

Modern Asset Management

How asset management evolves with technology, new data sources and artificial intelligence

April 2021



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April 2021

Introduction

In this article we describe the current state of the asset management industry, what defines a modern asset manager and what prerequisites he needs to be successful. After all, the asset management industry has been facing fundamental challenges for years, which we will explain in detail. In doing so, we break away from the "classic" questions and show which points are really at stake.

Technology, new data sources and artificial intelligence are changing the asset management industry for the better. Further success factors for the future are a modern work culture and clear and simple communication. We explain the five points in detail. They offer the ideal opportunity for a start-up to lead the modernization of the asset management industry.

Four pillars are the prerequisite for a successful implementation: a combination of financial know-how, statistical and computer science know-how as well as many years of industry experience. We explain the reasons using an example.

The asset management industry – from the seller's market to the buyer's market

For many decades, investing in stocks and bonds was so profitable that the high costs of the industry only played a subordinate role for investors. That has changed today, among other things because of the persistently low interest rates, but also because many investors are now better informed. They are looking more closely than ever before on many issues, such as fees. Three topics are important:

1. Better performance: active or passive?

Investors are looking more and more closely at the added value of investment strategists and fund managers. A major trend towards passive investing has emerged from this in recent years. Here, investment strategies are developed according to fixed rules and usually made investable through exchange-traded funds (ETFs). Index providers are increasingly becoming quantitative asset managers. In other words, fund managers who invest according to structured and transparent investment processes.

The American finance professor Campbell Harvey writes in a recent study¹, that all investors are "quants" in some form because everyone is looking at some numbers. The only difference is whether the numbers are systematically evaluated or not.

The key question is therefore not "active or passive", but "who can best evaluate the numbers systematically?"

2. Cheaper investment processes: asset manager or index provider?

The asset managers' products often lag behind their self-imposed investment objective, usually in the form of a benchmark, because the fees for the products are too high. The European Securities and Markets Authority came to this conclusion in its study published in 2019.² Active funds outperform their benchmarks and passive products on average when it comes to costs. No more after costs. So, the product fees are still too high. And this even though the analysts at Morningstar, an independent

¹ Harvey (2021)

² Derenzis (2019)

financial investment consultancy, show that product fees, and thus the income of asset managers, have been falling steadily for years.³ For European asset managers, this leads to permanent margin pressure across the board, because spending is still high and even rising continuously, as the McKinsey analysts write in their study.⁴

Since the demand for different, systematic investment strategies remains high, investors are increasingly turning to cheaper ETFs from index providers. There are more than 3 million financial indices worldwide as of October 2020 according to the annual survey of the Index Industry Association (IIA).⁵ In addition, scientists show in a recent study that ETFs are becoming increasingly "active".⁶

However, this does not have to be an advantage for the investor in every case. This category also includes the "smart beta" strategies of the index providers, which, for example, pursue a value strategy. These smart beta indices provide added value on average in the historical backward calculation, but no longer from the time the index is published, as a team of scientists shows.⁷ In addition, index strategies suffer from high hidden costs, as the economist Lasse Heje Pedersen shows.⁸ This includes, for example, implicit costs from the inclusion or exclusion of individual stocks or bonds from the index.

The key question is therefore not "asset manager or index provider", but rather "who can offer a first-class investment process and keep costs low at the same time?"

3. More individual customer solutions: product-centered or customer-centered?

The needs of investors are very different. Asset managers must rethink, from focusing on the product to focusing on the individual investor, wrote Professor Lionel Martellini back in 2016.⁹ In technical terms this is called: "mass customization". According to Professor Martellini, the scalability of investment processes is a technical challenge.

Scaling has always been the goal of platform solutions. Analysts from Gartner, a provider of market research analyzes, write in their current report how the world's leading data science platforms are developing and how scalability is constantly improving.¹⁰

The key question is not "product-centric or customer-centric", but "Who offers a first-class investment process, at low costs and, above all, individually?"

³ Boyadzhiev and Garcia-Zarate (2020)

⁴ Azed et al (2019)

⁵ <http://www.indexindustry.org/2020/10/28/fourth-annual-ii-a-benchmark-survey-reveals-significant-growth-in-esg-amid-continued-multi-asset-innovation-heightened-competition/>

⁶ Easley et al (2021)

⁷ Huang, Song, Xiang (2020)

⁸ Pedersen (2018)

⁹ Martellini (2016)

¹⁰ Idoine et al. (2020)

The special opportunities of a start-up

The great advantage of a start-up is that it can break new ground directly and without barriers. When we founded HQ Asset Management in 2018, we strived for the best possible solutions for the three core challenges at the time and focused on improving / introducing 5 points in detail:

1. Work culture: more collaboration, less silo organization
2. Technology: higher scalability, maximum flexibility, and lower costs
3. Alternative data: new data for new information
4. Artificial intelligence (AI): more complex methods of data evaluation
5. Communication: clear and simple communication

The use of technology and AI requires years of asset management expertise

Professor Campbell Harvey writes in his current scientific paper ¹¹: “Technology alone, however, does not increase the probability of outperformance: outperformance depends on the skills of the team who are applying the technology to the investment problem.”.

In 2019, the CFA Institute wrote in an article entitled "Investment professional of the future" how the skills and team structure in asset management will change in the future.¹² Very similar to our point of view, the authors emphasize the increasing importance of a team approach and the increasing influence of statistical and computer science know-how in the industry.

You need four pillars to be successful:

1. Financial know-how
2. Statistics know-how
3. Computer science know-how
4. Several years of industry experience

The first pillar is important for understanding the problem, the second for knowing the solution, the third for getting things going, and the fourth for developing “realistic” products.

To get the best out of technology and AI, you need a very high level of specialist knowledge paired with many years of practical experience. Due to our more than 10-year asset management history in research and in the management of mutual and special funds in stock selection and asset allocation, we have the necessary experience. Our heterogeneous training in the fields of business, computer science and statistics forms an optimal combination of specialist knowledge.

When asked how best to implement the ideas, one always comes up with the same solution: a platform. Specifically, this means that everyone works and develops together on and on a common solution - regardless of the tasks in a company.

¹¹ Harvey (2021)

¹² Cao, Fender, Stammers, Urwin (2019)

Modern asset management - the points in detail

1. Work culture

Organizational scientist and Harvard professor Ranjay Gulati wrote in a 2007 article titled “Silo Busting”: “Companies claim to offer customer solutions, but most are not designed to deliver them without specific changes in organizational structure, incentives and relationships.”¹³ Applied to asset management, this means that teams should not be divided up according to different investment processes, as is traditionally done. Otherwise, this means that countless tasks have to be done twice, regardless of whether it is just a performance calculation or an AI algorithm. Above all, one platform for all processes is also cost-efficient and scalable. But that also means that there are still specialists for stocks and bonds. It's just that both work on one platform.

The American economist Henry William Chesbrough wrote in 2003 in his book "Open Innovation"¹⁴: „Not all the smart people work for us. We need to work with smart people inside and outside our company.” In the past, research and development was almost exclusively carried out internally. Nowadays, an additional driver of innovation is the use of external information.

For example, we use programming standards from large tech companies (Open Standards), the programming languages R and Python (Open Source), ideas from research (Open Innovation) and freely available data (Open Data). A current example from asset management is the scientific work of Andrew Chen and Tom Zimmermann.¹⁵ The two authors have published their entire program code for calculating factors for individual stock selection.

“Silo Busting” and “Open Innovation” are two defining influences on the success of Silicon Valley companies. We make use of these philosophies.

2. Technology

Rob Arnott, Campbell Harvey and the Nobel Prize winner and founder of modern portfolio theory Harry Markowitz wrote down seven points in 2019 that should serve as best practice in research.¹⁶ When reading, it quickly becomes clear: the requirements can only be achieved quickly and easily with modern technology. A key point is that the analyzes in asset management should be as robust as possible. In other words: analysts should have the various levers in the investment process under control, calculate and compare several variants.

The use of modern technologies is not only important for the application of procedures from the field of artificial intelligence, but in general. In their scientific work, the researchers Yun and Zheng construct thousands of fundamental signals from traditional indicators taken from annual reports.¹⁷ The authors apply 76 different rates of change and relative comparison values to each of the 240 indicators and thus arrive at 18,240 fundamental signals. Even for the monthly calculation of simple investment strategies based on the 18,240 fundamental signals, simple computing capacities are no longer sufficient.

One example of a modern technology is cloud computing. Cloud computing is more than just shifting “investment costs” to “operating costs”. It is more of a “pay as you go” system where you only pay

¹³ Gulati (2007)

¹⁴ Chesbrough (2003)

¹⁵ Chen, Zimmermann (2020)

¹⁶ Arnott, Harvey, Markowitz (2019)

¹⁷ Yan, Zheng (2017)

for what you use. You do not have to keep a computer capacity of 1000 computers available all the time. You can start, use, and stop it in just a few minutes. That makes sense not only economically, but also ecologically. Several scientists from the University of Berkeley published a groundbreaking study in 2009.¹⁸

Another fundamental study was the work of several Google employees in 2015.¹⁹ The authors share their experiences from many years of work at Google and write that for the application of artificial intelligence, the program code for AI only takes up a very small part. The biggest work lies in the entire IT infrastructure around it, which is huge and complex.

For years, a major development focus of data science platforms has been on automating the entire data analysis process by using automated machine learning (AutoML) techniques.²⁰

We do not use an external data science platform but have developed our own platform. The reasons for this are, among other things, that there is greater flexibility and individuality. Another important reason lies in the fact that the platform is tailored precisely to the problems in asset management. The researchers Gordon Leitsch and J. Ernest Tanner write in their study in 1991 that the optimal selection criterion for the appropriate prognosis method should be chosen individually according to the application.²¹

There is not one selection criterion for selecting forecasting methods that works across all applications. There is no single selection criterion that can be used equally for weather forecasts, sales forecasts, or stock market forecasts. There is no one size fits all solution that works for all industries. Here, too, individuality is usually required. For this reason, it is important to develop an individual platform for asset management.

3. Alternative data

With new data sources, information can be obtained that was previously not available. In their book, the authors Denev and Amen give an up-to-date overview of the large amount of data that could be useful in asset management.²²

Texts are an example. Text data provide additional information compared to traditional data, such as inflation, interest rates or the price / earnings ratio. Texts also provide an opinion or an interpretation. Newspaper articles contain the author's opinion at that moment.

The New York Times is one of the pioneers in the digitization of texts and has already digitized all articles back to 1850. Many other texts are only just being digitized. It is now possible to easily evaluate this data by machine. One possibility is the well-known dictionary approach, developed by Professors Timothy Loughran and Bill McDonald.²³ Interesting insights can be gained based on the data from the New York Times. For example, to analyze the relationship between return and risk in the stock market.²⁴

¹⁸ Fox et al (2009)

¹⁹ Sculley et al (2015)

²⁰ Hutter, Kotthoff, Vanschoren (2019)

²¹ Leitch, Tanner (1991)

²² Denev, Amen (2020)

²³ Loughran, McDonald (2011)

²⁴ Moritz (2018)

Text data analysis is becoming increasingly important. The scientists Gentzkow, Kelly and Taddy write in their review article in 2020: „Both the availability of text data and the frontier of methods are expanding rapidly, and we expect the importance of text in empirical economics to grow“.²⁵ Current studies provide explanations and show forecast approaches that were previously not possible. The authors Bybee, Kelly, Manela and Xiu measure the state of the US economy based on text analyzes of business news from 1984 to 2017.²⁶ In another current study, the scientists Ke, Kelly Xiu show how text analysis can be used to construct successful investment strategies in individual stock selection.²⁷

4. Artificial intelligence

Bruce Jacobs and Kenneth Levy are pioneers in quantitative asset management. In 1989 they wrote in a scientific article that the stock market is a complex system and that simple rules such as “only buy stocks with a small market capitalization” are not sufficient.²⁸ They write that the stock market is made up of a web of many interconnected effects and that substantial computing power is required to unravel the effects.

In 2011, the American scientist John Cochrane asked crucial questions about the factors in the stock market.²⁹ Is value an important factor? Or is momentum a factor? Are the two independent of each other? How many factors are there? Kenneth French and Nobel Prize winner Eugene Fama also pushed the limit in their five-factor model in 2015.³⁰ With the existing statistical methods from the 1970s³¹, it was difficult to separate the effects of the five factors from one another. The problem was that scientists had now identified over 300 factors³². New methods were needed.

About 25 years after the work of Bruce Jacobs and Kenneth Levy and three years after the work of John Cochrane, Benjamin Moritz (today: HQ Asset Management) and Tom Zimmermann (today: Professor at the University of Cologne) were the first to show the benefits of artificial intelligence in stock selection in an extensive study.³³ The results were very good considering the risk / return profile of the strategy. Since then, the work has been presented and discussed regularly at international conferences and at companies. In 2015, the work was awarded the Best Paper Award at the annual conference of the German Society for Finance. To date, the study has been cited over 70 times.³⁴

The "Random Forest" method was developed in 2001 by Leo Breiman.³⁵ The random forest itself is based on decision trees, which were published for the first time in 1963.³⁶

In the area of individual stock selection, there are more and more studies that certify that artificial intelligence methods are superior in price forecasting³⁷. Likewise in the corporate bond selection³⁸,

²⁵ Gentzkow, Kelly, Taddy (2019)

²⁶ Bybee et al (2020)

²⁷ Ke, Kelly, Xiu (2019)

²⁸ Jacobs, Levy (1989)

²⁹ Cochrane (2011)

³⁰ Fama, French (2015)

³¹ Fama, MacBeth (1973)

³² Harvey, Liu, Zhu (2016)

³³ Moritz, Zimmermann (2014)

³⁴ See e.g. Cerniglia, Fabozzi, Kolm (2016) and Mullainathan, Spiess (2017)

³⁵ Breiman (2001)

³⁶ Morgan, Sonquist (1963)

³⁷ Rasekhschaffe, Jones (2019), Gu, Kelly, Xiu (2020)

³⁸ Bali et al (2020)

government bond allocation³⁹, Asset Allocation⁴⁰ and volatility forecasting⁴¹. Artificial intelligence continues to be used increasingly in many other process steps, such as portfolio optimization.⁴²

Methods of classical financial econometrics will not be completely displaced by methods of artificial intelligence in the future. Financial econometrics continues to be used in particular for data analysis, checking economic hypotheses and for simple data relations. The scientists Cerniglia and Fabozzi provide an overview to compare the two approaches.⁴³

At HQAM, we use artificial intelligence processes and have developed them to market maturity. Among other things, we also implement the seven requirements from the article by Rob Arnott, Campbell Harvey and Harry Markowitz from 2019.⁴⁴ We invest a lot of time in data work (in stock selection there are more than 200 factors for every stock in the world) and investability (low turnover, low transaction costs). We control the complexity of the AI and document every single backtest to get a complete picture. We calculate our strategies across many different regions and countries to test robustness.

5. Communication

The scientists Burns, O'Connor and Stocklmayer define in 2003:⁴⁵ "Science communication is defined as the use of appropriate skills, media, activities, and dialogue to produce one or more of the following personal responses to science: Awareness, Enjoyment, Interest, Opinion-forming, and Understanding."

Good and simple communication is more than ever the key to success. Big changes, as we describe them here, have to be explained simply and using examples.

In 2017, the researchers Finale Doshi-Velez and Been Kim wrote a review article about the interpretability of artificial intelligence methods.⁴⁶ A research field that is currently being very strongly promoted. Even more complex processes from the field of artificial intelligence can now be interpreted, such as simple linear regressions. The method developed by Friedman in 2001, for example, gives a very good insight into the effect of individual data on the prognosis.⁴⁷

As Leo Breiman shows in his work "Statistical Modeling: The two cultures" in 2001, communication between scientists and laypeople is not only important, but also between scientists themselves.⁴⁸ We have developed an extensive reporting pipeline for internal and external communication to gain full insight into every work step in the process chain.

³⁹ Bianchi, Büchner, Tamoni (2021)

⁴⁰ Rapach, Zhou (2020)

⁴¹ Christensen, Siggard, Veliyev (2021)

⁴² de Prado (2018), Guida (2019), de Prado (2020)

⁴³ Cerniglia, Fabozzi (2020)

⁴⁴ Arnott, Harvey, Markowitz (2019)

⁴⁵ Burns, O'Connor, Stocklmayer (2003)

⁴⁶ Doshi-Velez, Kim (2017)

⁴⁷ Friedman (2001)

⁴⁸ Breiman (2001)

Summary

The asset management industry has evolved from a seller's market to a buyer's market.

To meet the requirements of investors, a modern asset manager should fulfill three tasks:

1. Better performance
2. Cheaper processes
3. More individual customer solutions

The opportunities for a start-up are:

1. Work culture
2. Technology
3. Alternative data
4. Artificial intelligence (AI)
5. Communication

You need four pillars to be successful:

1. Financial know-how
2. Statistics know-how
3. IT know-how
4. Several years of industry experience

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