

Brooklyn Law Review

Volume 85 | Issue 3

Article 1

6-25-2020

THE ABRAHAM L. POMERANTZ LECTURE: Investor Protection in the Digital Age

Kara M. Stein

Follow this and additional works at: <https://brooklynworks.brooklaw.edu/blr>



Part of the [Computer Law Commons](#), and the [Securities Law Commons](#)

Recommended Citation

Kara M. Stein, *THE ABRAHAM L. POMERANTZ LECTURE: Investor Protection in the Digital Age*, 85 Brook. L. Rev. ().

Available at: <https://brooklynworks.brooklaw.edu/blr/vol85/iss3/1>

This Article is brought to you for free and open access by the Law Journals at BrooklynWorks. It has been accepted for inclusion in Brooklyn Law Review by an authorized editor of BrooklynWorks.

THE ABRAHAM L. POMERANTZ LECTURE

Investor Protection in the Digital Age

Kara M. Stein[†]

The following is a transcription of Kara M. Stein's keynote address presented at the 17th annual Abraham L. Pomerantz Lecture on September 24th, 2019 at Brooklyn Law School. The Pomerantz Lecture is sponsored by the Brooklyn Law Review and the Center for the Study of Business Law and Regulation at Brooklyn Law School. This transcript has been lightly edited for clarity.

Before I begin, I would like to thank Professors Jim Fanto and Roberta Karmel, the Center for the Study of Business Law and Regulation, the *Brooklyn Law Review*, and perhaps most importantly the law firm of Pomerantz LLP for making it possible for me to speak with you this evening. It is a privilege to have been chosen to give the 17th Pomerantz Lecture.

Abraham L. Pomerantz, whom we are honoring this evening, graduated from Brooklyn Law School over ninety-five years ago. This lecture series is a testament to both his legacy and to the importance Brooklyn Law School places on the study of corporate securities law and related issues of professional responsibility.

INTRODUCTION

For over eighty-five years, the U.S. Securities and Exchange Commission (SEC) has played a vitally important role in protecting and shaping the U.S. economy. In fact, the SEC was borne out of necessity. Congress created the Commission as part of the Exchange Act of 1934 in an effort to help stabilize the national economy from weaknesses in the capital markets.¹

[†] Kara M. Stein served as Commissioner of the U.S. Securities and Exchange Commission (SEC) from August 9, 2013 until January 2, 2019. Commissioner Stein was appointed by President Barack Obama and confirmed unanimously by the U.S. Senate.

¹ Securities Exchange Act of 1934 § 2, 15 U.S.C. § 78b.

Historically, the SEC's mission has been to protect investors; ensure fair, orderly, and efficient markets; and facilitate capital formation. The agency's organizational structure has been based on regulating certain public company disclosures and on regulating equities markets dominated by human intermediaries, such as broker-dealers and investment advisors.

However, the securities markets are increasingly challenged by new technologies, from innovative investment products to computers trading stocks instantaneously without human intervention.

Does the regulatory paradigm created at the beginning of the twentieth century still work for new concepts such as crypto assets, distributed ledger technology, and dark pools? With more and more regulations favoring private over public markets, a majority of capital raising actually now takes place without SEC oversight. How does this affect the agency's ability to protect investors and the U.S. economy going forward? What changes need to be made to help the agency perform its critical mission in the Digital Age?

This evening, I would like to talk about a new regulatory paradigm that takes into account the dramatic changes that have been taking place in our capital markets. How should an organization of mainly lawyers and accountants regulate capital markets that are increasingly being run by data scientists and software programmers? Going even further, how does the SEC regulate machine learning or artificial intelligence (AI) in the capital markets setting? Perhaps more importantly, how does the SEC itself use machine learning or AI to enhance its ability to regulate and to protect investors?

The Culture Divide: Lawyer Versus Technologist

Since we are at a law school tonight, I thought it would be helpful to acknowledge a bit of a cultural divide. Although lawyers are trained to be logical in order to construct persuasive arguments, lawyers also very much tend to think in shades of gray. In fact, it is in that gray area that lawyers are often most needed. An unexpected accident happens, and lawyers are involved to help resolve issues around who should pay for the accident.

Meanwhile, technologists like to think in "binary" terms when they are coding (1 or 0/on or off). The technologist wants the

program to execute as coded, without mistakes or unintended results. Technologists prefer bright lines so that they can be assured their code will be executed by the machine in exactly the fashion intended.

So, what happens when the driverless car runs over a pedestrian? Or, what happens when the computer code in an airliner overrides the pilot's direction resulting in a crash and loss of life?

When something goes wrong in the digital world we live in, who is at fault? Who is responsible? Is it the company that employed the technologist? Is it the technologist who wrote the code? Or the owner of the computer?

Can a computer be negligent? When is computer code reckless? Can it be willful? If it's human error, then which human? The programmer? The designer? The engineer? Who is ultimately responsible when source code malfunctions or fails to execute as intended?

Whether in the area of tort law, contract law, or securities law, the foundations of our legal system are being disrupted by things we simply cannot observe: the ones and zeros that are processed at nearly the speed of light to force the pitch of an airplane down instead of up, the ones and zeros that determine whether you qualify for a mortgage, the ones and zeros that select new and innovative investment products.

How will we answer those questions? Simply put, by re-envisioning the law and by changing our approach toward regulation. And all of you in this room today are going to have a hand in it.

The underlying question we are facing concerns the rapid explosion of technology in the capital markets and whether the law is adapting quickly enough. This creates both risks and opportunities.

Traders now are using artificial intelligence techniques to trade equities, bonds, derivatives, and exchange-traded funds. AI is being used to better understand and predict economic variables that might affect a trade or a particular company. It is also being used on the corporate finance side to establish relationships between financial statement analysis and various financial

scenarios. AI is even being used for portfolio management to better determine asset allocation and optimization.

So, if AI techniques are being used to reduce costs and enhance performance in the private sphere, why shouldn't they be adopted by the government to reduce costs and enhance performance in the public sphere?

It strikes me that in order to harness some of the amazing breakthroughs in technology to improve government oversight, government needs to get comfortable—truly comfortable—with technology. Some have called it “GovTech.” Government too needs to deploy algorithms and machine learning to protect investors and ensure the markets are fair and efficient. But that requires a sea-change in how those who enter government—often lawyers—approach these questions.

To start out with, how many of the people in this room are conversational in C++? How about Python? How many of you work in the Cloud? (Incidentally, how many of you know where the cloud is located?)

How many of you don't live in the world of minutes and seconds, but of microseconds and structural latency? Not surprisingly, I am noticing a bit of a generational divide in the room.

In many ways, this same generational divide can be seen in the government. Of course, this argues for hiring younger people into the government. But it also argues for mid-career professionals getting the training and continuing education they need to understand the dramatically different capital markets that they are responsible for regulating.

In short, with folks like many of you, already beginning to break down the divide between lawyers and technologists, I'm increasingly confident that the government of tomorrow will not be the same as the government of today. But to get there, we have a number of tough questions to grapple with on emerging issues.

So, let's start out with some. My first question is:

What Do We Regulate?

Artificial intelligence is a useful place to start this discussion. A great deal has been written about artificial intelligence during the past couple of years. Much of that discussion is about how businesses can use artificial intelligence to enhance a company's performance or improve customer relationships or secure compliance with regulatory mandates.

Equally relevant is how AI can be used in the government context.

Let's stop for a moment and discuss what we actually mean by AI. I recently ran across a definition that I found helpful. Artificial intelligence was defined as: "A set of technologies capable of adaptive predictive power against a well-defined problem and exhibiting some degree of autonomous learning and improvement in the solving of that problem."²

This definition encompasses many common types of AI such as machine learning, machine vision, neural networks, natural language processing, and genetic and evolutionary algorithms.

So how is AI changing the securities markets? Some firms are now offering exchange-traded funds that make investment decisions using AI technologies. Companies like Vanguard, Charles Schwab Corp., and Betterment LLC are offering "robo-advisory service[s] that [can] cut[] out [a] human advisor[] completely" in selecting investments.³ And high-speed traders are using AI to make nanosecond trading decisions before anyone else can trade on new information in the markets.

Although sophisticated market participants are using AI techniques, securities regulators currently have no way to monitor these techniques and the effect they may be having on the overall marketplace. In many ways, artificial intelligence exemplifies both the opportunities and challenges for how we regulate the capital markets going forward.

On the one hand, AI techniques potentially offer investors an immensely powerful tool for navigating an increasingly complex and global marketplace. Think about having a Siri or an Alexa

² HENRI ARSLANIAN & FABRICE FISCHER, *THE FUTURE OF FINANCE: THE IMPACT OF FINTECH, AI, AND CRYPTO ON FINANCIAL SERVICES* 169 (2019).

³ Dawn Lim & Anne Tergesen, *Vanguard Bets on Robo-Only Adviser: Money Manager Is Aiming to Capture Younger, Tech-Savvy Investors*, WALL STREET J. (Sept. 20, 2019), <https://www.wsj.com/articles/vanguard-bets-on-robo-only-adviser-11568989446?mod=searchresults&page=1&pos=7> [<https://perma.cc/D5HV-KC4L>].

or a Google Assistant that answers all of your financial questions. Going further, imagine this same electronic assistant following your instructions to actually sell or buy securities based on certain parameters that you have set for it. One step further is telling your electronic financial advisor what financial goal you would like to accomplish and having that e-advisor empowered to make whatever trades make sense to help you reach your long-term goal of purchasing a house, or sending a child to college, or retiring early.

On the other side of the equation, envision a world in which a company could raise equity or debt whenever it wanted from the capital markets. It would electronically let the market know that it wanted to capital raise in some fashion, and immediately access the capital markets, perhaps raising the capital overnight (from Japanese markets that were open while the U.S. markets were closed). This would be like an evergreen shelf offering on steroids.

Think of the possibilities for both companies and investors. What if a company conducted its IPO with data instead of documents? No road shows. Would your e-advisor subscribe to the offering and transfer the necessary funds?

Finally, imagine a world in which the SEC was able to use AI to monitor the capital markets in real time, and immediately shut down boiler rooms and halt fraudulent offerings. Could the SEC put an end to insider trading?

Further, technology may make the divide between our private and public markets no longer necessary. In effect, the SEC would be able to use AI to shut down a fraudulent offering or an offering that was illegal under the law regardless of where it was happening. And investors might have new opportunities to invest in both public and private offerings.

So, what does this mean for the securities laws? Do foundational principles such as fair and accurate disclosure still provide value? And how do such foundational principles have to change in a digital world?

For example, does the SEC's disclosure regime need to continue to be centered around paper forms (such as Form 10-K, Form S-1, Form 3, etc.)? How many of you read these forms cover to cover? Now how many of you use the internet or other data

search tools to query for information on companies? Imagine a world where the companies provide periodic feeds of relevant data and information to the SEC that is instantaneously disseminated to investors and other market participants.

Extending that concept further, why shouldn't the data be submitted in a structured form—for example in inline XBRL—so that it is both machine and human readable? This data would cost less and could be verified more easily by both the company submitting it, and those reviewing it—whether auditors or investors.

In fact, there is an immense pool of data in our markets—but it is only accessible by the most sophisticated market participants. I was just reading an article in MarketWatch about active fund investors who are using data obtained from web scraping, satellite and aerial surveillance, credit cards, and social media feeds to help make investment decisions.⁴

Over ten years ago, the SEC set forth to create a data warehouse for stock trades in our public markets. Unfortunately, the SEC remains blind as the Consolidated Audit Trail (CAT) continues to falter.

But, imagine a regulator that could see around the corner and into the darkest of shadows. Regulatory AI could spot false dealings and manipulative practices and allow for immediate intervention. Could the use of AI make our markets less expensive and safer? I believe it can.

And how can AI techniques be used to protect investors? Well, AI can be used to quickly determine if certain data points appear accurate or not. Because AI can use both structured and unstructured data when trying to solve a problem, it can likely find anomalous behavior—either too good or too bad to be true. Mistakes or frauds can be found more easily, and investors can suffer less or no harm. This is a foundational principle of the SEC's compliance and enforcement programs. Both work to find problems quickly so that less harm occurs to both investors and the marketplace.

⁴ William Watts, *The Explosion of 'Alternative' Data Gives Regular Investors Access to Tools Previously Employed Only by Hedge Funds*, MARKETWATCH (Sept. 19, 2019), <https://www.marketwatch.com/story/the-explosion-of-alternative-data-gives-regular-investors-access-to-tools-previously-employed-only-by-hedge-funds-2019-09-05> [<https://perma.cc/D5HV-KC4L>].

The creation of the CAT also requires exemplary data stewardship by both the stock exchanges and FINRA, but also by the SEC. And that hasn't happened yet. Both the use and storage of data is becoming an increasingly challenging issue. Because of the internet, information that once would have been kept inside a filing cabinet within a home or office is now travelling across state and national boundaries at the speed of light. How do we make sure such data is secure, is used fairly, and protects the privacy of those involved? And how do you discover whether data has been stolen or misused without monitoring the data?

With today's trading occurring in microseconds in a market dominated by computerized and automated trading, we cannot rely solely on the human eye to detect problems. Artificial intelligence techniques may provide extraordinary tools for detecting fraud and market manipulations that would be almost impossible to detect otherwise.

In many ways, the best way to protect investors is to prevent fraud from happening in the first place. The exchanges and FINRA have been using computers to surveil the markets for years now. But as these markets become increasingly fragmented, AI techniques may be able to detect patterns that no single exchange would be able to do on its own.

When it comes to data privacy, what expectations or legal rights should an investor or company have regarding the collection and use of its data? Should those expectations be different depending on whether it is an individual's information or a company's? Should those expectations or requirements be different based on what country the data originated from? For example, the EU's approach begins with regulation, establishing a mandatory regime that is seen by many in industry as both inflexible and challenging. Alternatively, leaving these issues to private ordering and best practices hasn't been going too well.

These issues get even trickier when we realize that data is not static. It is traveling across international borders at the speed of light. How do we protect these data flows, which are vitally important not just to the financial services sector, but to our entire economy?

There are new “digital trade” provisions in the signed United States-Mexico-Canada Free Trade Agreement (USMCA).⁵ For example, the provisions prohibit states from forcing data to be localized, limit the ability of regulations to require companies to turn over the code to their algorithms, and prohibit digital taxation, amongst other provisions. These provisions have a wide range of implications across technology-impacted policy. The question is whether such standards are appropriate when it comes to the financial markets and whether this is the appropriate forum for thinking through international policies in this regard.

There are real tensions at play. Some foreign countries have been known to seek the underlying source codes from companies, and questions have arisen about whether the lines between government regulator and national champion are getting too blurry. So, if U.S. financial companies are doing business in a foreign country, we should naturally be concerned about what types of codes and access are being provided. This is important from a competitiveness perspective, as well as from a market stability and national security perspective.

But what if American regulators decided appropriate supervision or examination required a better understanding of what the algos are doing in a particular model? For example, for the Volcker Rule,⁶ which recently was weakened significantly but still exists and needs to be monitored. Is this something the new trends in digital trade, such as the USMCA, would squash unless there was an active investigation or enforcement action? Presumably, the prudential exception for financial regulation in the trade agreement would kick in, which is supposed to be broad and cover consumer and investor protection as well. But if one is concerned about a foreign country demanding a company’s secret sauce, what good has this trade agreement done?

We quickly start getting to the logic of the way financial regulations are coordinated internationally. Regulators often coordinate by making determinations about the equivalence of other regimes based on shared values, common approaches, and shared outcomes—rather than based on maximizing trade. It may make more sense to start thinking about data more like how we

⁵ United States-Mexico-Canada Agreement, art. 19, Can.-Mex.-U.S., Nov. 30, 2018, <https://ustr.gov/trade-agreements/free-trade-agreements/united-states-mexico-canada-agreement/agreement-between> [<https://perma.cc/C9CH-MF7B>].

⁶ Dodd-Frank Wall Street Reform and Consumer Protection Act § 619, 12 U.S.C. § 1851.

think about financial assets, rather than how we think about blueberries or automobiles.

My point is, people are starting to make rules in this area, and there is a lot that can be learned with the input and experience of financial regulators. And financial regulators need to pay close attention to the digital trade and digital rule-setting conversations going on in a range of forums.

Another issue we need to think about is fair use of data. Who gets to use your financial data? Who does it belong to? And what happens when the data is being aggregated? How should it be able to be used? The answers to these questions have important implications for SEC anti-fraud regulations like Rule 10b-5.⁷

If Big Tech companies can predict what you type into the search box or what you like to buy, what if they could predict your securities trades? Or, even more likely, what if they were able to aggregate trade data and deploy the collected information to enable others to trade more effectively? Many would say this is already happening in some form. And if this is done via data and AI, it might be very difficult to uncover or stop it from happening. Going further, what is front running in a world filled with high-speed computers?

As we think through the new rules of the road regarding the storage and movement of data around the world, the SEC should work to be an exemplary steward of data. With recent advances in cryptography, data users can now share information while preserving their confidentiality. Cryptography also allows analysis of data without having to reveal the firm or individual from which it originated. Such techniques might also allow the Commission to identify threats to the financial markets by identifying concentration ratios or crowded trades while still protecting the anonymity of the firm or the proprietary nature of the data.

My next question is:

Who Do We Regulate?

This is helpful to talk about in the context of Distributed Ledger Technology (DLT). Many extremely bright software engineers have been working hard to figure out how to use this technology in the

⁷ 17 C.F.R. § 240.10b-5.

financial markets. As with AI, many of the same questions arise. How do we promote innovation and the use of technology and data analytics, while understanding that there are limitations and risks? Both AI and DLT bring up one of the most important questions facing the SEC (and other government agencies), which is who do we regulate?

By design, distributed ledger technology allows people to disintermediate legacy financial players and interact directly and anonymously with one another—whether they are trying to raise money for a new company or trade different types of tokens or coins. Because of the anonymous and distributed nature of this particular technology, it is not immediately clear sometimes what entity or individual might be running, organizing, or in charge of a particular operation.

In many ways, this challenges the foundational principles of our current regulatory paradigm. In essence, the Commission contracts out some of its regulatory function right now to private individuals or entities. These regulated entities include stock exchanges, FINRA, clearing agencies, broker-dealers, investment advisers, transfer agents, and auditors, to name a few. These gatekeepers are responsible for being licensed and making sure everyone in their purview follows the securities laws and regulations. So, at its most basic level, the question is how do you regulate a computer software program which is available on the internet to everyone?

The SEC has started to think through these issues and is beginning to provide some guidance to this new and innovative marketplace. In April 2019, the SEC's new Strategic Hub for Innovation and Financial Technology, or "FinHub," released a document called the *Framework for "Investment Contract" Analysis of Digital Assets*.⁸

This document attempts to put into plain English what securities laws may apply when someone is considering engaging in an Initial Coin Offering or in the offer, sale, or distribution of a digital asset. The FinHub Framework is largely

⁸ SEC, FINHUB, FRAMEWORK FOR "INVESTMENT CONTRACT ANALYSIS" OF DIGITAL ASSETS (2019), <https://www.sec.gov/corpfin/framework-investment-contract-analysis-digital-assets> [https://perma.cc/84LC-PRLD] [hereinafter FINHUB, FRAMEWORK].

based on explaining how the Supreme Court's holding in *SEC v. Howey* applies to digital assets.⁹

The Framework reiterates that “an ‘investment contract’ exists when there is . . . money in a common enterprise with a reasonable expectation of profits to be derived from the efforts of others.”¹⁰ It then states that this test “applies to any contract, scheme, or transaction, regardless of whether it has any of the characteristics of typical securities.”¹¹ It goes further and emphasizes that anyone involved in digital assets will need to conduct a legal analysis of their transactions and determine whether the securities law apply.

Finally, it states that “all offers and sales of securities, including those involving a digital asset” need to either be registered with the SEC or qualify for an exemption from registration.¹²

What is interesting to me about the FinHub Staff Framework is that it effectively says that the first two prongs of *Howey* are almost always met when dealing with digital assets.

The Framework states that the first prong of the *Howey* test is usually satisfied “because the digital asset is purchased or otherwise acquired in exchange for value, whether in the form of real (or fiat) currency, another digital asset, or other type of consideration.”¹³

It then goes on to say that courts generally have analyzed a “common enterprise” as a distinct element of an investment contract and that the staff has found in evaluating digital assets that a “common enterprise” usually exists.

So that leaves almost all of the legal analysis about whether a digital asset is an investment contract or security to the third prong of *Howey*—whether there is a reasonable expectation of profits derived from the efforts of others.¹⁴

⁹ *SEC v. W.J. Howey Co.*, 328 U.S. 293 (1946).

¹⁰ FINHUB, FRAMEWORK, *supra* note 8.

¹¹ *Id.*

¹² *Id.*

¹³ *Id.*

¹⁴ *See Howey*, 328 U.S. at 299.

Most important of all, this framework discusses the new idea of an “active participant” whose work or actions are relied upon by others to satisfy the third prong of the Howey test.

These efforts have to be “the undeniably significant ones, those essential managerial efforts which affect the failure or success of the enterprise,” versus being just ministerial in nature.¹⁵ It then says one should ask if the purchaser can reasonably expect to rely on the efforts of such an active participant.

And who are these active participants?

They could be smart contract developers, miners, wallet software developers, people hosting the user interface, people responsible for matching trades, or users of the platform (e.g. sellers, buyers, or market makers)—to name just a few.

Now, perhaps after the fact, we can figure out who an “active participant” might be. But this begs a different set of questions. In effect, who should the Commission be regulating or supervising?

Traditionally, the SEC has supervised the intermediaries in the marketplace, like the broker-dealers or stock exchanges. But in this new world, should the SEC oversee the buyers and sellers instead? Or should it supervise the activities of a given software program? For example, if a software program is clearing and settling trades, should it now be regulated as a clearing agency or platform?

Finally, since it is impossible to focus on every single transaction in the marketplace, should we insist that the Commission now have a “node” on any type of decentralized platform? Or is this something that argues for the Commission to use AI tools to surveil the marketplace and make sure our capital markets are fair and efficient, and not subject to manipulation or fraud?

A recent paper makes it clear to me how important regulators and regulation are in some of these new financial marketplaces. The paper was published in April 2019 by a group of Cornell Tech researchers. It is called *Flash Boys 2.0: Frontrunning, Transaction*

¹⁵ FINHUB, FRAMEWORK, *supra* note 8 (quoting SEC v. Glenn W. Turner Enter., Inc., 474 F.2d 476, 482 (9th Cir. 1973)).

*Reordering, and Consensus Instability in Decentralized Exchanges.*¹⁶ The paper attempts to:

document and quantify the widespread and rising deployment of *arbitrage bots* in blockchain systems, specifically in *decentralized exchanges* (or “DEXes”). Like high-frequency traders on Wall Street, these bots exploit inefficiencies in DEXes, paying high transaction fees and optimizing network latency to front run, i.e., anticipate and exploit, ordinary users’ DEX trades.¹⁷

The paper basically states that blockchain businesses of various sorts have become subject to exploitation, similar to exploitation found in the financial markets. Their research documents how certain players in the blockchain ecosystem are making riskless profits because there are no rules or enforcement mechanisms to ensure that these markets are fair.

Again, if investors are going to participate in these new types of trading venues, regulators need to both understand the technology behind these platforms and make sure they are regulated appropriately.

CONCLUSION: TOWARDS A NEW REGULATORY PARADIGM FOR THE DIGITAL AGE

This goes back to the beginning of my speech this evening: Government has a critically important role to play in making sure that the markets are fair, that they protect investors, and that they facilitate capital formation. These principles remain the same, regardless of what type of technology is being used. These are the foundational principles of good government.

But as the *Flash Boys 2.0* article points out, market manipulation and fraud do not disappear just because new and innovative computer technologies are being used in the marketplace. New forms of manipulation require government to adjust to the environment. Just as animals must adjust to their new environment or risk extinction.

¹⁶ PHILIP DAIAN ET AL., FLASH BOYS 2.0: FRONTRUNNING, TRANSACTION REORDERING, AND CONSENSUS INSTABILITY IN DECENTRALIZED EXCHANGES (2019), <https://arxiv.org/pdf/1904.05234.pdf> [<https://perma.cc/DQR9-XEUL>].

¹⁷ *Id.* at 1.

So, what is the role for the SEC in this area? Well, clearly timely, relevant, and reliable disclosure can be part of the solution. But, where is that disclosure?

And perhaps registration or licensing can be part of the solution. But whatever is done, it needs to focus on ensuring that investors have confidence and trust in the systems they are using to purchase and trade digital securities. This is of course far more complicated in a decentralized world. Nonetheless, trust and transparency remain vitally important in order for these innovations to reach their potential. Without trust and transparency, our markets will not function, whether dominated by individuals or by computer code.

In addition, when AI techniques are used in the securities markets, it might make sense to set up legal parameters around the use of AI, in effect to put a “legal box” around the “black box.” When important decisions are being made on behalf of investors or companies in the marketplace, it also makes sense to require human oversight and responsibility at critical junctures. In effect, when can a firm rely on AI, and when does AI need to be turned off?

As lawyers, whether inside or outside of government, we also have to start to think through how liability is going to be allocated when things go wrong. When a robo-advisor gives terrible investment advice or a broker does not meet its best execution obligation because of a computer programming mistake, the response can't be “the computer did it, and it's not my fault.”

If done well, this should give everyone legal certainty and help push such innovations forward. If done badly, people are going to have a hard time trusting new technologies.

Finally, the SEC is going to have to transform and reinvent itself. The Commission needs to get the Consolidated Audit Trail completed. It needs to start recruiting nontraditional hires with data and coding backgrounds. It also needs to start using machine learning and other AI techniques to effectively oversee our increasingly complicated markets and ensure they are worthy of investor trust.

The dominance of digital is upon us. If the SEC is to stay relevant, the Commission must adapt itself to this new paradigm. And indeed, the Commission's very mandate demands it.

The SEC's mission is three-pronged. First and foremost, to protect investors. At the same time, to facilitate capital formation and make sure the markets are fair and efficient. This mission remains critically important, regardless of the pace of technological changes. At base, regulation should be protecting the two most important conditions of a healthy marketplace: trust and information.

If we can answer the questions raised by the new challenges I've set out above, we will have developed that new regulatory paradigm for the Digital Age.

Again, I would like to thank Professors Jim Fanto and Roberta Karmel, the Center for the Study of Business Law and Regulation, the *Brooklyn Law Review*, and the law firm of Pomerantz LLP for making it possible for me to join you this evening.