasm</td>
<td></td>
</tr>
<tr>
<td>Inflated</td>
<td>Shake-out</td>
<td></td>
</tr>
<tr>
<td>Expectations</td>
<td>Do not invest</td>
<td></td>
</tr>
<tr>
<td>Trough of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disillusionment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slope of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enlightenment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plateau of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Productivity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Gartner, Robeco Trends Investing

**Portfolio construction dependent on phase of hype cycle** | Our investment approach during this first stage is twofold. First of all, since there are no clear winners yet, we believe it is best to construct broad baskets of companies with good (preferably pure) exposure to the underlying technology instead of focusing investments on a few companies. Especially since valuation models at this stage can produce practically any outcome as a result of a wide range of expectations regarding value drivers, it is very hard to determine true intrinsic value.

Another important portfolio construction consideration in the first phase is to invest in those companies that facilitate the new technology. We dubbed this the ‘picks and shovels’ approach. Instead of trying to invest in a (presumed) star gold miner during the gold rush, our approach is to invest in the shop in town that is supplying the picks and shovels to all those who try to find gold. A practical example of this approach is the self-driving car. We do not yet know who will be the winner in self-driving cars and how business models will exactly evolve, but we do know that self-driving cars require a lot of sensors and software,
irrespective of the eventual winners. Hence, the investment focus would be on companies that benefit from their supply position.

After the hype has peaked, the next phase is a difficult one from an investment perspective. During the ‘trough of disillusionment’ and part of the ‘slope of enlightenment’, sentiment is still very negative and the technology enters a turbulent time period in which companies cease to exist and Merger & Acquisition (M&A) activity peaks. During this shake-out, winners will emerge, but it is hard to invest during this period, which is why we dubbed it the ‘investment chasm’.

The second stage of investment opportunity comes along halfway the ‘slope of enlightenment’ and continues onto the ‘plateau of productivity’. This is where we find the companies that have survived the shake-out period and are able to continue their development of the technology as investors imagined during the hype period. This time the big difference with the hype period is that the technologies and companies actually implement and use the new technology and are able to monetize this development with a sound underlying business model. The investment opportunities are especially present during the ‘slope of enlightenment’ period, where sentiment is still negative on the technology trend because many investors witnessed the crash period. The portfolio approach during this phase is to identify long-term winners and concentrate portfolio holdings into these names as opposed to the basket approach in phase one.

**Differentiating on portfolio construction** | The Robeco trends investing approach combines multiple trends in one portfolio. The reason for this approach versus the offering of stand-alone trends is that there are substantial diversification benefits to be made on a portfolio level by combining low-correlated trends. This makes the entire portfolio less vulnerable to trends that fall out of favor or perform less well in certain periods. In line with what we described above, our portfolios combine trends in the early stage of the cycle with trends that are more mature.

**Long term focus is key** | Another important consideration when translating trends into portfolios is the time horizon. We believe in long holding periods and typically hold investments in our portfolios for a period between three to five years. We think it is very hard to pinpoint the exact time a trend will start to perform from an investment perspective. Therefore we position for the long run and closely monitor developments.

---

**Portfolio construction = phase dependent**
Investing in early-stage technology is most prudently accomplished through a basket and/or picks and shovels approach. As the technology matures, expectations reset and weaker players have been shaken out, a more concentrated approach focusing on the winners becomes more expedient.
This chapter includes examples of a socially driven trend, a policy-driven trend and a technology-driven trend. The common denominator of these trends is the structural underestimation of long-term, non-linear growth expectations, which leads to investment opportunities.
### Figure 10 | Examples of trends

<table>
<thead>
<tr>
<th>Trend</th>
<th>Change dynamic and maturity</th>
<th>Short description</th>
<th>Key monitoring signals</th>
</tr>
</thead>
</table>
| Emerging middle class  | • Socio-demographically driven change  
• Maturity depends on country. China just starting | The steady rise in income per capita in most, but not all, emerging countries is expected to lead to a non-linear change in consumption behavior (a disproportionate increase in discretionary spending as spending on basic necessities levels off) as the income level surpasses the middle class threshold. Many Western countries went through this development several decades ago. The observations from those periods can be used to a certain extent in assessing the investment opportunities in emerging markets. A factor that possibly leads to an underreaction is the magnitude of this. Emerging middle class. China, India and Nigeria are expected to house 35 percent of the world population by 2050. Given the long-term nature of demographically driven change, the full potential of this change has not yet been included in long-term growth estimates. Another dynamic which coincides with the emerging middle class is the difference in sociological behavior as a result of new technologies and network effects. An emerging middle class also allows to leap-frog Western countries that have to change from their legacy basis. As there is no legacy in emerging markets, change happens much faster, as does the adoption of new technologies. China is a good example. As the Chinese middle-class rises in terms of spending power, smartphone penetration levels are high, which enables a mobile-first ecosystem that is not yet available in many Western countries but leverages many capabilities ranging from e-commerce to mobile payments. | • Discretionary spending versus spending on basic needs  
• GDP/capita development  
• Global trade flows |
| Renewable energy       | • Policy-driven change  
• Several ups and downs historically. partly driven by fossil fuel price fluctuations | Renewable energy, one could argue, is both a technology and policy-driven trend. Energy producing and storing technology is progressing fast and costs are coming down quickly. However, global policy initiatives to transition from fossil fuel based to renewable energy still are by far the most significant driver, in our view. Many of the renewable energy technologies have not been profitable during the many years of development and still depend on subsidies and government guarantees. COP21 clearly shows politics are supportive for the near future. This is likely to remain a largely policy-driven trend until renewable energy sources become viable profit models. | • Levelized cost of energy (LCOE) estimates  
• Project biddings  
• Cost development  
• Adoption data |
| Additive manufacturing | • Technology-driven change  
• Climbing out of the trough of disillusionment | Additive manufacturing, a.k.a. 3D printing, is a technology that has gone through the complete Gartner hype cycle. When graphing the stock performance of the companies that have survived the shake-out, a similar pattern can be observed. Although 3D printing was hyped a couple of years ago, the technology has continued to develop over the years and has survived the “through of disillusionment” by improving the technology and changing the business model. It is now possible to print many more materials than plastics or specific metals, and the way this is being done leads to objects that have superior specifications compared to those that have been manufactured by using traditional methods. The dominant business model has changed from B2C to B2B, which required solving the production scale issues previously observed. In a B2B model, the industry dynamics change substantially. We think many of the productivity gains envisioned during the hype period can become reality through the integration with existing manufacturing processes in contrast to the vision of consumers who become manufacturers themselves by investing in 3D printers. Many investors still remember the investment chasm period and are underestimating the full potential of this technology, which is likely to create investment opportunities. | • Earnings estimates  
• M&A activity  
• Overall industry growth (e.g. Wohlers report) |

Source: Robeco Trends Investing

**Trends need to be monitored |** Trends evolve all the time, as this is a process where new inputs lead to new dynamics. This reassessment of trends could lead to the conclusion that a trend is not interesting anymore from an investment perspective (for example; the shale revolution), or we could find reasons to reiterate our previous beliefs (for example, the emerging middle class). It is important to closely monitor developments and create screening criteria. Although the focus is long term, our views and the market's must eventually align if positive alpha is to be generated.
Conclusions

Trends investing is a viable strategy based on insights in the dynamics of secular change and people's predictable behavioral biases to non-linear change. Finding trends and companies favorably exposed to these trends is insufficient for success. Correctly evaluating the monetization probability is also key for successful trends investing.
**Beating the market through inspired trends investing** | Financial markets process new information almost instantly and in the vast majority of cases produce unbiased expectations about future events. To consistently produce investment alpha, logic therefore dictates that investors either persistently produce more accurate expectations than the market through better analysis or better information processing, or find the limited number of situations in which expectations are predictably biased. We believe that a trends investing approach can generate better understanding and, consequently, better expectations of the implications of secular change. In addition, and as a result of this understanding, trends investors can exploit the predictable expectations biases that occur during non-linear transformations that often characterize secular change.

**Keyelements in our trends investing approach** | Based on the premise that trends investing can generate alpha through analysis of secular change and the exploitation of behavioral biases that occur in dealing with non-linear change, we believe the following elements are key in our trends investing approach:

- Categorizing trends into those where non-linear change takes place and where we can apply useful models or theoretical frameworks that help us understand the dynamics of the change process
- Examining the potential for monetization based on established insights from financial and management theories
- Constructing portfolios in a way that is consistent with and conditional upon the insights of the analysis and consisting of more than one narrowly defined trend in order to generate more stable returns through time

**Trends investing is a viable strategy that can move beyond the anecdote** | We submit that trends investing is a viable investment strategy that needs to, and definitely can, evolve further than the appeal of a few good stories.
Appendix A  Trends investing toolset. Below we describe the models introduced in figure 7 in more detail.
**Rogers’ model on technological diffusion**  One of the prime sources of non-linearity in economic processes is the constant flow, and especially the diffusion rate, of innovations. In 1962 Everett Rogers, an assistant professor of rural sociology, published a book about innovation diffusion that was to become hugely influential. Based on extensive empirical analysis of the adoption of new products and technologies, Rogers proposed that adopters of any new innovation or idea can be categorized as “innovators” (2.5%), ‘early adopters’ (13.5%), ‘early majority’ (34%), ‘late majority’ (34%) and ‘laggards’ (16%). These categories, based on standard deviations from the mean of the normal Bell curve, have proven robust, withstood the test of time and become a common standard in innovation research.

When graphed as the cumulative percentage of adopters over time - slow at the start, more rapid as adoption increases, then leveling off until only a small percentage of laggards have not adopted - a curve shaped in the form of an S appears. This non-linear S-curve lies at the root of many, if not most, diffusion processes, whether it concerns the diffusion of knowledge/information, rumors, ideas, new technologies or fashion trends.

**Figure 11 | Everett Rogers’ technology diffusion and the S-curve**

![S-curve diagram](image)

Source: Rogers, RobecoTrendsInvesting

**Moore’s crossing the chasm**  Closely related to and building upon Rogers’ innovation diffusion framework is Geoffrey Moore’s concept of ‘crossing the chasm’. In his similarly titled 1991 book, Moore argues that there is a chasm between the early adopters of the product (the technology enthusiasts and visionaries) and the early majority (the pragmatists) when innovations are of a disruptive or discontinuous nature. Moore believes visionaries and pragmatists have very different expectations, the former group being primarily interested in
the new technology and its performance improvement, while the latter group is primarily interested in the user experience. Marketing to these different groups with different needs and expectations requires a sometimes radically different approach and Moore suggest techniques to successfully cross this ‘chasm’.

**Figure 12 | Crossing the chasm**

Source: Moore; RobecoTrendsInvesting

**Gartner’s hype cycle |** Gartner’s hype cycle is based on the observation that people have a tendency to overreact to new, exciting technologies that promise to revolutionize entire industries, especially when the media, acting as huge amplifiers, pick up on it. When these new technologies fail to live up to unrealistically high expectations, disappointment sets in and expectations typically are pared back drastically. However, when these technologies have taken root, overcome their teething problems and customer uptake starts to accelerate, people, in classic under-reactive fashion, are slow to pick up on this new
information and tend to be positively surprised by it. This empirical pattern of overreaction to early-stage new technologies and subsequent underreaction to later-stage acceleration of the acceptance of these technologies, is also sometimes referred to as Amara’s Law. Like Moore’s concept of crossing the chasm, Gartner’s hype cycle is primarily applicable to discontinuous or disruptive innovation. Gartner charts hype cycles for more than 90 industries/technologies.

The investment implications of Gartner’s hype cycle are as follows:

• During the innovation trigger phase: invest in a broadly diversified basket of exposed companies as no winner can be identified with confidence yet and all or most boats will be lifted by the rising tide of enthusiasm. Investing in the facilitators of other companies’ growth ambitions (the ‘picks and shovels’ approach) is usually an even more prudent approach.
• Get out completely during the peak of inflated expectations phase; this would normally be shortly after mass media pick up on the story.
• Get in again after a 5% adoption rate has been surpassed. Still use a broadly diversified basket as winners probably are still difficult to pinpoint.
• Gradually shift to a more concentrated approach as the plateau of productivity comes into view and likely winners are usually more easily identified.

**Figure 13 | Gartner’s Hype Cycle**

![Gartner’s Hype Cycle Diagram](image)

*Source: Gartner, Robeco Trends Investing*

**Christensen’s theory on disruptive innovation** | The term ‘disruptive innovation’ was coined by Harvard Business School professor Clayton Christensen. In his 1997 bestseller *The Innovator’s Dilemma*, he describes how successful, well managed businesses can suddenly experience trouble despite seemingly making all the right moves recommended by
mainstream management theory. Christensen distinguishes between sustaining and disruptive innovation.

Sustaining innovation concerns incremental improvements in a company's products in order to better serve its customers' performance requirements. In the pursuit of serving their most demanding, and often most profitable, customers and after many product improvement iterations, Christensen contends that many companies tend to overshoot the performance needs of their bread and butter customers, who become increasingly reluctant to pay up for high-end product features that provide little or no added value to them. This makes these companies vulnerable to the emergence of low-end competitors who, usually by employing a cheaper, albeit initially inferior, technology, make a product that is good enough to meet the performance requirements of the lower tiers of the market. As this cheaper new technology improves along the path of its own sustaining innovation, it may start to move upmarket and gain share from incumbents who have trouble competing with the lower-cost product and consequently rely ever more on their high-end customers whose performance requirements cannot be met by the new technology. This process continues until the original incumbents become obsolete or can only survive in small high-end niches of the market. The low-end disruptors then effectively become the new incumbents and the process starts over again.

According to Christensen, there is another way strong incumbents can become victim of disruption. Low-end disruptors position and measure themselves along the same performance dimensions as incumbents, e.g. speed, accuracy, customizability etc. However, it is sometimes possible to position a product based on a new technology along another performance dimension, e.g. portability, and target non-consumers who cannot or will not use the existing product or non-consuming occasions where the existing product cannot be used. Christensen calls this "new market disruption" and uses the rise of cheap, portable transistor radios and VOIP phone calls as examples. As these new market technologies build alternative ecosystems and travel along their own trajectories of sustaining improvement, they can start to draw customers away from the original ecosystem, especially when performance along the original performance dimensions becomes good enough.
The investment implications of Christensen’s theory of disruptive disruption are straightforward. If new technologies enable innovation of a sustaining nature, investors are advised to bet on the incumbent(s), since these companies usually have the resources, know-how and capabilities to prevail. If, however, technologies enable low-end or new market disruption, it is usually advisable to bet on the disruptors, provided the new technology can improve over time.

**Porter’s Five Forces model** | Porter’s five forces analysis is a framework for analyzing the level of competition within an industry. It identifies five forces that determine the competitive intensity and therefore the attractiveness of an industry. Attractiveness in this context refers to the overall industry profitability. An ‘unattractive’ industry is one in which the combination of these five forces acts to drive down overall profitability. A very unattractive industry would be one approaching pure competition, in which available profits for all firms are driven to ‘normal’ profit. Conversely, an ‘attractive’ industry is one where the combined effect of the five forces results in high overall profitability (approaching monopoly in the extreme case).

Porter’s five forces include three forces from ‘horizontal’ competition: the threat of substitute products or services, the threat of established rivals, and the threat of new entrants; and two forces from ‘vertical’ competition: the bargaining power of suppliers and the bargaining power of customers.
Figure 15 | Porter's Five Forces model

Source: Porter, Robeco Trends Investing

**Business models as a conduit of technological change** | Whether disruption actually takes place largely depends on the incumbents’ response to the competitive challenge posed by disruptors. In most cases, incumbents have been around longer than disruptors and, consequently, have gathered more resources that, theoretically, could be used to adopt the new technology and pre-empt the rise of disruptors.

In practice, this has proven to be very difficult to do. As Christensen points out, disruption in business models, not technological innovation per se, has been the dominant historical mechanism for generating corporate and economic change. Most companies, however, find it close to impossible to radically adapt their existing business model since it almost always requires a complete overhaul in processes, capabilities and corporate culture that have taken many years to build and refine. Consequently, in order to gauge potential disruption stemming from new technologies, investors should pay more attention to changes in business models that are enabled by technological innovation than in technological innovation itself.

There are three generic types of business models:

- **value chain** - in this business model a company employs technologies that facilitate a production process consisting of a fixed sequence of steps to transform standardized
inputs into standardized outputs. The value chain business configuration is typically well-suited to mass market, high volume production.

- **value shop** - value shop business models combine a non-standard transformation process with unique inputs and outputs. The coordination of experts and/or expert knowledge and pooling this expertise to create a unique outcome is the hallmark of this business model. Creative, project driven industries are typically employing this business configuration.

- **value network** - the value network business model is characterized by a standardized, pre-defined transformation process that delivers unique outcomes to unique clients. This business model is well suited to link partners in an exchange that helps them locate appropriate counterparties to interact commercially or socially.

The table below summarizes the main characteristics of these three generic business models:

**Figure 16 | Three generic business models and their main characteristics**

<table>
<thead>
<tr>
<th></th>
<th>Value chain — making stuff</th>
<th>Value shop — solving unique problems</th>
<th>Value network — facilitating interactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>Long-linked</td>
<td>Intensive</td>
<td>Mediating</td>
</tr>
<tr>
<td>Manage</td>
<td>Products</td>
<td>Projects</td>
<td>Networks</td>
</tr>
<tr>
<td>Create and combine</td>
<td>Components</td>
<td>Competencies</td>
<td>Connections</td>
</tr>
<tr>
<td>Maximize...</td>
<td>Capacity utilization</td>
<td>Knowledge leverage</td>
<td>Network yield</td>
</tr>
<tr>
<td>... by optimizing the trade-off between</td>
<td>Component flow vs. product variation</td>
<td>Knowledge depth vs. knowledge breadth</td>
<td>Reach (# of connections) vs. Richness (# of relations per connection and quality of connections)</td>
</tr>
<tr>
<td>Scale gives</td>
<td>Cost efficiency</td>
<td>Competence mobilization</td>
<td>Connectivity</td>
</tr>
<tr>
<td>‘Perceptual real estate’</td>
<td>Brand</td>
<td>Reputation</td>
<td>‘Net expectations’ – how networks live up to expectations</td>
</tr>
<tr>
<td>Source(s) of competitive advantage</td>
<td>Scale, intangibles (brands, trademarks, patents), installed base switching costs</td>
<td>Intangibles (track record, access to expertise)</td>
<td>Network effects, switching costs, scale</td>
</tr>
<tr>
<td>Organic growth characteristics</td>
<td>Capital-intensive, limited by available financial means / expected utilization</td>
<td>Capital-light, limited by available talent, time to acquire skills</td>
<td>Capital-light for virtual networks, capital intensive for real networks, Limited by available infrastructure</td>
</tr>
</tbody>
</table>

Source: RobecoTrends Investing

Value chain business models, optimally suited for making ‘stuff’, flourish and tend to dominate in industrial economies centered around manufacturing industries, whereas value network business, optimally suited to connect dispersed resources, flourish in an economic setting where the retrieval, aggregation and further dissipation of scattered information, knowledge and resources, is highly valued.
In our time, where information and communication technologies have become the dominant drivers of innovation, it is therefore no surprise that value network business models are becoming, and in certain instances already have become, the dominant modes of business organization, while the importance of value chains is on the wane. The value shop configuration, which harnesses the knowledge of experts to provide unique client solutions, is by its very nature less affected by technological innovation.

**Investment implications of business model dynamics** | The transition from a world dominated by value chains optimized to facilitate a mass market, mass production economy to one dominated by value networks optimized to facilitate a mass customized and ultimately personalized production economy, is perhaps the biggest overarching trend of all. Investors are well advised to acquire an in-depth understanding of the characteristics and peculiarities of value networks and, as their latest and most sophisticated manifestation, platform companies.\(^5\)

**Centralization followed by decentralization** | The evolution of technologies tends to follow a lifecycle pattern that is characterized by an early stage centralization of resources and subsequent de-centralization and modularization of resources as the technology matures. Early-stage technology is often expensive, suffering from teething problems that need to be worked out, and is usually not easy to understand and work with except by highly skilled experts. These conditions practically force the centralization of resources in order to efficiently use and improve the technology. As the technology improves, becomes cheaper, more modularized and easier to use, it becomes possible to gradually decentralize and move closer to customers, thus providing more convenience and thereby driving accelerated uptake.

---

\(^5\) For a more in-depth treatment of business models, platform companies and their relevance for investors, see our white papers on Business Model Disruption and Platform Power.
Figure 17 | Centralization of resources followed by decentralization

Depending on the technology, this process of increasing decentralization can go through several stages, with each stage pushing further towards the customer while providing ever more convenience, personalization and ‘do-it-yourself’ features. The evolution of computing power, from mainframe to minicomputer to personal computer to desktop internet to mobile internet etc., provides an excellent example of this process.

Investment implications of centralization followed by decentralization | In the early stages of a new technology, it is often necessary for companies to be vertically integrated in order to iron out product flaws and get all the steps in the production process right. These companies tend to accumulate the largest part of the profit pool at this stage, while suppliers and other parts of the ecosystem tend to lead a marginal existence. Investors should normally own vertically integrated industry players at this stage.

As the technology becomes more modularized and the process of decentralization gets underway, the production chain tends to fragment into ever more specialized niche suppliers and the profit pool tends to flow away from the vertically integrated companies to the suppliers of the performance defining components or subsystems. For investors the adage is: follow the money!

Stewart Brand’s Pace Layer model | The Steward Brand Pace Layer Model (or Six Layer model) is a model to apply to the way change happens over time. There is a natural order to systems where some elements move faster than others. This fractal pattern of fast and slow is repeated in all things. The outer layers move more rapidly than the inner ones but each
ring is not independent. As one ring moves, there is a tension that pulls and pushes neighboring layers so that changes in fashion lead to changes in commerce which then influences the infrastructure necessary to support that commerce and so on.

One way to translate our three drivers of secular change, socio-demographic, policy- and technology-driven, is to see Brand’s culture/nature layers as representing socio-demographic/societal change, the governance layer as representing policy-induced change and the infrastructure layer as representing technological change.

**Figure 18 | The Stewart Brand Six Layer Model**

![Diagram showing the Stewart Brand Six Layer Model](image)

Source: Stewart Brand, Robeco Trends Investing
Sources

Bergakker, Steef; "Business Model Disruption - Digitization and Connectivity Drive Ground-Shifting New Business Models"; Robeco Trends Investing White Paper (June 2016)
Bessembinder, Hendrik; "Do Stocks Outperform Treasury Bills?", W.P. Carey School of Business, Arizona State University, 2017
Brand, Stewart; "The Clock of the Long Now", Perseus Book Group, 1999
Fuller, Russell J.; "Behavioral Finance and the Sources of Alpha", RJF Asset Management, 2000
Gartner; "Inside Gartner Research", Marketing Communications, 2016

Acknowledgements

We would like to thank our colleagues from the Trends Investing team for their discussions and feedback. The documentation and implementation of our trends investing methodology constitute an evolving process, which relies on the continuous sharing and discussion of new insights. We would also like to thank our sales team for their valuable feedback, which has shaped the Robeco trends investing approach over the years to what it has become today.