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INVESTMENT MANAGEMENT
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INTRODUCTION: Current state

With tailwinds having supported the asset management industry for decades, managers had no urgent need to innovate or radically change their business models. Progress had typically been evolutionary, revolving around repackaging products or incrementally improving certain processes. The current post-financial crisis environment has forced managers to enter new markets, roll out new investment vehicles, and launch new strategies in search of growth. Along with a shift in emphasis from security selection to asset allocation, investments in new and innovative strategies continue to grow.

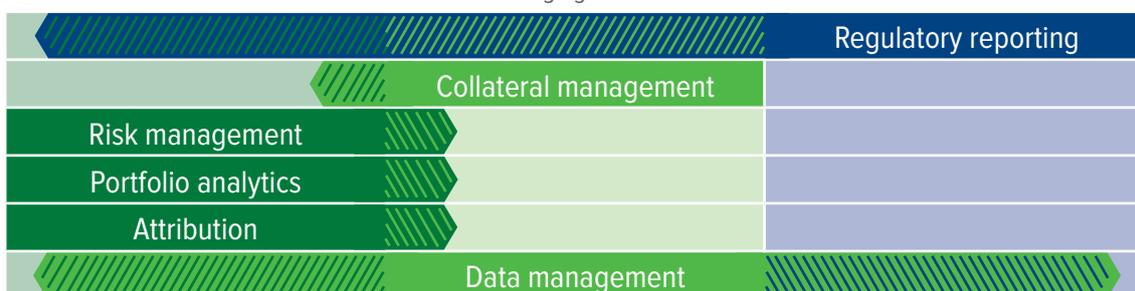
Additionally, asset management firms have been significantly shifting their technology and operations strategies, as they have come to realise that there is value throughout their organisations, in operational as well as portfolio management functions.

The conventional operational structure typically consisted of three distinct areas—front, middle and back offices. However, these lines have now blurred, with the definitions of what is included in each inconsistently applied from firm to firm. What’s driving this shift? As portfolio managers tap into increasingly complex investment strategies, the demand for investment information is testing the bounds of traditional technology and workflows. Since these strategies use more complex instruments, asset managers require increasingly sophisticated middle offices, featuring more effective systems that can support an evolving and sophisticated investment operational infrastructure.



| Front Office | Middle Office | Back Office |
|--|--|--|
| Portfolio modeling Portfolio construction Trade order management Order execution Cash management Pre-trade compliance | Trade settlement Post-trade compliance Investment accounting Performance management Client reporting and billing Portfolio reconciliation Portfolio administration Treasury cash management | Fund administration Fund accounting Transfer agency Investor servicing Fund performance Fund compliance |

Converging functions



Source: SEI.

At a foundational level, the investment in more accurate, enriched, and timely flow of data throughout the organisation is both revolutionising and challenging existing asset management operations. In addition to enhanced operations and infrastructure, managers must also support new investor and regulatory reporting requirements, while simultaneously gleaning new insights to compete more effectively.

With this change, service providers are adapting their offerings to both keep pace and better support their clients' requirements. The original middle-office-focused providers are now diversifying their offerings into the front office, while historically front-office-focused providers have begun offering more middle-office functionality. On top of that, pure back-office fund administrators are moving up the chain and offering degrees of middle-office and even front-office services. This convergence of providers and platforms—one in which everyone is playing in everyone else's sandbox—that used to cater solely to either managers of traditional or alternative products, is driving the development of technology that is able to handle traditional exchange-traded securities as well as more esoteric, derivative or illiquid securities or investments often associated with alternative asset managers.¹

This changing landscape will only continue to evolve as new entrants, from financial services to fintech, break through and next-generation technologies mature. Robotics, cognitive computing, artificial intelligence, blockchain and digitalisation all offer the possibility of profound disruption.²



The changing face of asset management technology

Historically, asset management organisations have been functionally siloed into three pillars: the front, middle and back offices. The goals of these functional silos were different, as were the technology support structures that grew around them. Many industry veterans will remember the days of distinct front-, middle- and back-office IT teams with different skill sets and technology platforms. Though this was—and still is, to some extent—a commonplace structure for asset managers, it was not without shortcomings.

Silos inconsistent with convergence

The much-discussed trend of convergence of traditional and alternative investing has not just taken hold, it has accelerated as managers and investors have absorbed the harsh lessons of the 2008 financial crisis. Investment frameworks continue to move away from traditional style box products toward alternative, outcome-driven, and solution-oriented products. Asset managers can no longer compete successfully in their accustomed silos of the past; they must now ensure that their operational infrastructure—their operating systems—be similarly product-agnostic, able to handle a greater variety and complexity of investment holdings, and support highly customised reporting requirements.³

Front Office: One of the hallmarks of the traditional front-office IT structure was the use of asset-class specific products (e.g., MSCI Barra for equity, Barclays POINT for fixed income) that were often functionally or configurationally limited to a subset of investment products or styles. These products, while very good for their purpose, didn't play well with others. They had limited integration with the broader infrastructure, separate security masters, and an inability to provide an aggregate picture of risk, exposure and attribution, impairing operations.

Middle Office: Meanwhile, the middle office leveraged large, cumbersome accounting platforms, often with a highly customised data structure, or occasionally piggybacked off custodian systems. These legacy solutions provided limited scalability, lacked real-time transparency into cash and positions, and had difficult upgrade paths. These challenges led many operations teams to develop their own bespoke solutions (or a greater dependence on Excel spreadsheets), repurpose functionality of other applications, or implement complicated workarounds to support specific functions. As investment strategies evolved, expanded, and became more complex, the challenges of middle-office IT were only amplified.

Back Office: Adding to this complexity, the back office was typically inundated daily with unstandardised data from a variety of sources. Holdings, prices, trades, cashflows, and countless other transactions flowed to different applications on different timetables. This stream of data was then used by back-office administrators to provide a snapshot of portfolio positions at a specific point in time and calculate performance and risk estimates on a monthly basis.

Limitations of the silo structure

Supporting this legacy silo structure has become increasingly beset with problems. The complex nature of these environments makes them extremely high touch, and the high cost of dedicated resources and constant monitoring has become a resource drain and economically unsustainable for many asset managers. This expanding technology stack has been in place at many firms for decades, despite the fact that a number of these vendor-based solutions have been sunsetted or sold. Couple that with the demand for increased transparency into (near) real-time data, and this opens an opportunity for forward-thinking solutions providers that offer new and innovative solutions to serve as viable alternatives across the front, middle and back offices.



The game changes for asset managers

Traditional silos and legacy technologies became ubiquitous in asset management, in no small part due to the slow pace of innovation in the industry. As we've seen in recent years, that is no longer the case. But most progress within asset management has been evolutionary rather than groundbreaking, with asset managers embracing information technologies that help them better manage portfolios, create economies of scale, and make complex financial operations more efficient. Only in rare instances have investment firms used technology to reinvent business models. Yet a confluence of drivers is changing investment strategies, operations and technology across the industry. This, in turn, is presenting opportunities for solutions providers to broaden their offerings and help asset managers enrich their client relationships, develop innovative products and reinvent their business models—opportunities the industry has only begun to exploit.⁴

Investment strategies evolve

In the post-2008 financial crisis era, single-asset-class investment strategies have struggled to attract assets at the previous rate as asset managers seek to perform in a low interest rate, low return, but increasingly competitive environment. Despite the CBOE Volatility Index currently near historic lows, this trend does not appear to be changing as industry pundits continue to forecast a period of prolonged volatility and uncertainty with 2016 geopolitical changes in our recent rearview mirror.⁵ In search of elusive pockets of alpha, the industry has turned to alternative and multi-asset-class investments. These complex strategies require a greater volume, frequency, and quality of data to effectively manage them. At the same time, the technology required to support these assets doesn't reside within the traditional front-office silo. With a growing need for timely risk and attribution data, portfolio managers are demanding a shift in both technology and skill set, breaking down the walls between the middle and front offices.



Everyone knows that multi-asset investing is on the upswing. The rising thesis is that we should be looking at our portfolios as multi-asset-class portfolios. That's caught on over the past few years. Assets managed in such strategies are growing at one of the fastest paces in the industry worldwide.”

Source: CFA Institute⁶

Increased focus on risk management

In today's market, there has been a general reticence from investors to take on risk, which can be partly attributed to political uncertainty and the thought that one unexpected event could rock the financial markets and put an end to the second longest bull market in history. Even for those investment managers who must remain fully invested, risk management has become just as important as generating returns. Indeed, some long-only portfolio managers have begun developing frameworks to help them identify opportunities during market downturns, a strategy that was historically reserved for hedge fund managers. This focus on investment risk management has created a growing need for sophisticated tools for risk correlation, scenario analysis and risk modeling.

The front office has led the charge in terms of technology investment and taken on a growing share of risk management functions that historically resided in the middle office as an ex-post process. Today's front office is focused on risk analysis that takes into account volatility, correlations, changing market dynamics and pricing as an ex-ante function.

It's important to note that market factors are not the only driver for an increased focus on risk management. Though in many ways, the impending effects are unclear, an evolving wave of financial regulation is pressuring asset managers to ensure their investments comply with new mandates. Regardless of how Dodd-Frank, MiFID II, SEC Modernisation, or Solvency II shake out, the growing call for transparency requires timely delivery of aggregated, accurate and easily consumable data across the front, middle and back offices. As such, many asset managers are turning to middle- and back-office service providers (who must be at the forefront of these regulatory changes to remain competitive) to provide these services.

Data management becomes a top priority

Changing investment strategies and risk management are prevalent drivers of a seismic shift in asset management operations, but these elements all underscore the importance of data management. Silo-based structures have historically precluded portfolio managers from accessing and querying data that could fundamentally influence their investment strategies.

With the increased focus on sophisticated risk models, client service, and complex asset classes, a broad-reaching audience now requires timely and accurate information. By breaking down walls between the front, middle and back offices, the industry has moved from monthly snapshots of portfolios to weekly and daily, with the ultimate goal of providing near real-time investment data to a variety of consumers.⁷

Unfortunately, legacy systems and operations models are often incapable of handling this increased flow and diversity of data. Particularly with the increased concern about cybersecurity and improper access to data, the new data-enablement era necessitates stringent governance, safeguarding and maintenance structures, along with new functional skill sets throughout the asset management organisation.

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Service providers adapt to keep pace

As the boundaries have eroded between the front and middle offices, a wide range of solutions providers (from traditional fund administrators and custodial banks to software vendors and new fintech entrants) have seized the opportunity to cater to a new set of needs. Middle- and back-office providers are now expanding capabilities beyond their traditional purview, while front-office providers are extending their services into the middle-office space. Adding to this changing landscape, new players are entering the fray on the back of big data capabilities developed in other industries.⁸

Middle-office providers expand offerings

Middle-office service providers have capitalised on the opportunity presented by the replacement of legacy systems to further develop and evolve their business model. The mainstream proliferation of alternative assets—expected to account for 15% of global AUM and 40% of the revenues in the global asset management industry by 2020, as compared to 12% and roughly 30% currently⁹—has allowed certain providers to develop shared capabilities to support these value-added active investment products. This has been achieved through a variety of different approaches, including partnerships with clients to develop expanded product suites designed to increase their scope of service beyond their historic purview.

Another way has been through acquisitions of holistic businesses intended to fill specific gaps in their service offerings (e.g., a service provider who serviced mainly traditional asset managers acquiring another provider that caters mainly to alternative managers). These expanded product offerings have enabled the traditional providers to gain traction with new clients that they previously would not have serviced, including hedge funds, private markets, asset owners and real estate.

Emboldened by the success of their horizontal expansion and eager to market their powerful datasets, middle-office providers have begun expanding vertically into the front office. It is no coincidence that this shift mirrors the blurred lines of the front and middle offices within the asset management organisation. Leveraging their strong data and staffing resources, these providers have been able to quickly introduce data-enabled services, often as Data-as-a-Service (DaaS).

Front-office providers infiltrate the middle office

We have also seen traditional front-office application providers and software vendors look to establish footholds in the middle office. These vendors previously focused on decision support and portfolio construction for the investment professional and order management for trading desks, but are now diversifying their offerings and moving into middle-office functions. By leveraging early data capture, front-office vendors make a strong argument for their enterprise data management offerings.¹⁰ These new solutions are targeting the same audiences as middle-office service providers but are starting further upstream and can make a compelling case for asset managers who are already reliant on their front-office solutions.

New entrants break through

Digital giants Google, Apple, Facebook, and Amazon are estimated to own more than 50% of the digital user journey.¹¹ At one point in mid-2016, “the Big Five,” which includes the aforementioned plus Microsoft, held the top five spots in terms of market capitalisation, eclipsing energy giant Exxon.¹² Three of the five were founded in the mid- to late-1990s, and over that time, they have built up a massive repository of consumer data that allows them to profile, target and sell to end users in nearly any industry, leveraging their proprietary big data capabilities.

Armed with data economies of unprecedented scale, they have entered financial services through the most consumer-facing vertical: banking. Thus far, the internet giants have made notable inroads through payment technologies (Google Wallet, Apple Pay, and Amazon Payments) and formed the Financial Innovation Now coalition to advocate technology advancement in financial services.

While their near-term focus is on the individual investor, as the industry moves toward digitisation, their competitive edge may threaten incumbents who cannot adapt their technology to new digital service models for both retail and institutional investors. In today's wired world, every person is a data generator, as are all the devices connected to the burgeoning Internet of Things. Indeed, Goldman Sachs estimated that by 2020, 28 billion such devices would be in use, leading to the doubling of knowledge every 12 hours.¹³ Yet with the majority of new data being largely untagged, file-based and unstructured—there's an unscientific truism that 80% to 90% of business-relevant information originates in unstructured form—only 3% of the potentially useful data is tagged, and even less is analysed.¹⁴

The cloud-based web services of Amazon, Microsoft, Google and IBM are already cutting into the market share of traditional service providers. Their entry may well be only the beginning of their disruption of the Software-as-a-Service (SaaS) and DaaS landscapes in asset management. Combined with their unrivaled capabilities in data, digitisation and innovation, future technologies developed or optimised outside of the financial services industry could have a strong value proposition over traditional financial offerings.



Next-generation technology

Asset managers have historically been reticent to experiment with new technologies, but that attitude is rapidly changing, particularly when observing the potentially relevant advances made in other industries. In the past few years, a growing data management focus has attuned asset managers to concepts like big data, predictive analytics and artificial intelligence. Although many new technologies are not yet proven, or in early stages, in financial services, some of the industry's biggest players are investing early in hopes of harnessing a competitive advantage in a developing market.

While innovation centres are still the playground of blue-chip firms, understanding where the industry is headed is necessary to take advantage of new technologies as they are integrated into the trade management life cycle.

But it is not just the buy-side that is looking to the future; regulators are keeping a watchful eye on emerging technologies as well. Former US SEC Commissioner Luis Aguilar and current SEC Commissioner Kara Stein have both addressed technology and innovation in asset management. They focused particularly on technologies that pertain to the need for timely, accurate and complete data and information, as well as on developments that are challenging business models and practices, not to mention regulatory structures.^{15 16}



All across the capital markets, technology and innovation are challenging the old ways of transacting business and old ways of thinking about regulation. Many of the new innovations are reimaginings of current market functions.”

- US SEC Commissioner Kara M. Stein

Cognitive intelligence and labour arbitrage

While it's not likely that humanoids will start to occupy the offices of asset management firms and service providers, simple-form robotics are currently being leveraged for automation of repetitive back- and middle-office processes, such as reconciliation, risk model snapshots and underwriting. As of now, one of the most applicable technologies to asset management operations comes in the form of robotic process automation (RPA). RPA takes error-prone and inefficient manual processes and writes an algorithmic programme to automate them, and in doing so, offers efficiencies in terms of cost and time. According to a report by Grand View Research, the RPA market is predicted to grow to \$8.75 billion by 2024, and while banking, manufacturing and healthcare have started using robotics, asset management operations could well be next in line for disruption.¹⁷ With the technology available now, it's easy to see how the business process outsourcing (BPO) model could fundamentally change from predominantly offshoring to robotics in the near future.

RPA can automate rote tasks, but more complex programmable learning falls under the umbrella of artificial intelligence (AI). AI, or more specifically machine learning, doesn't just follow the processes it is programmed to perform, it learns how to do them better, adding to a growing repertoire of processes and outputs. Nascent AI technologies are coming to the fore in wealth management where high-touch services such as preparing client reports are too complex to automate based on basic input/output. Software vendors such as Narrative Science, Arria, and Yseop are leveraging proprietary AI to analyse investment data and turn that into commentary for client, regulatory and internal reports. This commentary is far from robotic—it reads like natural language (without typos or grammatical inconsistencies, naturally).

What is truly impressive about AI is not its ability to cut costs and streamline operational processes—it's the possibility that it could one day be the competitive differentiator among asset managers as an indispensable front-office tool. Machine learning may feel a long way off, but a growing number of asset managers are investing in cognitive technologies like IBM's Watson to improve their predictive models and better inform investment strategy. However, none of these technologies can function without accurate, enriched data, so this foundation must be a priority before AI can come into play in force.

Digitalisation offers differentiation

In recent years, the client service model has increasingly shifted to more interaction and transparency for the end (underlying) investor. While this has partially been driven by investors, improved client service through digitalisation has also come to the forefront as a competitive differentiator. Digital platforms and client portals now provide investors with unprecedented access, in a variety of forms, to their portfolios. Standout client service is increasingly defined by easy-to-use interfaces and round-the-clock accessibility of information.

Having spent considerable time focused on the needs of institutional clients, asset managers are increasingly looking to the client service models in industries such as retail banking and travel to ward off new entrants with strong digital presences. Pressured by automated advice via robo-advisers, a shift from active to passive investments, and shifting demographic targets, the front and middle offices are expanding and diversifying their services to keep up with new communication channels employing text, online chat and video. These changes will bring more robust service via technology, allowing employees to focus their efforts on tailored, client-facing services.

Blockchain: the new standard?

More than five years after bitcoin was introduced as the world's first decentralised, open-source digital currency, its prospects remain murky. The cryptocurrency is still more popular as a speculative commodity than as the basis for digital wallets.

But blockchain, the technology protocol behind bitcoin that has been in development since 2008, now seems poised to take hold in a big way. In fact, it could completely transform our current system for enabling and recording financial transactions. No longer would financial institutions have to communicate with each other to enable transactions, nor would they have to use intermediaries to clear and settle accounts.¹⁸ Such is the enthusiasm behind the technology that research estimates the total savings to global financial market ecosystems could reach as much as \$15 billion to \$30 billion.¹⁹

At a basic level, blockchain technology is a decentralised, shared digital ledger that keeps a secure record of each transaction that occurs across a fully distributed or peer-to-peer network, whether public or private. It promises the ability to link a transaction, settlement and recording in one motion, creating one indisputable, unalterable record less vulnerable to cyberattacks or data breaches. With the cost and time that currently goes into fundamental middle- and back-office functions and services, such as reconciliation, confirmation and custody services, it's easy to understand how blockchain and distributed ledger technology (DLT) could forever alter the asset management industry.

Primarily due to factors of scale and cost, early stage innovation is being led by global banks and consortia replete with venture-backed capital; the R3CEV consortium counts 70 financial institutions on its roster. It's easy to visualise a future in which regulatory reporting is as simple as granting secure permissions to oversight authorities to view the ledger. Because DLT looks to vastly improve financial security, accuracy and latency, regulators and standards associations have been quick to voice their support in getting blockchain to the point of standardisation.

While industrywide buy-in has not been hard to come by—more than 80% of respondents to a Bain & Co. survey expect DLT's impact on clearing and settlement to be “transformative”²⁰—true disruption may be multiple years off, with funding concerns and competing initiatives affecting collaboration and consortia harmony,²¹ not to mention stringent and costly adherence to regulatory and legal requirements.²² Yet strides are being made, including the DTCC's recent announcement that it will migrate the post-trade processing of credit derivatives to a DLT system in 2018²³ as well as SWIFT's announcement of a proof-of-concept to test blockchain's impact on real-time reconciliation of international accounts. With these technologies gaining industrywide clout, a new operational paradigm is beginning to unfold.

Savings to global financial markets

**\$15-30
BILLION**

Source: Bain & Company

CONCLUSION: The future is bright

It is more apparent than ever that traditional silos, legacy technologies, and maintenance of the status quo no longer have a place in asset management. Though futuristic technologies dominate headlines, there is a more subtle shift that has taken hold of the industry. The traditional asset manager of old has effectively become a thing of the past—single-asset-class investment portfolios and monthly attribution reports will struggle to gain traction in a competitive market.

The front office has led the charge in breaking down barriers and evolving investment strategies to keep pace with the changing asset management landscape. That said, it's the experience, skill and leadership of the middle and back offices that will set the tone for technology and operations in the data enablement era. To their advantage, operations and IT leaders will find no shortage of partners as a growing list of service and solutions providers expand their front- and middle-office capabilities.

With the right technologies, the right expertise and thoughtful systems design, forward-looking managers can turn their infrastructure into a powerful source of competitive advantage. Instead of being overwhelmed by the torrent of data streams and information demands, they can harness it to gain economic leverage, meet the demands of investors and regulators, gain new insight into business dynamics and fuel product development.²⁴

Time will tell whether today's cutting-edge technologies will become quickly outdated or replaced as the next generation of technology revolutionises the asset management industry.

But of one thing we are sure: asset managers who underinvest in their operational infrastructure or adopt a wait-and-see approach risk far more than a regulatory breach. They are likely to miss a rare chance to truly differentiate themselves from their competitors and capitalise on an exciting opportunity to lay the foundation for sustainable future growth.

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SEI (NASDAQ:SEIC) is a leading global provider of investment processing, investment management, and investment operations solutions that help corporations, financial institutions, financial advisers, and ultra-high-net-worth families create and manage wealth. As at 31 March 2017, through its subsidiaries and partnerships in which the company has a significant interest, SEI manages or administers \$779 billion in hedge, private equity, mutual fund and pooled or separately managed assets, including \$297 billion in assets under management and \$478 billion in client assets under administration. For more information, visit seic.com.

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