

## THE ROLE OF THIRD PARTY VENDORS IN ASSET MANAGEMENT

SEPTEMBER 2016

Policy makers have increasingly focused on the role of service providers to the asset management industry.<sup>1</sup> Indeed, there are a diverse range of services utilized by asset managers to perform numerous functions – from obtaining security data and risk analytics that inform investment decisions, to order management and trade execution systems that facilitate placing and executing trades, to accounting and performance systems and service providers that are used for reporting and recordkeeping purposes. In addition, custodians are responsible for holding and safeguarding client assets as well as facilitating the settlement of transactions. Further, there are a variety of financial market infrastructures (FMI) upon which all market participants rely, including exchanges, central clearing counterparties (CCPs), electronic trading and affirmation platforms, and trade messaging systems.

Third party vendors reflect a broad range of companies. For example, some vendors are affiliates of banks or asset managers, while others are independent firms. In addition, some vendors have a very narrow set of offerings that are provided on a stand-alone basis, while others offer more comprehensive solutions to support a variety of asset manager business processes. This landscape is further complicated by the diversity of asset manager business models and the fact that many asset managers can and do complete functions internally or build their own systems to support their unique needs. In other words, most asset managers take a “mix and match” approach, performing some tasks internally while engaging vendors to complete other tasks. For example, while economies of scale permit some organizations to perform multiple functions in-house or with affiliates, other asset managers find it more effective to outsource or purchase the same services from third parties. The resulting landscape allows no simple definition or description of third party vendors and creates no single model for the role of third party vendors in asset management. Nonetheless, as is the case for many other industries, all asset managers have at least some level of reliance on third party vendors, underscoring the need for a better understanding of the landscape.

In August, 2014, we published a *ViewPoint* entitled [The Role of Technology within Asset Management](#), which highlighted how technology is integrated into various asset management functions. Technology systems represent just one dimension of the discussion. In this *ViewPoint*, we expand upon our previous work by cataloguing the broad range of vendors that help asset managers conduct critical functions. In particular, we survey some of the key types of third party vendors to asset managers. We then look briefly at FMI, as these entities have a profound impact on the ability for asset managers to operate, but the selection of these entities is not always in the control of asset managers, nor is the regulation to which they are subject. Given the increasing policy focus on the role of third party vendors in asset management, we end by offering some recommendations regarding guidance that should be provided to purchasers of services and we suggest a framework for approaching the analysis of the providers of these services.

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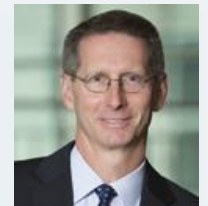
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The purpose of this paper is to provide an overview of key vendors within the asset management landscape; however, this paper is by no means comprehensive, as there is considerable variation around the role of third party vendors and there are hundreds of different vendors offering a wide range of data, systems, and outsourcing services. Nonetheless, we hope the paper will be helpful in beginning a dialogue on this important subject. Given the breadth of this topic, there is clearly a need for further analysis by policy makers before drawing conclusions about potential risks that the use of third party vendors by asset managers (or the vendors themselves) may present.

## Diversity of Asset Manager Business Models

The asset management industry serves a broad range of clients from defined benefit and defined contribution pension plans to insurers, sovereign wealth funds and other official institutions, family offices, foundations, endowments, individual clients, and more. Each of these clients has their own unique investment objectives and constraints. The diversity of client needs results in a wide variety of firm structures and business models across the industry, ranging from investment boutiques that focus on a single product or clientele to larger institutions that offer multiple services in addition to asset management.

The organizational structure of asset managers also varies widely. Some asset managers are operated by publicly-traded companies that are subject to a variety of financial disclosure standards.<sup>3</sup> Other asset managers are privately-held entities and, therefore, are not subject to public company reporting standards. Another means of distinguishing asset managers is whether or not they are affiliated with other types of businesses due to ownership by a common parent company.<sup>4</sup> Affiliations with other types of financial services providers generally affords significant opportunities to find synergies and cost efficiencies in terms of being able to provide a more comprehensive suite or bundle of services to a given client base. Banks represent the best examples of this model, as most banks have affiliates that provide custodial services, transfer agent services, asset management, agent lending capabilities, and fund administration.

Another key area of diversity among asset managers is the investment strategies and products offered. Whereas many asset managers specialize in a single asset class or investment strategy, many others offer a variety of investment strategies managed by different portfolio management teams. Further, asset managers can focus on a specific investment style (e.g., passive index tracking versus active management), while others offer multiple investment styles.

### KEY OBSERVATIONS

#### **All asset managers utilize multiple third party vendors.**

- ▶ There are numerous vendors providing a wide range of services to asset managers.
- ▶ The range of services and the number of vendors reflect the growing diversity of the global market ecosystem and concomitantly the asset management industry.
- ▶ Asset managers need a vendor management program and a business continuity management program that factors in services provided by third parties.
- ▶ Where they have not already done so, regulators should provide guidance for conducting due diligence on vendors, including reviewing business continuity and technology disaster recovery plans, as well as cybersecurity standards.

#### **As providers of services, vendors should include business continuity management, technology disaster recovery planning, and cybersecurity as critical components of their business models and operations.**

- ▶ Any new rules established for vendors of data, systems, or outsourcing services should be applied to *all* vendors with similar offerings, regardless of their organizational structure or affiliation with another organization.

#### **Custodian banks play a central role in safeguarding client assets and often provide a variety of additional services.**

- ▶ Additional services provided by custodians can include cash management, foreign exchange and currency hedging, securities lending agent services, fund accounting and administration, among others.
- ▶ The regulation of custodians has been updated post-crisis in several jurisdictions.<sup>2</sup>

#### **Special attention should be given to shared financial market infrastructure, which are critical to the proper functioning of capital markets, including asset management.**

- ▶ Exchanges and CCPs are central resources that are relied on by virtually all participants in the market ecosystem, not just asset managers.
- ▶ The SWIFT messaging network is the primary communications network used by banks, insurers, asset managers, and asset owners that manage their assets directly (e.g., sovereign wealth funds, pensions, insurers, etc.).
- ▶ Depositories facilitate the movement of securities, foreign exchange, and other positions from one counterparty to another.

In addition, there are many asset managers that specialize in alternative asset classes including real estate, private equity, venture capital, and hedge funds.

Product structure and client base are additional differentiators is assessing the business models of asset managers. For example many managers offer commingled investment vehicles (CIVs) such as registered mutual funds and private funds. These products have a range of administrative, operational, and regulatory requirements, which can differ from one jurisdiction to another. Further, the operational and regulatory requirements of separate accounts differ somewhat from those of funds. As such, the product structures offered and jurisdictions in which the manager operates can shape how that manager chooses to structure its business, as well as its need to utilize third party data, systems, and the degree to which operational functions are outsourced to third party vendors.

### Key Asset Management Functions

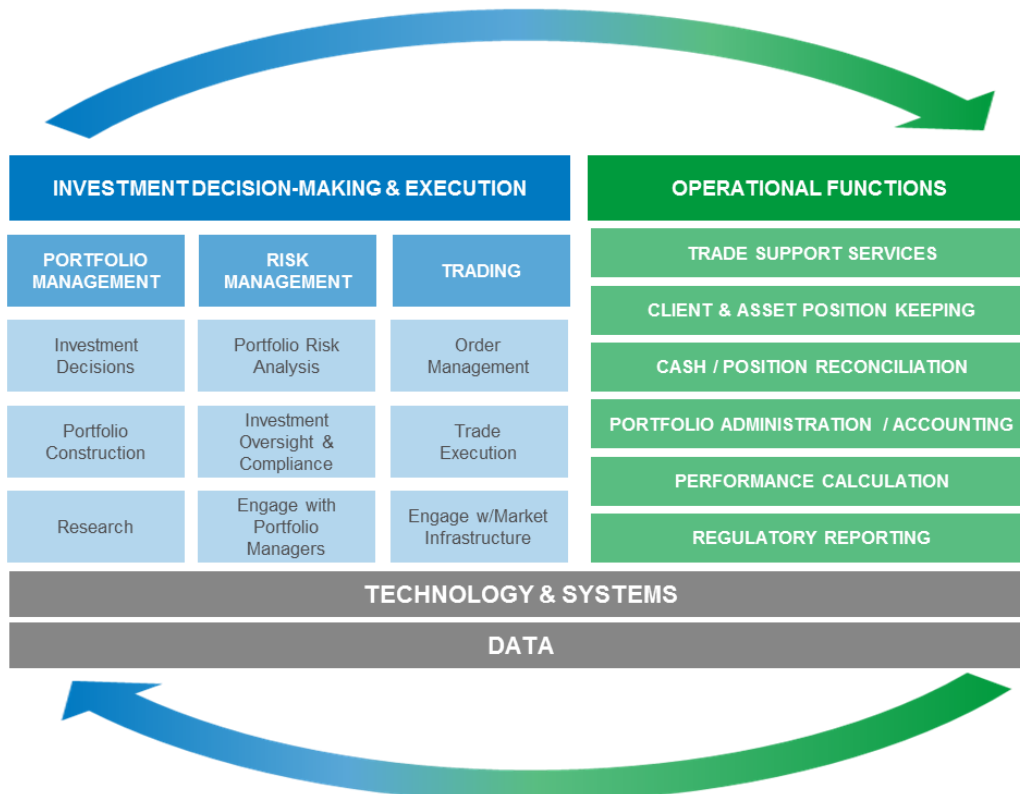
In order to understand the role that third party vendors play in the asset management ecosystem, it is helpful to first think about the main functions that an asset manager must carry out on a daily basis. We will categorize these functions under two broad umbrellas: (i) investment decision-making and execution, and (ii) operational functions, as shown in Exhibit 1.

Investment decision-making and execution and operational processes interact in many ways in the course of managing assets on behalf of clients and how these processes are carried out may differ significantly from one asset manager to another, depending on the manager’s organizational structure, product set, client base, and the unique choices that the asset manager makes in the course of running its business. Importantly, there are a variety of data and systems that underlie both investment decision-making and execution, as well as operational functions.

### Investment Decision-Making & Execution

Investment processes are the core functions that come to mind when considering the work of asset managers. Each asset manager has the choice of how to set up its investment decision-making and execution function(s). For example, some asset managers have multiple portfolio teams that make investment decisions for specific portfolios independent from one another, while other asset managers establish a “house view” that is implemented across all portfolios. Likewise, some asset managers specialize in one asset class or market, while others offer investment products in multiple asset classes and markets. Nonetheless, while the exact setup and structure of investment decision-making and execution functions may differ, all asset managers generally

**Exhibit 1: ASSET MANAGER INVESTMENT PROCESS**



For illustrative purposes only. Not meant to be comprehensive.  
Operational functions can be performed in-house or outsourced to affiliates or to third party vendors.  
There are numerous interactions between investment decisions & execution and operational functions.

conduct elements of portfolio management, risk management, and trading when managing money on behalf of their clients. Likewise, asset owners who manage their assets in-house also conduct many of these activities.

Portfolio managers make decisions on behalf of clients in order to meet their clients' objectives within the agreed portfolio guidelines. Portfolio managers use data as well as risk models and analytics to make investment decisions. Active managers may base their decisions on research they conduct about individual securities and markets, as well as their clients' guidelines and expectations. While many asset managers develop risk models internally, it is also common for asset managers to purchase risk models and analytics from third party vendors to supplement their internal analyses. Market indices also play an important role in portfolio management as many portfolios are managed relative to a benchmark. In the case of passive investing, for example, portfolio managers seek to track the composition and performance of the index.

In addition to portfolio management, many asset managers have a risk management function that is independent from portfolio management. Risk managers work closely with portfolio managers to ensure that client portfolios are being managed in accordance with client guidelines and risk parameters. They perform portfolio risk analysis to ensure that the risks being taken are deliberate and understood by the portfolio manager. Similar to portfolio managers, risk managers need security and pricing data, as well as risk models and analytics to perform their duties.

Finally, asset managers place trades as agents on behalf of clients. Trading requires the generation of orders and the execution of trades with the market. While trading can be conducted via phone directly with broker-dealers in many markets, there are systems that streamline the trading workflow and facilitate communication with the requisite parties. In addition, financial market infrastructure (e.g., exchanges, electronic trading venues, and Society for Worldwide Interbank Financial Telecommunication (SWIFT)) are integral to an asset manager's ability to place and communicate trades on behalf of their clients. Traders also utilize pricing and security data in a variety of ways.

### **Operational Functions**

The business of asset management extends significantly beyond making investment decisions and trade execution. Transactions need to be settled, cash needs to be tracked and invested, and various systems need to be regularly reconciled to ensure the books and records of the portfolio are in sync with any other systems relying on this data. Funds such as mutual funds, collective investment funds, and private funds, involve additional administrative requirements from fund accounting to detailed disclosure documents and

regulatory reporting. For example, many of these products require a transfer agent to track shareholder ownership by maintaining the official shareholder registry. Further, like investment decision-making and execution, operational functions are powered by a tremendous amount of data and systems. In addition, given the number of resource-intensive operational and administrative requirements associated with managing money, asset managers have the ability to outsource some or all operational functions to a number of different vendors.

In the following sections, we review examples of vendors that provide a variety of products and services to the asset management industry.

## **Data and Systems Vendors**

Data is fundamental to everything that asset managers do, from helping to inform key investment functions like portfolio management, risk management, and trading to providing the backbone for key operational functions like accounting and pricing of securities and fund net asset values (NAVs), recordkeeping, portfolio compliance and more. To this end, asset managers require a variety of data on a daily or intra-day basis and need to purchase data from multiple vendors. Further, asset managers need systems to manage all of the requisite data and information.

Historically, asset managers typically relied on internally developed technology solutions in conjunction with manually maintained spreadsheets. As the landscape has evolved, however, the effort required to load, cleanse, and process data has increased significantly leading asset managers to look for more sophisticated solutions. In particular, many asset managers have decided to purchase systems from third party vendors to help them perform a variety of tasks related to investment-decision making and execution as well as operational functions. That said, many other asset managers continue to use internally developed systems, which they customize to meet their individual needs. In these instances, the asset manager must make a greater commitment to building and maintaining technology resources and capabilities in-house. In many cases, asset managers use a combination of third party and internally built systems.

Given the demand for data and systems by asset managers, there are numerous competing vendors offering a variety of solutions. In this section, we review some of the main vendors in key areas. For data providers, we look at security data and pricing vendors as well as index providers. With respect to systems, we review vendors of risk models and analytics, order management systems (OMS) and trade execution systems, as well as accounting systems. As shown in Exhibit 2, in many cases, the same vendors provide both data and systems.

## Security & Pricing Data Vendors

Asset managers require a variety of data on the universe of securities within their portfolios and benchmarks. This information informs risk analyses, investment decisions, valuations, and reporting activities including regulatory and client reporting. It is typically received on an intra-day or daily basis, either sourced directly from the data originator (e.g., S&P, Moody's, or Fitch for ratings) or from a third-party data re-distributor. Security data includes security identifier, issuer, sector, and country, among other items. For fixed income, this also includes information such as coupon and other information required to calculate expected payments

from the issuer. In addition to indicative information, which rarely changes for a particular security, asset managers rely on updates to certain types of data, such as prices, ratings and corporate actions. Prices include real-time quotes to support trading as well as end of day prices for risk analysis, compliance, and calculation of portfolio NAVs.

Vendors aggregate data from a variety of sources, such as stock exchange feeds, broker-dealers, and regulatory filings. Because it is not likely for one provider to have information on every security, it is common for an asset manager to use multiple sources for security data.

**Exhibit 2: THIRD PARTY VENDORS TO ASSET MANAGERS – DATA AND SYSTEMS**

	DATA		SYSTEMS			
	Security & Pricing Data	Market Indices	Risk Models & Analytics	Order Management Systems	Trade Execution Systems	Accounting Systems
BlackRock Solutions			X	X		
Bloomberg	X	X	X	X	X	
Charles River				X	X	
Citi		X	X			
Clearwater Analytics			X			X
Eagle Investment Systems (BNY Mellon)						X
Eze Software Group				X	X	X
FactSet			X		X	
Fidessa				X		
FIS (formerly SunGard)			X	X		X
Fitch Ratings	X		X			
Flextrade					X	
FTSE Russell		X				
IHS Markit	X	X	X	X	X	
Intercontinental Exchange	X					
ITG					X	
Linedata				X	X	X
MarketAxess					X	
Moody's Analytics	X		X			
MSCI		X	X			
PAM (State Street)						X
S&P Dow Jones	X	X	X			
Simcorp				X		X
SS&C Technologies			X	X		X
Thomson Reuters	X				X	
Tradeweb					X	
UBS		X	X			
Wilshire Associates		X	X			

For illustrative purposes only. Not comprehensive. Many of the organizations perform more functions than are listed in this table.



Although the number of data providers has grown significantly, there are two key players: Bloomberg and Thomson Reuters. Bloomberg remains the market leader, with a 33% market share as of 2015.<sup>5</sup> The Bloomberg Professional Service (the Terminal) has 325,000 users globally.<sup>6</sup> Thomson Reuters is the second leading provider, with a 24% market share.<sup>7</sup> Additional security data and pricing providers include IHS Markit and Intercontinental Exchange (which acquired Interactive Data Corporation in early 2016).

In addition, rating agencies provide key security data to asset managers. Moody's Analytics, S&P Dow Jones, and Fitch Ratings provide credit ratings, research and risk analysis on sovereign nations, corporate issuers, public finance issuers, and structured finance obligations.

Lastly, the importance of data vendors in providing source data for the purposes of regulatory reporting by asset managers is increasing, giving rise to questions of how to harmonize and standardize data that is needed to fulfill regulatory reporting requirements.

### Index Providers

Market indices play a fundamental role in many aspects of the investment process, from performance benchmarking and asset allocation to portfolio construction and rebalancing. Index providers also act as a key pricing source for the securities within their indices. For CIVs, such as mutual funds, market indices are used as performance benchmarks. For funds, benchmarks are selected by the fund sponsor. For separate accounts, benchmarks are typically chosen by the client, often under the advisement of their external consultant. The ability of indices to serve as a proxy for measuring and modeling risk and returns aids portfolio construction and rebalancing. Market indices are also fundamental to passive investment strategies, such as those employed by most exchange-traded funds (ETFs). In recent years, passive investing has become popular among a variety of investors and is even encouraged by certain regulatory initiatives,<sup>8</sup> given the lower costs associated with these products compared to active management. Market indices are also used as reference rates embedded in structured products and index-based derivatives.

Although there are numerous index providers, three players have significant market share: S&P Dow Jones, FTSE Russell, and MSCI. According to the Financial Times, these three index providers jointly provide benchmarks for 73% of US mutual fund assets, representing \$9.4 trillion in AUM.<sup>9</sup> S&P Dow Jones is the world's largest provider of financial market indices. Their most well-known index, the S&P 500 Index, is widely regarded as the best single gauge of the large-cap US equity market performance, and has over \$7.8 trillion of assets benchmarked to it.<sup>10</sup> Further, FTSE Russell

calculates thousands of indices that measure and benchmark the performance of markets and asset classes in more than 80 countries, covering 98% of the investable market globally and trading on over 25 exchanges worldwide.<sup>11</sup>

Notably, the use of benchmarks is not limited to clients of asset managers, as benchmarks are used by other market participants. For example, FTSE Russell's clients include the top 10 investment banks, 97 of the top 100 asset managers, 48 of the top 50 pension plan sponsors and the top 5 global custodians.<sup>12</sup> MSCI has roughly \$10 trillion in assets and over 850 ETFs benchmarked to or based on its indices.<sup>13</sup>

### LEHMAN INDICES IN THE COLLAPSE OF LEHMAN BROTHERS

Prior to its collapse, Lehman Brothers was the world's leading provider of fixed income market indices. In 2007, approximately \$6.1 trillion in assets were managed against their indices, which included the US Aggregate Index, Euro-Aggregate Index, Global Aggregate Index and US Universal Index. Thousands of investors, pension plan sponsors, issuers, and consultants depended upon these indices to support pricing, performance benchmarking, and portfolio rebalancing.<sup>14</sup>

When Lehman Brothers filed for Chapter 11 bankruptcy on September 15, 2008, those reliant upon Lehman Indices were concerned that the Lehman indices would not be priced due to the parent company's distress. To address this concern, market participants using Lehman indices had a range of alternative options, from getting pricing and benchmarks from another vendor to fully replicating Lehman's indices themselves. In BlackRock's case, we created a shadow index production process, based on Lehman's published pricing and index rebalancing methodologies, as a contingency plan during the weekend prior to the bankruptcy filing.

Ultimately, however, alternate arrangements were not necessary. Lehman's Index Service was not materially interrupted by the bankruptcy filing, and indices and prices continued to be made available the day of and the days following the bankruptcy announcement. On September 17, 2008, Barclays announced it would purchase this business as part of a \$1.75 billion acquisition of Lehman's North American investment banking and capital markets business.<sup>15</sup> Barclays maintained the family of Lehman Brothers indices and the associated index calculation, publication and analytical infrastructure and tools (although they were rebranded under the Barclays name). In 2016, Barclays Risk Analysis and Index Solutions business was sold to Bloomberg.

Two additional index providers that are important to highlight are Bloomberg and IHS Markit. Bloomberg recently acquired Barclays Risk Analysis and Index Solutions. This acquisition increases the breadth of Bloomberg's index business by integrating Barclays' leading fixed income indices with Bloomberg's analytic dashboards, portfolio analysis, and order management and execution management systems. IHS Markit provides a variety of fixed income and derivative indices that are predominantly used as a reference for products such as index-based derivatives and ETFs. Other index providers include Citi, UBS, and Wilshire Associates.

### Risk Models and Analytics

Since the 2008 global financial crisis, risk management has become a primary focus for financial institutions. While asset managers can build their own risk models or analytics, many license these capabilities from a third-party vendor. It is important to note that the design of these externally provided models are such that different asset managers who use the same third-party risk models can choose to "run" them differently through the use of highly configurable switches, dials, and changing underlying assumptions.

Asset managers use risk models and analytics to measure their risks relative to the risk and return objectives specified by clients as well as to support investment decisions. While the underlying models used in risk systems provide important information, there are many other factors that drive investment decisions. This includes the underlying client's investment objectives, portfolio strategy, security indicative data, rating agency ratings, benchmark constituents and weights, media reports, broker-dealer research, and a manager's own internal research and ratings, among other factors. As a result, different users of the same models are likely to make different decisions at any given point in time.

There are numerous providers of risk analytics solutions. Some examples of risk analytics providers include: BlackRock Solutions, Bloomberg, Clearwater Analytics, Citi, FactSet, IHS Markit, MSCI, FIS/SunGard, S&P Dow Jones, Fitch Ratings, Moody's Analytics, SS&C, UBS, and Wilshire Associates, among others.

Bloomberg's Portfolio and Risk Analytics solution (PORT) is incorporated into Bloomberg's terminals, and provides portfolio risk and performance measures. FactSet provides a market data aggregation, risk analysis, and portfolio management tool to over 2,000 buy-side and sell-side institutions. MSCI provides risk models, analytics, and performance attribution solutions under the Barra and RiskMetrics brand names. BlackRock Solutions provides a risk analytics platform that is offered to its clients in two ways: 1) as part of the Aladdin investment platform, and 2) on a standalone basis. In total, BlackRock Solution's risk analytics

are used by 190 client organizations. We discuss risk models and analytics providers in greater detail in our August 2014 *ViewPoint* entitled, "The Role of Technology within Asset Management".

### Order Generation and Workflow Systems, and Execution Management Systems

**Order Generation and Workflow Systems:** Order management systems (OMS) enable an asset manager to view portfolio positions and cash balances, and to generate trade orders. Oftentimes, OMS will have capabilities that include checking to see if the proposed trades would violate compliance restrictions (e.g., regulatory restrictions on fund composition or client guideline restrictions for separate accounts). OMS allow portfolio managers to review trade orders before they are executed in order to ensure that the trade would be in line with client or fund guidelines and objectives. Once trade orders are generated and approved in an OMS, they need to be executed by traders through interaction with the marketplace. An OMS is not required for trade execution as orders can be traded without an OMS; however, they do increase the efficiency of trading workflows and facilitate coordination with portfolio managers.

**Trade Execution Systems:** Trades are typically executed by traders in one of two ways: 1) phone execution (a call between a buy-side and sell-side trader to agree on price and to execute the trade); or 2) electronic execution through one of several electronic platforms. For equities, electronic execution is typically done using an execution management system (EMS), which sends the order to a broker or exchange, or through direct electronic connectivity to a broker. In addition, in some cases, an integrated order and execution management system (OEMS) is used, where functionality for order generation and trade execution reside in a single platform. In other cases, the OMS sends orders to a separate EMS. The terms and mechanisms work slightly differently for fixed income trades, where electronic execution is typically done through an electronic trading marketplace. That said, phone execution remains a means of executing trades. Phone execution does not require any technological systems to be in place at the asset manager, and serve as a backup in the event of technological failure of electronic execution systems.

Similar to risk analytics, many financial services companies license these capabilities from a third-party vendor as opposed to maintaining a system in-house. For example, Bloomberg is a leading provider within the space, offering order management and execution management systems, both of which are delivered through Bloomberg terminals. Bloomberg's buy-side OMS is called AIM. AIM is used by 14,000 professionals at over 700 firms.<sup>16</sup> Bloomberg's EMS is called EMSX. EMSX supports equity trade execution.

Bloomberg's FIT platform supports trade execution for fixed income, derivatives and futures. Orders executed through EMSX or FIT can come from Bloomberg's AIM OMS or from other OMS that route trade orders to EMSX or FIT to execute trades.

Another example of a service provider in this space is Charles River Development (Charles River). Charles River offers an integrated OEMS as part of its Investment Management System (IMS) offering. IMS is used by 350 investment firms, including 50 of the top 100 asset managers, and supports 25,000 investment professionals.<sup>17</sup>

Thomson Reuters is another vendor in the trade execution space. Its Autex Trade Route is one of the world's largest global order-routing networks, delivering order flow of 40 billion shares per day in equities, options and futures, as well as FX and fixed income trades.<sup>18</sup> Thomson Reuters also provides an FX trade execution platform, FXall, which is used by asset managers, corporate treasurers, banks, broker-dealers, and prime brokers.

Another vendor in this space is SimCorp. SimCorp offers an OMS combined with an accounting system, which is provided as either an installed software or hosted technology. SimCorp has more than 16,000 users.<sup>19</sup>

BlackRock Solutions offers an OMS called Aladdin. Aladdin has 75 clients including asset managers, insurers, pension funds, corporations and financial institutions. Some of these clients route orders to the marketplace directly from Aladdin, while others use Aladdin along with a third party EMS. Importantly, while Aladdin has a number of clients that utilize the Aladdin system, Aladdin does not cross trades between or among Aladdin clients. At one point, BlackRock Solutions initiated a project to develop and promote a proprietary alternative trading system (ATS) that would be integrated into Aladdin. After testing the platform, however, BlackRock Solutions found that while the concept was viable, it did not have a broad enough participant base to meet the needs of participants. As a result, in June 2013 we withdrew our Form ATS application from consideration by the SEC. Instead BlackRock Solutions created integrated order routing interfaces in Aladdin to aggregate third party liquidity, facilitating the ability of Aladdin users to more easily and efficiently effect transactions on an external fixed income platform.<sup>20</sup>

Other notable OMS providers (some of which couple OMS and EMS capabilities) include IHS Markit, Fidessa, Linedata, and Eze Software Group. Other providers of equity EMS include Factset, ITG, and Flextrade. Fixed income trading marketplace providers included Tradeweb and MarketAxess. We discuss order generation and workflow systems and execution management systems in greater detail in our August 2014 *ViewPoint* entitled, "The Role of Technology within Asset Management".

### Accounting Systems

Asset managers use accounting systems to calculate net asset values, performance, and returns. Asset managers managing portfolios of insurers and other financial institutions may use accounting systems to support regulatory accounting requirements to which these institutions are subject. Accounting systems serve as a basis for generating official books and records for portfolios, and outputs from these systems are then used for a variety of reporting purposes. Importantly, however, while asset managers may perform reconciliation and accounting internally, in an outsourced model fund administrators are responsible for maintaining funds' official books and records.

### CLOUD COMPUTING

Within the past decade, financial services companies have started to leverage cloud computing, and use by asset managers is quickly increasing. Cloud computing is the practice of using a network of remote servers hosted on the Internet to store, manage, and process data. This allows financial services companies to reduce IT infrastructure expenses, and achieve further efficiency and scale. Cloud computing providers own and maintain the network-connected hardware required for these application services, while financial services companies provision what they will need via a web application. Cloud computing introduces a different set of considerations and risk factors to consider in a virtual world, including cybersecurity, technology infrastructure, and disaster recovery.

Amazon Web Services (AWS) is the dominant provider in this space and provides services to over a million customers including leading banking, capital markets, insurance, financial technology (fintech), and industry service providers. For example, Nasdaq is moving an average of 5.5 billion rows of data into one of AWS' data warehouse offerings every day, and FINRA is able to analyze billions of market events with tools provided by AWS.<sup>21</sup>



Asset managers use a variety of vendor systems for portfolio accounting and administration, which includes NAV calculation and performance measurement. Major players include SS&C Technologies' Portia system (200+ clients<sup>22</sup>), and FIS (formerly SunGard) Asset Arena. SS&C Technologies offers two additional asset manager accounting systems through its recent acquisition of Advent (Geneva and APX). Eze Software Group and Linedata offer accounting systems integrated with their OMS. In some cases, asset managers use full accounting systems that support multi-basis accounting requirements and portfolio administration. These systems include SimCorp Dimension (\$19 trillion in assets),<sup>23</sup> State Street's PAM system, BNY Mellon's Eagle STAR platform, and SS&C's CAMRA offering.

## Operations Outsourcing Vendors

Every asset manager has a different philosophy on which operational functions they want to control directly versus which functions they want to outsource. This leads to a very diverse set of operating models across the industry. In some cases, economies of scale and the ability to provide a bundle of services cost-effectively may be a factor in decisions to select one or more external service providers, while affiliations with large banks may present other reasons to conduct processes in-house or with affiliates. Another factor may be because the asset manager wants to focus on its core competency of investing, while outsourcing operational functions to a third party. As a result, there are a variety of different models that range from fully outsourced to full execution of these functions in-house. In BlackRock's experience the use of different operating models is well-distributed across the industry. Each manager, regardless of size, needs to decide which functions to manage in-house and which functions to outsource based on various aspects of their business model.

In a fully in-house model, all operational functions are performed internally by the asset manager. This model requires direct investment in personnel, technology, and other resources that are dedicated to these functions. In a fully outsourced model, the asset manager hires a service provider(s) to perform all activities post trade execution, on their behalf. In this situation, the asset manager will typically employ various oversight processes on the outsourced service.

In some cases, service providers have conducted what is called a "lift out" where previously insourced functions are outsourced to an external party.<sup>24</sup> A lift out can also entail transfer of personnel from the asset manager to the third party. Key providers of this level of outsourcing include BNY Mellon, JP Morgan, Northern Trust, and State Street. In addition, a number of smaller independent service providers have developed similar capabilities targeted to smaller firms and hedge funds.<sup>25</sup>

Of course, there are many operating models that fall in between the two extremes of fully insourced and fully outsourced operational functions. As a result, there are a variety of competitors offering different solutions for the outsourcing of operational functions. While some vendors offer more comprehensive solutions that lend themselves to full outsourcing of operational functions, many vendors are able to provide individual services on a stand-alone basis. For example, asset managers may choose to outsource fund administration to a third party, but perform other operational functions, such as trade processing internally. Given the range of services provided and the variety of vendors that provide outsourcing capabilities, asset managers have the ability to "mix and match" which services they want to perform in-house and which services they want to outsource. Exhibit 3 provides some examples at a high level, though the ability to mix and match is more wide-ranging than is shown in Exhibit 3. As such, while there are many different providers of operations solutions, we will focus on a few key sets of providers in this section, namely providers of middle office outsourcing, portfolio/fund accounting and administration, transfer agents, and custodians.

A deep dive into each asset manager's operating model is needed to understand the role of third party vendors used by an asset manager to perform its operational functions. In the case of BlackRock, our operating model employs a combination of insourcing and outsourcing. In particular, BlackRock's business operations team manages functions including trade support services, data management, corporate actions, cash/position reconciliation, and client reporting. While BlackRock performs portfolio administration for separate accounts internally (though separate account clients often hire third party accounting agents to keep independent books and records), BlackRock outsources fund accounting, custody, fund administration, and transfer agent services for the majority of our commingled funds.

### Exhibit 3: EXAMPLES OF THIRD PARTY VENDORS TO ASSET MANAGERS

	OPERATIONAL FUNCTIONS OUTSOURCING			CUSTODIANS
	Middle Office Outsourcing	Transfer Agent	Fund Accounting & Administration*	
American Stock Transfer & Trust		X		
BNP Paribas	X		X	X
BNY Mellon	X	X	X	X
Brown Brothers	X	X	X	X
CACEIS	X		X	X
Citco	X		X	
Citi	X	X	X	X
Clearwater			X	
ComputerShare		X		
DST		X		
Genpact	X			
IFDS		X		
JP Morgan	X	X	X	X
Northern Trust	X	X	X	X
RBC	X	X	X	X
SEI	X		X	
Societe Generale	X		X	X
SS&C Technologies	X		X	
State Street	X	X	X	X

For illustrative purposes only. Not comprehensive. Many of the organizations perform more functions than are listed in this table.

\*Note, these services can also be provided for separate accounts. In this section, we will focus primarily on fund accounting and administration given several unique responsibilities.

#### Middle Office

The middle office serves as the connection point between trade execution and back office functions (such as fund administration and custody). In particular, the middle office is responsible for keeping investment and accounting systems aligned. Functions of the middle office include, but are not limited to, trade confirmation and settlements, corporate action processing, derivative operations and collateral management, cash and position reconciliation and security data maintenance. Supporting these functions requires a significant investment in headcount and technology. Consequently, some investment managers have chosen to outsource these responsibilities to third party vendors. Furthermore, there are a number of trends that are supporting a shift towards outsourcing investment operations, including an increased need for scale and resource optimization, regional and product nuances, and heightened regulatory requirements. According to BNP Paribas, “the increasing complexity of the functions of the middle office, the burden of maintaining the technology necessary to keep up with reporting and compliance obligations, and a need to be ruthless about finding efficiencies wherever possible are

conspiring to make outsourcing investment operations a more compelling prospect. These trends are set to continue, while the means to outsource post-trade functions will proliferate”.<sup>26</sup>

Some of the key providers of middle office outsourcing services include BNY Mellon, State Street, JP Morgan, Citi, Northern Trust, SS&C Technologies, and Brown Brothers Harriman.

#### Transfer Agents

Transfer agents are responsible for maintaining records of investors in funds, including account balances and transactions and processing and settling subscriptions and redemptions in funds. Transfer agents maintain the unit holder registry for funds and interface with direct clients, broker-dealers, and various industry utilities. The dominant transfer agents are American Stock Transfer and Trust, DST Systems Inc., BNY Mellon, ComputerShare, and IFDS (a joint venture between affiliates of State Street and DST Systems Inc.)

The risk of a lapse in a transfer agent’s systems interrupting its ability to provide services was highlighted in March 20,

2015 when IFDS in the UK experienced a systems hardware failure, which affected its normal operations. At the time IFDS supported around 40% of the UK market and the outage led to delayed payments for clients of funds that use IFDS for executing transactions electronically.<sup>27</sup>

### **Portfolio / Fund Accounting & Administration**

Fund administrators support the process of administering a fund, whether a mutual fund, hedge fund, unit trust or other type of CIV. Though highly interrelated, fund accounting and fund administration are separate services that can be offered together or individually. Together, the fund accountant and fund administrator are responsible for the official book of record for the CIV. These responsibilities may include:

1. Calculation of the NAV including the calculation of the fund's income and expense accruals and the pricing of securities at current market value;
2. Preparation of financial statements;
3. Maintenance and filing of the fund's financial books and records as the fund accountant, including reconciliation of holdings with custody, transfer agents and broker records;
4. Payment of fund expenses;
5. Calculation and payment to the transfer agent of dividends and distributions (if required);
6. Preparation and filing of the fund's prospectus;
7. Preparation and filing of regulatory filings/reports;
8. Calculation of the total returns and other performance measures of the fund;
9. Monitoring investment compliance with regulations; and
10. Supervision of the orderly liquidation and dissolution of the fund (if required).

Most large custodian banks have affiliates that offer fund accounting and administration outsourcing. Some of the largest fund administrators include: State Street, JP Morgan, and BNY Mellon, to name a few. Most fund administrators are also custodians.

Separate account clients may require some of the administrative and accounting tasks mentioned above to be performed – we will refer to this as portfolio administration. Portfolio administrators perform similar functions to fund accountants and fund administrators, including calculating portfolio values and performance measurement. However, there are generally fewer regulatory filings required for separate accounts.

### **Custodians**

Custodians are one of the most important service providers to ensuring that client assets are safeguarded as they are responsible for holding and safeguarding an asset owner's or fund's assets including bonds, equities, cash, and derivatives. Custodians also collect income (e.g., dividends or interest)

from the securities they hold in client accounts and they facilitate the settlement of securities that are purchased or sold. Separate account clients have the ability to select and engage the custodian of their choice. This is an important distinction because the fiduciary obligation shifts to the client to manage the vendor relationship. In addition to providing custodial services, custodians may perform other services for their clients, including cash management, foreign exchange and currency hedging, securities lending agent services, fund accounting and administration, and others. Custodians have fee structures for the provision of services in addition to custody. Regardless of the extent of the outsourcing services provided by the custodian, there is daily interaction between the asset manager and custodian in the course of managing client separate accounts and/or funds.

Most asset managers interact with and maintain connectivity with multiple custodians, given that clients can select the custodian of their choice. For example, client portfolios managed by BlackRock are custodied at more than 80 custodian banks worldwide. The largest custodians are BNY Mellon, Citi, JP Morgan, and State Street. Between them, they provide custody for more than half of the total assets under custody among the 75 largest global banks identified by the Basel Committee on Banking Supervision.<sup>28</sup>

Unlike the majority of third party services discussed in this document, disruption at a large custodian would likely have a significant disruptive impact on *all* asset managers, including both external asset managers and asset owners that manage their assets directly. This is one reason why the largest global custodians are regulated as global systemically important banks (G-SIBs).

### **Vendor Risk Management**

While operational functions may be performed by a third party, asset managers need to ensure that third parties, like the asset manager itself, have sufficient controls to mitigate the risk of operational errors and to ensure adequate business continuity and disaster recovery plans are in place.<sup>29</sup> Further, there are a number of legislative and regulatory requirements in place that require asset managers to have comprehensive controls over the selection and ongoing monitoring of third parties providing critical or important operational functions to the asset manager. In the EU the Markets in Financial Instruments Directive (MiFID) sets out a comprehensive set of requirements on the outsourcing critical functions which apply to both investment firms and their service providers.<sup>30</sup> In the US, there are a variety of regulatory standards in place.<sup>31</sup> Regulators, such as the SEC, also conduct regular reviews of the effectiveness of controls put in place by asset managers. More recently, the SEC issued a proposal for public comment that would require all investment advisers to have business continuity plans in place that address, among other things, the role of critical

third party service providers in the adviser's operating model.<sup>32</sup> Similarly, in July 2016, the Monetary Authority of Singapore (MAS) issued "Guidelines on Outsourcing" for financial institutions, which stipulate that due diligence assessments when outsourcing to third party service providers should include a review of, among other things, the security and internal controls of the service provider, the corporate governance structure of the service provider, disaster recovery arrangements of the service provider as well as the provider's disaster recovery track record, and the reliance upon any sub-contractors to provide the service. Further the MAS Guidelines on Outsourcing stipulate that financial institutions must review BCPs for third party service providers to ensure the plans are satisfactory and in line with the nature of and risks associated with the provision of the service in question.<sup>33</sup>

Where the asset manager has a choice of service providers, conducting due diligence in the selection of third party service providers, followed by ongoing monitoring is key to ensuring that third party service providers are adequately managing operational risk and can continue operations, even during times of market stress or business disruptions. BlackRock maintains a selection program with a comprehensive set of guidelines and criteria to ensure that critical providers meet certain requirements without limitations, such as business concentration, financial stability, proper legal documentation, operational efficiencies, and adequate risk mitigation and controls including business continuity plans (BCP).

## **BUSINESS CONTINUITY RISKS**

Business disruptions can occur from a variety of natural and man-made events resulting in the loss of facilities, technology systems, and the inability of personnel to perform their duties. In order to manage the business continuity risk that could arise as a result of business disruptions, asset managers must have procedures in place to recover business operations and supporting technology in the event of a disruption. We believe that planning for these types of events requires a comprehensive program that includes: (i) business continuity planning, (ii) technology DRPs, and (iii) a crisis management framework to coordinate in crisis situations. As mentioned above, a key component of our overall strategy and a key differentiator for BlackRock is our ability to transfer work across our offices globally. By having staff that utilize shared systems and common processes, we are able to service our client base from our offices around the world. In the event of a disruption that impacts one office or region, work can be transferred to staff at other locations. This capability is included in BCPs and in many cases is utilized in the course of normal business.

Oversight and ongoing relationship management of critical third party service providers includes performance monitoring, onsite process and control reviews, reviewing financial condition, documentation related to internal controls (i.e., SSAE 16), and assessing potential vulnerabilities as well as the results of BCP and technology disaster recovery testing. BlackRock is in regular contact with third party service providers in the course of supporting our day-to-day operations, and, therefore, has an ongoing relationship and understanding of our providers' performance in their given areas. In addition, service level agreements and key performance indicators are metrics used to gauge and measure provider performance and adherence to BlackRock's operational requirements.

As it relates to BCP, asset managers should review the BCPs and technology disaster recovery plans (DRPs) of critical third party service providers both during the initial due diligence process and on an ongoing basis, thereafter. As part of these reviews, onsite meetings are typically conducted in which individual contingency plans are reviewed, evaluated, and, where appropriate, tested. These standards are to ensure that key incidents faced by critical third party vendors will not have an adverse impact on the asset manager's business. It is important to ensure that technical experts from the asset manager are engaged with the corresponding teams from the service providers. This helps asset managers ensure that their service providers are appropriately prepared to handle adverse circumstances and mitigate risk, while continuing to provide their services during such a crisis.

The level of engagement with providers will likely vary based on the services being provided and potential impact to the asset manager should the vendor's services be interrupted. Written contracts with third party service providers should clearly outline the duties, obligations and responsibilities of each third party. That said, it is important to recognize that while asset managers can perform rigorous due diligence on third party vendors and engage in a high level of ongoing communication and oversight, asset managers cannot and do not control every aspect of a third party vendor's functioning, nor do they have the ability to guarantee that a third party vendor will never make a mistake or face an operational or business continuity challenge of their own. To this end, it is important for regulators to act as a "second pair of eyes" and to ensure that custodians, fund administrators, and financial market infrastructure are sufficiently regulated and supervised, regardless of their affiliations with other types of financial institutions. Indeed, the regulation for custodians and financial market utilities have been updated post-Crisis in most jurisdictions to the benefit of asset managers and their clients; regulators should ensure that ongoing supervision is robust and keeps up with the rapidly evolving financial market



ecosystem, particularly as the need to maintain a durable technology infrastructure and cybersecurity program becomes more prevalent.

## Financial Market Infrastructures (FMI)

There are certain operational risks that are present for all market participants – in particular, those related to the FMI or the “plumbing” that makes the financial system work. These firms and services include exchanges, electronic trading and affirmation platforms, trade messaging systems (i.e., SWIFT), and depositories that facilitate the movement of securities, foreign exchange and other positions from one counterparty to another (i.e., Depository Trust Company (DTC) and National Securities Clearing Corp. “NSCC)) to

execute investor subscriptions and redemptions. Likewise, CCPs are used for centrally cleared OTC derivatives. All of these FMI are central resources that are relied on by virtually all participants in the asset management ecosystem. While these firms and services may not technically be defined as “third party services”, all market participants, including asset managers, are dependent on the critical infrastructure that is provided by these entities, as are other market participants. Unlike with respect to third party services, where asset managers or asset owners have the ability to select their service provider among a number of competitors, there is limited or no ability to select vendors for FMI – in other words, FMIs are not generally substitutable.

### MUTUAL FUND ADMINISTRATION AND ACCOUNTING SYSTEM ISSUE IN AUGUST 2015

Even with robust vendor risk management standards in place, asset managers are not immune to operational issues that impact their third party vendors’ abilities to provide services. One example of this was the BNY Mellon/SunGard pricing issue that began on August 24, 2015 and persisted for several days thereafter. While unrelated, this issue occurred simultaneously with the US equity market structure opening issues on August 24, 2015.<sup>34</sup>

BNY Mellon is a prominent fund administrator, providing fund administration services to several hundred registered mutual funds and ETFs across the US fund industry. To perform these services, BNY Mellon relies on SunGard’s InvestOne fund administration and accounting system. On August 24, 2015, the SunGard system experienced an outage and abruptly ceased to function correctly. The issue simultaneously corrupted the backup environment that BNY Mellon had in place as a fall back for a system issue of this nature. While BNY Mellon invoked its business continuity and disaster recovery procedures to address the issue, they were unable to restore the system before the end of the day, when NAVs needed to be delivered to funds. The issue rendered BNY Mellon unable to produce NAVs for 1,200 individual fund structures across 66 BNY Mellon fund manager clients.<sup>35</sup> The issue persisted for several days before BNY Mellon was able to restore full fund administration services to its clients.

To address the situation and publish NAVs for their funds, managers using BNY Mellon as fund administrator needed

to rely on alternate pricing mechanisms (including using internal “shadow” accounting systems) to determine fund NAVs. In addition, BNY Mellon performed processes manually to help produce fund NAVs. These alternate procedures permitted impacted funds to produce NAVs, which enabled them to continue processing purchases and redemptions throughout the week, despite the disruption to BNY Mellon’s normal processes.

The situation resulted in a lesson learned for the industry. Namely, that it is important to consider not only one’s third party vendors but also the vendors upon which those third parties rely (known as “fourth parties”). At this point in time, the industry has not entirely come to a consensus on best practices regarding the level of oversight of fourth parties that can reasonably be expected of asset managers who rely on third party vendors, and asset managers have implemented different policies and procedures in this regard.

At BlackRock, we shadow the books for the fund administrator, including computing daily NAVs, using internal systems. This allows us to oversee and validate fund administrator calculations by comparing our computed NAVs to the fund administrator-calculated NAVs and reconciling differences. While this type of reconciliation is commonplace between asset managers and custodians, it is not widely used between asset manager and fund administrator records. This process also provides us with a backup estimated NAV, which can be used if the fund administrator became unable to produce them.

A significant breakdown in a major component of FMI would pose substantial operational risk to all market participants, including asset managers and their clients, and could potentially require regulatory intervention to resolve. Recent examples demonstrate that there is more work to be done to ensure appropriate protections are in place. While many market entities have been designated systemically important financial market utilities (SI-FMUs) which are subjected to greater regulatory safeguards,<sup>36</sup> other elements of the financial market infrastructure are not subject to the same degree of attention.

In particular, post-Crisis regulations have successfully shifted credit risks from bi-lateral counterparties to CCPs. These risks are now concentrated in a smaller number of market participants whose resilience is paramount to market stability.

## CYBERSECURITY ISSUES

Cybersecurity is a critical component of market plumbing. Recent incidents in which unauthorized SWIFT messages were used have highlighted the importance of cybersecurity protections. For example, \$100 million was stolen from the account of the Bank of Bangladesh from the New York Federal Reserve Bank as a result of unauthorized SWIFT messages sent by an unknown source,<sup>37</sup> \$12 million was stolen from a bank in Ecuador,<sup>38</sup> and an unsuccessful fraud attempt was made at a bank in Vietnam.<sup>39</sup> SWIFT recently stated that new cyber theft attempts, some of which were successful, have surfaced since June 2016.<sup>40</sup> In August 2016, US regulators – the Federal Reserve Board, OCC, and FDIC – indicated in a letter to Representative Carolyn Maloney that they are working to conduct expanded reviews of cyber controls for banks that are members of SWIFT and urging US banks to review their risk management and cybersecurity systems.<sup>41</sup> This follows up on a request by the Bank of England in April 2016 calling for the banks it regulates to update their cybersecurity measures and a similar request by the Monetary Authority of Singapore.<sup>42</sup> As highlighted in recent testimony by SEC Chair Mary Jo White, “cybersecurity is...one of the greatest risks facing the financial services industry and will be for the foreseeable future” and ensuring cybersecurity protections are in place is a key consideration for asset management.<sup>43</sup> This focus by regulators across the globe underscores the need for robust cybersecurity measures at financial institutions and other participants within the financial ecosystem. Further regulatory guidance on controls and other cyber-defense measures would be helpful to the resiliency of the financial markets. In April 2015, the SEC’s Division of Investment Management issued guidance related to cybersecurity measures that should be considered by investment advisers.<sup>44</sup>

We have outlined our concerns in various documents over the past few years.<sup>45</sup> We support increased standardization and centralized clearing of derivatives; however, we also agree with US Commodity Futures Trading Commission (CFTC) Chairman Massad that central clearing is not a “panacea”.<sup>46</sup> To address this concentration of risk, we encourage regulators to implement safeguards to reduce the likelihood of a CCP failure and to avoid the contagion effect of such failure. We recommend regulators focus on establishing rigorous capital standards for CCPs, requiring global standardized stress testing of CCPs, and improving transparency to counterparties of the CCP. Regulators should consider recommendations that have been made for policies that would promote CCP soundness, such as developing comprehensive risk management processes, focusing on strengthening risk model development and model validation practices, ensuring CCPs have business continuity plans and technology disaster recovery plans, and regularly conducting end-to-end testing of default management processes with market participants. Some regulators have already addressed these topics.<sup>47</sup>

## Recommendations

Any analysis of third party services in asset management needs to start with an understanding of the different business models of various firms. As regulatory compliance and reporting requirements increase, scale has become ever more important. Gaining insight into the buy versus build decisions and the increasing importance of scale will help to understand the growth in third party vendors and the important role that they play in assets managed by asset managers and asset owners. As purchasers of services, asset managers need a vendor management program and business continuity plans that factor in outsourced services. We recommend that where they have not done so already, regulators provide guidance for conducting due diligence on vendors and for developing business continuity plans.

Likewise, understanding the landscape of the services that are available and the vendors who provide these services is critical. Often custodians offer add-on services such as cash management, foreign exchange and currency hedging, securities lending, fund accounting, fund administration, compliance and risk analysis, as well as legal and tax support. Many clients find this bundled approach attractive. Alternatively, there are a growing number of independent firms that offer niche services tailored to specific areas of emerging demand. Importantly, as the needs increase, the number and types of competitors increases, thereby offering purchasers choice and cost-effective solutions. As providers of services, technology disaster recovery and cybersecurity should be critical components of the business models for these vendors, regardless of whether they are affiliated with a bank or asset manager, or whether they are independent.

In considering the potential vulnerabilities in the system, special attention should be given to shared infrastructure that is critical to managing assets. While these firms and services may not technically be defined as “third party vendors”, asset managers and asset owners alike are dependent on critical infrastructure that is provided by other firms. Custodians, CCPs, exchanges, and the SWIFT messaging network are just a few examples. The role of third party vendors in asset management warrants additional analysis.

While this paper provides a foundation, it is by no means comprehensive with respect to the lists of vendors shown in Exhibits 2 and 3, nor with respect to the operating models that are employed by asset managers large and small. If regulators are interested in assessing potential risks associated with the role of third party vendors in asset management, we recommend that as a first step, regulators or global policy bodies (e.g., IOSCO, FSB) conduct a more in-depth survey than is provided in this *ViewPoint* to develop a more comprehensive understanding of the landscape.

## RELATED CONTENT

- ▶ [ViewPoint – The Role of Technology Within Asset Management, August 2014](#)
- ▶ [Letter to FSOC, Request for Comment on Asset Management Products and Activities, March 25, 2015](#)
- ▶ [Letter to SEC, Adviser Business Continuity and Transition Plans, September 6, 2016](#)

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## Notes

1. Financial Stability Oversight Council, Update on Review of Asset Management Products and Activities (Apr. 18, 2016), available at <https://www.treasury.gov/initiatives/fsoc/news/Documents/FSOC%20Update%20on%20Review%20of%20Asset%20Management%20Products%20and%20Activities.pdf>; Financial Stability Board (FSB), Consultative Document, Proposed Policy Recommendations to Address Structural Vulnerabilities from Asset Management Activities (Jun. 22, 2016), available at <http://www.fsb.org/wp-content/uploads/FSB-Asset-Management-Consultative-Document.pdf>.
2. For example, in the US, in 2009 the Securities and Exchange Commission adopted amendments to the custody rule for investment adviser client funds or securities, rule 206(4)-2 under the Investment Advisers Act of 1940. SEC, Custody of Funds or Securities of Clients by Investment Advisers, 75 Fed. Reg. 1456 (Jan. 11, 2010) available at <https://www.sec.gov/rules/final/2009/ia-2968fr.pdf>. In the EU, see Alternative Investment Fund Managers Directive (AIFMD) – Directive 2011/ 61/EU, available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:174:0001:0073:EN:PDF>; Undertakings for Collective Investment in Transferable Securities Directive (UCITS V) – Directive 2014/91/EU, available at <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0091&from=EN>, which have both introduced higher standards for depositaries of investment funds. The Markets in Financial Instruments Directive (MiFID II) – Directive 2014/65/EU, available at <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0065&from=EN> has also been recast, treats custody as a core MiFID service and provides for more rigorous standards for the holding of client assets.
3. US federal securities laws require public companies to disclose information on an ongoing basis. For example, US publicly-traded companies must submit annual reports on Form 10-K, quarterly reports on [Form 10-Q](#), and current reports on [Form 8-K](#) for a number of specified events and must comply with a variety of other disclosure requirements. For More information, see SEC, Fast Answers: Form 10-Q, available at <https://www.sec.gov/answers/form10q.htm>.
4. For example, BlackRock Solutions, which is a provider of risk analytics, order management systems and trade processing, among a variety of other capabilities, through the Aladdin® platform, is affiliated with BlackRock.
5. Ben McLannahan, Financial Times, Banks' belt-tightening threatens to drive a terminals decline (Jun. 3, 2016), available at <http://www.ft.com/cms/s/0/5950311c-2961-11e6-83e4-abc22d5d108c.html#axzz4K9P5wVzq>.
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17. Charles River, available at <https://www.crd.com/solutions/charles-river-ims/>.
18. Thomson Reuters, Equity Market Solutions, available at <http://financial.thomsonreuters.com/en/markets-industries/equity-market.html>.
19. SimCorp, Why SimCorp, available at <http://www.simcorp.com/en/why-simcorp>.
20. In 2012, BlackRock announced that it planned to create and launch a fixed income trading platform, the Aladdin Trading Network (ATN). After testing the platform, we found that while the concept was viable, ATN did not have a broad enough participant base to meet the needs of participants. In June 2013, we formally withdrew the Form ATS application submitted to the SEC which would be required to run an ATS. As a next step, in April 2013, BlackRock formed a strategic alliance with MarketAxess, a leader in electronic credit trading. See Cate Long, Reuters, Aladdin's new lamp (Apr. 13, 2012), available at <http://blogs.reuters.com/muniland/2012/04/13/aladdins-new-lamp/>; Matthew Leising and Alexis Leondis, Bloomberg, BlackRock Electronic Bond-Trading Fails From Client Imbalance (Apr. 24, 2013), available at <http://www.bloomberg.com/news/articles/2013-04-24/blackrock-electronic-bond-trading-fails-from-client-imbalance>; BlackRock Press Release, BlackRock and MarketAxess Announce the Creation of a Unified, Electronic Trading Solution in the US Credit Markets (Apr. 23, 2013), available at <http://phx.corporate-ir.net/phoenix.zhtml?c=119943&p=irol-newsArticle&ID=1809975>.
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