

11 ON GOVERNANCE AND (TECHNICAL) COMPLEXITY

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Governance is becoming more of an issue as technology, and technology companies, become more intimate parts of our personal and social fabric. By examining a unique data set in the field of finance, we hope, through the lens of finance and asset management, to provide insight into some of the modern challenges created when technology integrates with legacy systems and propose some methods for improving governance and avoiding failure.

Governance and complexity have a somewhat strained relationship. Intuitively, they are proportionally related. The more esoteric the business strategy, the more complex the organizational structure or processes are, the more intertwined management is with assets (i.e., conflicts), the greater the need for rigorous independent oversight and financial stewardship. Yet time and again, when things fall apart, the postmortem shows a dramatic variance between the complexity of the underlying instrument and the robustness of the oversight. Often, this variance is shocking in its starkness and simplicity.

Recent history contains several illustrative examples. Bernard Madoff's multibillion-dollar fund utilized a strip-mall audit and accounting firm and issued trade statements listing purchase and sale prices of stocks well outside the entire daily trading range. Theranos's board consisted of wealthy and elite members without even the most basic understanding or

curiosity of the underlying science—leading them to believe claims of innovation dramatically outside the reach of what was achievable by the largest public competitors. WeWork's CEO took more than \$2 billion out of the company before any substantive investor liquidity event occurred—including a \$1.7 billion exit package simultaneous to a revaluation down to \$8 billion, extracting ~21.5 percent of all shareholder value while being removed from the company by said dissatisfied shareholders. By the time this volume is published, there will likely be other examples.

Not everyone in charge of governance is at fault. While transparency, or specifically the mechanisms to facilitate transparency, has arguably never been more accessible, the notional values of losses wholly or partly attributable to governance and control failures continue to increase, whether due to fraud, irrational exuberance, or collective delusion.

As more public money flows into investment strategies historically limited to sophisticated investors, newer, more sophisticated models of governance are necessary to ensure that the control systems overseeing these increasingly complex and sophisticated investments are up to the challenge. In the absence of effective governance, the increasing complexity of these investments is likely to compound larger errors, much like the 2008 financial crisis, leading to larger and more frequent *black swan*-like failures, which will exacerbate retail investor losses.

Excellent academic research is available on public company corporate governance, owing to the availability of large data sets. Private company governance is far more difficult to analyze because board participation is noninstitutionalized and widely spread out, resulting in relatively few data/decision points. Consolidation has occurred to some degree in one specific niche: the boards of asset management/fund entities. Therefore, we have access to a relatively large (more than 1,500) data set around board composition, powers, and functions.

Asset management has undergone a technical evolution similar to that of most industries over the past ten years. By assigning an admittedly subjective, but consistent, determination of complexity, we can draw some observations along with a framework for how governance should respond to increasingly technical or structural complexity.

We start with the basic methodology. Fortunately, asset managers are required to lay out the specific nature and drivers of their strategy in an offering memorandum or prospectus. In this document, they also need to describe the risks associated with their approach, both external and internal. It is *generally* considered reasonable that first-order liquid assets are less complex (large-cap US equities, for example, are less complex than options or other derivatives). The first step, then, is to score firms by the complexity of the markets they engage in. Next, we can scan these descriptions for examples where a quantitative approach is identified as a primary strategy driver and/or where data, engineering, or software is identified as a key performance risk (as opposed to human capital). Finally, as asset management firms' corporate structures tend to be fairly consistent, we can identify those firms with additional corporate structure complexity beyond the norm. By weighting these three characteristics (performance drivers, risk, and corporate structure complexity), we identify a data set of ~35 percent of the total available universe as complex.

Once we have identified these categorizations, we can compare boards across complex versus less complex firms and see how this function has adapted over time. From this, we can draw a framework—one that hopefully is useful across a variety of industries—for how governance should adapt to complexity.

Finally, astute readers will undoubtedly notice that a major (arguably the primary) variable of proper governance (namely, economic incentives) is not covered in detail. There is sufficient academic literature covering alignment of interests, and it is unlikely we will be able to solve the conundrum of how

to balance too little alignment / “skin in the game” (in which indifference toward negative results leads to recklessness) with too much skin in the game (in which the desire for positive results leads to recklessness). We should assume that a reasonable level of aligned economic incentives is maintained in accordance with current best practices and compensation levels.

11.1 DATA FRAMEWORK

We gained access to a sample set of about seven hundred boards of directors of asset management entities. These records included access to all formation documents, board activities, functions, and decisions over the life of the entity (mean life of five years).

The first step was to group the entities into “simple” versus “complex” categories. For this we took information from the entity offering documents. Asset management firms are generally required to list their strategies and risk details. By scraping these documents for keywords around asset classes, strategies, and identified risk, we were able to divide these entities into three categories:

A (simplest): Liquid asset classes with all publicly available pricing (i.e., Level I assets), fundamentally driven strategies with low turnover. The risks highlighted in these types of entities—that is, interest rates, equity fund flows, and market beta along with human error as they are discretionary driven—tend to be macro oriented.

B (moderate): Liquid to illiquid asset classes with mostly publicly available pricing (Level II assets), fundamental or systematic strategies with low to medium turnover. Risks for moderate complexity investment strategies tend to involve both macro factors and trade/strategy execution. While discretion may still be utilized, trading signals are

mostly systematically generated, so success/failure is less dependent on external market forces.

C (complex): Liquid to illiquid assets with public or model-driven pricing (Level III assets), systematic or quant-driven strategies with medium to high turnover. Highly complex strategy risk is based mostly on internal execution, data quality/availability, technical failure or failure to maintain technical (i.e., programming development) edge relative to competitors.

We then looked at the following board activities and their characteristics:

- Meeting frequency
- Management communication frequency
- Number of board committees
- Size of the board
- Average years' experience per board member

We also manually looked at a subset of twenty-five complex managers and compared them with a sample set of twenty-five simple managers and looked more deeply into the following:

- Director specialty experience, specifically STEM (science, technology, engineering, and mathematics) experience
- Diversity

Finally, we engaged in survey conversations with several dozen directors and governance professionals (such as compliance officers and general counsels) of firms engaged in a relatively complex approach to asset management. This allowed us to see whether data patterns for addressing complexity were empirically present.

From this data set, a few observations became immediately apparent.

11.1.1 Complexity and Frequency of Board Activity Appear to Be Directly Related

More complex strategies generated 20 percent more board interactions than simpler strategies, adjusting for size (i.e., on a per-\$50-million-assets basis). This relationship begins to break down at the \$3-billion-assets mark / thirty employees, indicating that the operational, financial, and human resources complexity of larger firms begins to narrow the natural spread that technical complexity creates with regard to governance activity. Notably, the percentage of email traffic between board members and management increases by almost 55 percent, with phone calls and board meeting frequency going up a smaller percentage. This could indicate the volume of data being transmitted or, since most data transmissions are done over a secure portal, the clarification or discussion of that data. From our secondary data set, complex strategies are two times more likely than simpler strategies to utilize encryption or secure (FTP, or File Transfer Protocol) channels to communicate data.

Data-driven firms tend to approach all aspects of the business in a data-driven manner. Therefore, we see more extensive codification of processes and procedures, greater use of comparative tools for decision-making, a greater number of meetings before decisions are finalized, and codification of the decision-making process, which is then subject to an internal or external peer review to ensure it is in line with industry standards and conforms to stated internal policies.

It seems reasonable, therefore, that directors should engage with management in both formal communications (minuted meetings) and informal communications (periodic reporting and email, phone, and face-to-face contacts/updates) at a frequency proportionate to the degree of complexity. Since no standard benchmark for engagement frequency exists, directors should seek to emulate the internal pace—that is, if product design intervals increase during a growth period, director

interaction should proportionally increase. This is sometimes counterintuitive, as during times of increased pressure, outside governance and compliance functions tend to recede in efforts not to impede growth; but the opposite should be true. Governance should integrate into the pace of growth without causing or being seen to cause an impediment.

11.1.2 Complexity Affects Board Composition and Skill Sets

A January 2019 study from Columbia / Harvard University¹ showed that despite the Financial Stability Board (FSB) clearly taking issue with pre-crisis financial bank boards, stating that they “had directors with little financial industry experience and limited understanding of the rapidly increasing complexity of the institutions they were leading” and consequently “were too deferential to senior management,” the percentage of bank boards with prior banking experience *decreased* from 15.69 percent in 2007 to 15.38 percent in 2011. In fact, virtually all of the FSB recommendations were largely ignored.

In our data set, we find that complex strategies have, on average, 15 percent larger boards on a per asset basis. These boards have 25 percent more committees, indicating a desire to compartmentalize board functions and apply specific domain expertise to relevant decisions. Again, at a larger asset size, the variance between simple and complex strategies begins to break down, perhaps because of efficiencies of scale or diminishing returns on governance investment. Asset management firms tend to reach critical mass at around the \$4 billion range.

Complex firms’ governance professionals have, on average, three and a half years or 30 percent more experience cited in their résumés than the governance professionals in simple firms and are more than two times more likely to have advanced science degrees. If we consider only the nonmanagement board members, we still see similar variance to simple strategies.

In some ways these data observations match with intuitive predictions. We would expect that firms deploying more complex technical strategies would require more governance involvement, and that those in positions of responsibility would possess more, and more specific, experience or education.

Yet, interestingly, the proportional increase in sophistication does not appear to have any effect on firm performance. Complex firms are as likely to fail in the first five years of operation as simple firms. And while it makes sense that the largest failures would, owing to their size, likely showcase high levels of pedigree and sophistication, the point remains that governance sophistication does not appear to have a mitigating effect on large-scale failure.

To help explain this, we conducted about fifty survey conversations with governance professionals in complex firms, with a focus on understanding the perceived weaknesses of their governance practices. The patterns that emerged in these conversations formed a framework that appears to be directly proportional to the degree of technical complexity of the underlying company and appears as a set of recurring problems.

The most jarring data point from the interviews is the degree to which board sophistication/experience resulted in less governance engagement than the mean complex entity in the larger data set—almost 50 percent less (estimated) engagement. There appears to be an optimal point where experience and sophistication versus capacity and availability of directors crosses over. Firms that choose board members below this point run the risk of building incompetent boards or ones intimidated by management; those who cross over it are at risk of having a board with neither the time nor the motivation to be actively engaged.

11.1.3 Complexity Intimidates

Sociologists and public planners are often tasked to address *wicked problems*—problems whose social complexity means that

it has no determinable stopping point. Moreover, because of complex interdependencies, the effort to solve one aspect of a wicked problem may reveal or create other problems.

Directors need to maintain the balance between respect for the technical complexity underpinning the company strategy and the skepticism necessary to ensure they are not blinded to embedded faults. Continuing education and maintaining an external, impartial, and perhaps even competitive/skeptical expert resource is the foundation of building a *cynically enthusiastic approach* toward complexity. This should include the following:

- Respect for complexity, requirement for clarity
- Continual learning

In complex scenarios, those in charge of governance are less likely to voice concerns out of fear their contributions will be deemed uninformed or they themselves will be seen as nonqualified. There is no better empirical example of this than the years leading up to the global financial crisis, where an unwillingness to challenge overly complex financial structuring led to a cascade of risk that reverberated through the global financial system.

With the benefit of hindsight, many professionals who were in a governance position at that time express regret at not speaking out more strongly regarding obvious, simple problems with the complex mathematics that turned bad credit into good credit. Yet the culture of complexity that led to an element of hero worship of those who could create these highly complex structured products was not a one-time phenomenon. New York University professor Scott Galloway has made a career of studying the way investors and boards lose their direction because of hero worship. This behavior can mask outright fraud, but perhaps even more problematically, it can prevent directors from acting as necessary checks and balances of misguided CEOs.

In our discussions with directors who had been on boards where substantive (nonfraudulent or without accusation of fraud) failure occurred, all referenced one of two problems with their approach toward senior management, with about 70 percent referencing some form of manipulation (short of outright fraud) and the other 30 percent referencing some form of “hero worship,” where they felt intimidated by superior technical knowledge and were unable or unwilling to ask for clarifying information.

Directors have to walk a fine line between cynicism and enthusiasm. In order to build an appropriately cynical yet enthusiastic approach, directors require confidence in the form of direct or indirect technical expertise.

11.2 SOLUTION: BOLSTER CONFIDENCE WITH INTERNAL AND EXTERNAL SKILL SETS

Continuing education exists for many professions where an expectation of accountability exists alongside an understanding of the skills and knowledge needed to be refreshed or supplemented to an evolving complexity—such as in the fields of law and medicine. But these requirements also apply to accounting and certain forms of finance. The theory is that these professions demand increased responsibility for laypeople, and this responsibility demands periodic skill review to maintain certain licenses.

Governance responsibilities may not dictate life or death, and while the absence of good governance may lead to incarceration, legal assistance is likely more important in that respect. However, it is certainly reasonable to assume that good governance standards carry as much responsibility as a quality accountant or financial adviser. And just as we expect an attorney representing a technology company to understand the basic elements of that technology, or an accounting firm to understand the nature of the assets (digital or physical)

in order to value them or determine their tax status, we should expect directors to either enter into their positions with a reasonable technical underpinning or take the time and attention to procure one in their role.

Yet it is almost unheard of to demand continuing education or even basic competency standards from directors. A continuing education program for directors would place an increased onus on the role, but ultimately derisk the individual and company. There may be a legal argument for increased accountability if a presumption of knowledge is made, but the basic tenets of fiduciary responsibility generally do not allow ignorance as a defense. However, evidence of continuing education may make it more difficult to say that, at worst, a good-faith effort was made to retain relevant core knowledge required to protect investors.

In addition to, versus as a replacement for, governance, professionals need to develop a locus of independent resources for sanity checking advanced technical assumptions/claims. Just as the media has bifurcated to the point where it is useful to gather a range of sources to approximate accuracy and lower the probability of bad information, governance professionals need a range of knowledge resources, from within and, perhaps most importantly, outside the industry within which they serve. Gathering these resources will help reduce the probability they are being fed bad or biased information owing to fraud, irrational exuberance, or simply the existence of a self-perpetuating echo chamber.

These external resources do not need to be superior or competitive. Obviously, directors carry significant material, non-public information and have a responsibility to management and shareholders to maintain strict confidentiality. However, this doesn't mean they can't integrate themselves into the technical community and develop a sounding board to understand where the mean consensus is on research and functional capabilities, and then use their judgment to determine

whether their company's progress is within a normal range of operations—and if not, determine whether their competitive edge can reasonably explain the variance.

Finally, a brief word on compensation and conflicts. Much has already been written on the topic, and compensation benchmarks are readily available. However, our interviews reveal that notional compensation value may not be the only benchmark to consider when evaluating the effect compensation has on governance.

In retrospect, board members whose personal income derives from the same underlying technology utilized by the company highlight their bias from that shared interest as a factor in their inability to acknowledge problems or challenges. In other words, it appears that the more knowledgeable a board member is regarding the underlying complexity, the greater their financial separation should be from the outcome. This may appear counterintuitive, as having skin in the game (in the form of stock-based compensation, for example) is generally considered to be a good thing. However, we know that linking compliance or risk-control functions to trading performance in asset management can lead to a misalignment of interests and direct or subconscious pressure to allow excessively risky behavior. It seems reasonable, therefore, that directors who are subconsciously biased toward an outcome for a certain type of technology will be resistant to its faults.

11.3 INVESTORS DRIVE NEXT-GENERATION GOVERNANCE BOTH EXTERNALLY AND INTERNALLY

Shareholders—that is, investors—seek investment opportunities with the highest levels of governance yet, ironically, often do not scrutinize their own governance with the same rigor. Investors can vary from those less institutionalized (with less organizational structure and formal governance) to institutional investors from both the private and the public sectors, which typically have an established governance structure.

As discussed, that corporate entities or asset managers need governance to scale, investors' governance structures need to adapt as the complexity of investment strategies increases.

Over the past fifteen years, more institutional investors have adopted significant asset allocations that have moved from public stocks and bonds to private investment strategies with a variety of underlying assets, less transparency, and longer durations needing more rigorous oversight.² Investors have sought these strategies for their illiquidity premium, and for various reasons these investments target returns exceeding the investors' necessary return hurdles. Anecdotally among public pension investors, the rate of changes in allocation to these alternative investments has far exceeded the rate of evolution of the investors' governance framework.³ This complexity premium often sought from asset managers is not always recognized internally by investors as needing more resources to maintain the investors' fiduciary oversight.

A reality is that the investors often have limited resources and skill sets, so the need for seeking human capital that is either hired or "trained up" for this type of investing is critical not just at the staff level but also at the governing body level. Budgets are also often limited for resources, so the future should maximize technology to more effectively and efficiently create oversight functions of managers. Like other industries—retail, financial services, energy, or agriculture—technology is making functions easier and more precise; however, the complexity involved in institutional investors' adoption of those technologies requires a level of skill that is itself a hurdle.

An example of a future use of technology by investors is IBM and Northern Trust partnering to apply blockchain (its security-rich distributed ledger system) to a private equity fund administered by Unigestion, a Switzerland-based private equity manager with \$20 billion under management.⁴ The solution is based on open-source Linux Foundation Hyperledger Fabric. The general partner board of Unigestion noted that the technology "provided us with an infrastructure that will enable the

fund to be serviced in a digital environment, introducing a new collaborative ecosystem to the private equity market where all actions are undertaken on a common, open and transparent platform.”

11.4 REGTECH

RegTech, short for regulation technology, is seen as a massive potential market. The global accounting firm KPMG estimated in 2019 that spending on RegTech will soon equal about 40 percent of the ~\$270 billion of total US financial service compliance spending. Unsurprisingly, investment flows continue to grow, and an expanding suite of RegTech start-ups has emerged. Most of these solutions address the need for governance to be informed and the capabilities to monitor, using artificial intelligence and similar tools to (1) source, screen, organize, and present the vast amount of legacy and new data, rules, and decisions; and (2) review, in real time or with low latency, transactions, messages, and actions of employees and stakeholders. Technology that can deploy sentiment analysis to understand qualitative rule changes across multiple countries, for example, will certainly reduce the risk of governance failure due to ignorance. Software that can screen millions of stock trades in real time and search for patterns that indicate compliance breaches will lessen the chance of governance failure due to oversight limitations. Both play a vital role in empowering governance through brute-force application of computational power that allows those in charge of governance to scale their observation capabilities alongside the businesses under their charge. It remains to be seen how adaptable these systems will be when challenged by complex purposeful, or even subconscious, attempts by market participants to breach rules, or how the technology will respond to pervasive ethical breaches—as opposed to strict rule breaches. In all likelihood, compliance RegTech will get smarter over time and begin to mimic the basic tenets of legal and moral oversight. The question of how

long, and whether, it can keep up with the equally rapid evolution of its market adversaries remains to be seen.

However, informational and observational capacity are just two elements charged to governance. Fiduciary responsibility—founded on the notion that individuals should place the interests of others before their own—is more difficult to solve through computational power. This is because the advantages one party has over another are complex, nuanced, subject to interpretation, and multifaceted—all characteristics that stymie code-based compliance systems. Attempts are being made in the digital assets space, with decentralized autonomous organizations looking to automate complex social, commercial, and financial functions through code. While these measures appear promising, and likely impactful around simple transactions (e.g., conclusively determining titles for home or auto insurance purposes), governance failures, outside of straight fraud, also occur when participants, completely aware of the rule set governing behavior, nonetheless convince themselves a course of action is allowed. This generally comes from their interpretation of the rules or their determination that the particular facts and circumstances allow for an exemption. Both scenarios are very difficult to reduce to a decision tree that can be monitored by computer code. To put it differently, RegTech is (currently) excellent at catching indication of fraud, very good at monitoring binary decisions, good at helping to monitor first-order complexity decisions, but may struggle against the complex, perhaps even well-intentioned, delusion that has caused some of the most significant governance failures.

11.5 LANGUAGE AND COMPETENCIES SHIFTING TO REFLECT THE FUTURE STATE

Over time, we may see that fintech as a specific focus or practice area within governance will disappear, as technology in all forms saturates financial services to the point where it is simply an essential part of how capital flows through economic

systems. This day does not appear to be far off,⁵ with digital currencies poised to replace cash in the near future.

Just as a corporate director of a Japanese company invariably speaks Japanese, it will not be long before directors and governance professionals will invariably be fluent in the language of technology.

Ultimately, good governance comes down to taking the robustness that management uses to build high-performing teams and applying it to the construction and maintenance of high-performing boards. As technology evolves, boards must also evolve, and principles of continual learning, dynamic restructuring, and conflict mitigation can assist in maintaining parity.

NOTES

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1. S. Rajgopal, S. Srinivasan, and Y. T. F. Wong, "Bank Boards: What Has Changed since the Financial Crisis?," SSRN, January 1, 2019, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2722175.
2. A. Whyte, "Public Pensions Pour More Money into Private Equity," *Institutional Investor*, January 31, 2019, <https://www.institutionalinvestor.com/article/b1cy61jsl24097/Public-Pensions-Pour-More-Money-Into-Private-Equity>.
3. L. Farmer, "Politicizing the Portfolio," *Governing.com*, December 2018, https://archives.erepublic.com/GOV/GOV_Mag_Dec2018.pdf.
4. Y. Bobeldijk, "Northern Trust, Unigestion and IBM Team Up for Private Equity Blockchain," *FN London*, February 22, 2017, <https://www.fnlondon.com/articles/northern-trust-unigestion-and-ibm-team-up-for-private-equity-blockchain-20170222>.
5. D. Michaels and P. Vigna, "The Coming Currency War: Digital Money vs. the Dollar," *Wall Street Journal*, September 22, 2019.