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U.S. SECURITIES AND EXCHANGE COMMISSION

FINTECH FORUM

THE EVOLVING FINANCIAL MARKETPLACE

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U.S. Securities and Exchange Commission

100 F Street, N.E.

Washington, DC

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APPEARANCES:

RYAN VanGRACK, SENIOR ADVISOR

Commissioners:

MARY JO WHITE, CHAIR

MICHAEL PIWOWAR

KARA STEIN

Panel I:

KRISTIN SNYDER, MODERATOR

BEN ALDEN

BO LU

MARK GOINES

JIM ALLEN

Panel II:

VALERIE SZCZEPANIK, MODERATOR

BRAD PETERSON

PROFESSOR EMIN GUN SIRER

GRAINNE McNAMARA

CHRIS CHURCH

MARK WETJEN

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APPEARANCES(CONT.):

Panel III:
SEBASTIAN GOMEZ ABERO, MODERATOR
MATT BURTON
CONOR FRENCH
JAVIER SAADE
KAREN MILLS
RAM AHLUWALIA
SARA HANKS
MICHAEL PIECIAK

Panel IV:
MARC WYATT
TRAVIS SCHWAB
JOHN WALSH
NIKHIL LELE
RICK FLEMING

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P R O C E E D I N G S

MR. VanGRACK: Good morning, everyone. We're going to go ahead and get started.

My name is Ryan VanGrack. I am senior advisor to the Chair, and it is my pleasure to kick off the Securities & Exchange Commission's Fintech Forum. This event provides an important opportunity to explore the opportunities and challenges presented by groundbreaking innovations within the securities industry.

For those of you here today or following us online, you can contribute to the conversation on Twitter using the hashtag secFintech.

We're going to begin today's event with remarks from Chair White, followed by Commissioner Stein and Commissioner Piwowar.

Mary Jo White is the 31st Chair of the SEC, which she has led since April 2013. Her extensive public service also includes serving as the U.S. Attorney for the Southern District of New York from 1993 to 2002, the only woman to hold that position in the 200-plus-year history of that office.

During her tenure there, she specialized in prosecuting complex securities and financial institution frauds, as well as international terrorism cases.

Since becoming Chair, she has championed the

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use of data and technology throughout the Commission, including conducting a data-driven assessment of our

equity market structure and expanding the Commission's analytical capability to help us better detect fraud and suspicious activity through both our examination and enforcement programs.

Today's event is yet another step on this critical path she's laid out to ensure that our 21st century securities market is overseen by a 21st century regulator.

Please join me in welcoming Chair White.

(Applause.)

CHAIR WHITE: Thank you, Ryan, very much for that really terrific introduction.

I want to welcome all of you to the SEC's first Fintech Forum, both those of you in the auditorium in Washington and those obviously watching online, as well.

The rapid development of new platforms and technologies for financial services, which has been accompanied by tremendous growth in private investment and growing attention from regulators, makes this really an ideal time to bring the relevant stakeholders together to discuss both the role of Fintech in our securities markets today, and where it is headed.

With global investment in Fintech companies

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estimated to be over $19 billion last year, it is safe to say that Fintech is well on its way to playing an important role in the future of the securities industry, and regulators have an obligation to understand, monitor, and, where appropriate, encourage such developments, while simultaneously being prepared to implement safeguards where necessary to protect investors and our markets.

Today's forum is an excellent venue for considering all of these issues. Of course, an event of this magnitude with panelists of this caliber is not easy to produce. So, I want to begin by thanking our staff for their tremendous efforts in putting the Forum together, including Michael Batlogg, Sara Young, Bruce Claybrook, Amy Starr, Elizabeth Blase, Tina Barry, Dietrich King, the teams of the Office of Public Affairs and from Publishing and Printing, and our very talented moderators.

I also want to thank, specifically, Commissioner Michael Piwowar for suggesting that we hold the forum at this time, and I want to especially thank our distinguished panelists for coming here to share their important insights.

You know, there is relatively widespread agreement that Fintech innovations have the potential to

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transform key parts of the securities industry, and to do so in ways that could significantly benefit investors and our capital markets. Today's forum focuses on several of these developments that are particularly

important to the SEC.

Automated investing advice has the potential to give retail investors broader, and more affordable, access to our markets.

Distributed ledger technology could greatly simplify the trading, settlement and clearing processes, making transactions faster, more efficient, and less expensive.

Online marketplace lenders and crowdfunding portals are providing individuals and small businesses with new paths to access capital.

It is important to foster an environment where potentially transformative innovations that make for safer, better markets can flourish, but as the saying goes, with power comes responsibility.

We must ensure new developments are not rushed to market or implemented in a way that facilitates a risk of fraud or harm to investors.

Entrepreneurs should recognize that they are not only innovators, but also market participants with important duties and obligations.

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Although some may view regulatory compliance as a burden, the U.S. securities markets are the safest and most reliable in the world largely because of, not in spite of, our robust investor protections.

We, as regulators, also have an important responsibility to evaluate how our existing rules, address both the challenges and opportunities presented by these new technologies.

At the Commission, we have been thinking carefully about the specific challenges presented by each of the areas being discussed today.

The last few years have seen rapid growth in the availability and popularity of automated investment advisory programs.

Consistent with our mission, we have been considering how these so-called robo-advisers, as registered investment advisers, how meet their fiduciary and other obligations under the Advisers Act.

In particular, we are looking at how advisers that provide investment advice with limited, if any, human interaction provide appropriate disclosures so that their clients understand their services; and obtain information to support their duty to provide suitable advice.

We are also considering how automated-advisers

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are designing their compliance programs to address the particular challenges relevant to providing automated advice and how these firms safeguard client data and address business continuity in the event of a disruption.

In the area of blockchain, or distributed ledger, technology, our staff, including members from our

Distributed Ledger Technology Working Group, are carefully evaluating when and how this technology will be on-boarded within the securities market.

To the extent there are real benefits to participants in the financial services sector and their customers, especially to back-office functionality, we are considering whether this technology will obviate certain services and participants or, rather, be adopted into current infrastructures.

We also are looking closely at how innovators will overcome challenges to the widespread adoption of distributed ledger technology, such as interoperability and scalability, and to what extent such systems will be permissioned.

Another important concern is how innovators will address issues of cyber-security and the safety of customer data and assets in a blockchain.

Significant excitement also surrounds the use of securities-based crowdfunding, which we hope will

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continue to fuel the development of a vibrant alternative for small businesses to raise capital from retail investors.

To foster an ecosystem of growth, it is important that there be robust investor protection, and we are counting on brokers and funding portals to be active gatekeepers in this space.

In the online marketplace lending space, the Commission staff, uniquely among federal regulators, focuses on investor protection.

One key challenge is the adequacy of the information available to investors to make informed investment decisions, such as information about the loans and borrowers underlying their investments, as well as the platform's proprietary risk and lending models.

As investors are drawn to potentially higher yielding but riskier marketplace loans, information about the borrower's ability to repay the loan underlying the investment is obviously critical.

When it comes to these investors, innovation must be built upon a foundation of full and fair disclosure of material information, which is obviously the bedrock of the federal securities laws.

You know, the speed and impact of some of these developments heighten the need for the consideration of

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regulation to be both thorough and forward thinking.

That is why I directed the creation of a Fintech working group at the SEC earlier this year, which includes staff from across the agency to evaluate the emerging technologies.

I have asked the group to focus on specific, tailored recommendations, after a careful and informed review, including incorporating insights from today's

forum, about what the SEC should do to provide clarity on existing regulatory requirements and help foster responsible innovation.

Such recommendations could take several forms, including for providing staff guidance, concept releases, or proposed rulemakings, or they may simply call for, in part, improved communications about existing regulations and interpretations that are not widely understood among innovators.

They may also confirm, at least in part, that our existing regulatory approach is already suitable to address new developments.

The working group will be soliciting additional input from investors, innovators, and the many other stakeholders in these new technologies.

We are at the early phase, not the end, of our outreach. Today's event is an important part of that

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process, and I welcome and encourage, strongly encourage, everyone's continued engagement as we work to understand the new and emerging technologies to ensure that they work to further the interests of investors while building stronger, ever more innovative markets.

I really look forward to today's discussions, and again thank you for coming and sharing your expertise and insights.

Thank you.

(Applause.)

MR. VanGRACK: Thank you, Chair White, for those remarks.

We'll now bring up Commissioner Piwowar, who was sworn in as Commissioner in August 2013, part of a distinguished career in public service.

Among other accomplishments here at the Commission, he has helped advance the Commission's focus on Fintech issues, including as Chair White noted, suggesting that we hold this event in the first place.

Before joining the agency, Commissioner Piwowar was the Republican chief economist on the Senate Committee on Banking, Housing, and Urban Affairs under Senators Crapo and Shelby. In that capacity, he was the lead Republican economist on the SEC-related titles of the JOBS Act and Dodd-Frank Act.

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He also previously served as a senior economist at the President's Council of Economic Advisors in both the George W. Bush and Barack Obama administrations, and most notably, previously worked at the SEC in the Office of Economic Analysis as a visiting academic scholar.

Commissioner Piwowar.

(Applause.)

COMMISSIONER PIWOWAR: Good morning. Welcome to all of you, especially the distinguished panelists.

I want to thank Chair White for holding today's

forum, as well as for starting the Commission's first Fintech working group. As she mentioned, this is just the beginning.

Chair White mentioned a number of staffers who helped to make this forum happen. I won't mentioned their names again, but I do want to also recognize the efforts of Ryan VanGrack and Michael Liftik from the Chair's Office for all their efforts in coordinating this event.

I am delighted that the Commission has convened this forum to discuss Fintech and, specifically, Fintech's potential benefits to investors and our markets, the risks that Fintech may create, and the role of the Commission in fostering further Fintech innovations while staying true to our mission of

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protecting investors, maintaining fair, orderly, and efficient markets, and facilitating capital formation.

Fintech is frequently lauded as a disruptive force that is transforming the financial services industry, and that is clearly true.

On a recent trip to East Africa, I saw firsthand the transformational impact of Fintech. In a region where a significant portion of the population does not have access to the creature comforts that we take for granted in the United States , let alone bank accounts, the pervasive M-Pesa technology facilitates payment for services and money transfers on very early generation cellular telephones. Financial inclusion rates have grown dramatically and crime rates have dropped substantially since the introduction of that technology.

But I hope that today's discussion will go further than simply celebrating the successes, momentum, and future promise of Fintech.

I encourage the panelists to tackle the difficult regulatory questions that Fintech presents. We should also explore various constructs that have been proposed, both domestically and internationally, such as regulatory sandboxes, to encourage Fintech innovations without creating undue risks to the marketplace or imposing artificial limits on activities.

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As is obvious to any market participant or observer, our financial regulatory structure is a fragmented, sometimes contradictory, alphabet soup.

A recent study by Georgetown University's McDonough School of Business' Center for Financial Markets Policy correctly points out that the most common regulatory struggle for Fintech firms in the United States "does not concern a specific regulation or regulator, but rather the extremely complex process of navigating multiple regulatory portals." The great potential of Fintech should not be hindered by our current regulatory structure.

Therefore, I believe the Commission should take the lead regulatory role in the Fintech space.

Many of the firms pursuing Fintech are already SEC registrants, and others are providing services that are squarely within the Commission's oversight, such as investment advice and trading and settlement functionalities, and we are the only agency with a mission that explicitly includes facilitating capital formation.

In that regard, as Chair White mentioned, our recent crowdfunding initiatives provide us with the relevant experience and expertise for understanding the regulatory challenges of small and medium-sized

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enterprises, so-called "SMEs", as well as their investors.

Finally, the Commission has 11 regional offices, several in areas that are centers of Fintech innovation, that could serve as intake centers for Fintech startups seeking regulatory information and guidance.

All that is to say that the SEC is uniquely situated to determine whether and how Fintech currently fits, and ultimately should fit, within a financial regulatory structure. Today's forum is an important first step in that journey.

Thank you.

(Applause.)

MR. VanGRACK: We're just going to take a brief two-minute break. Commissioner Stein is occupied at the moment, but she should be down here momentarily, so feel free to Tweet hashtag #secFintech about the great remarks from Chair White and Commissioner Piwowar. We'll be resuming in just another minute or two.

(Pause.)

MR. VanGRACK: Okay. Finish with those Tweets, just 140 characters, so hopefully you're done by now.

Commissioner Stein. I have the honor of introducing her, as well.

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She was appointed by President Obama and also sworn in in August 2013. While at the Commission, she has been a vocal advocate for strong investor protections, has focused on identifying ways to enhance our market structure, to promote both efficiency and resiliency.

Before joining the SEC, Commissioner Stein held several senior positions in the United States Senate, including service as staff director of the Securities, Insurance, and Investment Subcommittee on the Senate Committee of Banking, Housing, and Urban Affairs, where she played an integral role in drafting and negotiating significant provisions of the Dodd-Frank Act.

Commissioner Stein.

(Applause.)

COMMISSIONER STEIN: I want to thank Ryan for the kind introduction.

This is really exciting that we're doing this today. I want to welcome everyone to today's forum. I want to thank Commissioner Piwowar, in particular, for suggesting that we host one, and Chair White for prioritizing this event on the Commission's calendar.

As all you know, the internet allows billions of people around the world to connect every day. The internet is also serving as a means to move information

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and data. New innovations, including open source architecture, are transforming how people are interacting with what effectively is a new world of data.

As we know, innovation is disrupting and transforming virtually every aspect of our nation's financial markets.

How we make payments is evolving with the emergence of digital money. The infrastructure of our capital markets and the interaction between investors and issuers is changing and being redesigned.

Without question, technologies are quickly changing how we live, how we work, and how we invest.

I think one of the most interesting part of this sort of disruption is that the paradigm of how we establish trust online is changing.

New applications allow for collaboration and interaction around the globe, with unprecedented levels of digital trust. This may enable new ways to put capital to use and potentially create new and tangible assets.

So, today's panels will discuss issues such as blockchain technology, automated investment advice or robo-advisors, online marketplace lending, and crowd funding, and how they may impact investors.

Recently I had the opportunity to visit

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Singapore and Hong Kong and learned about their sandbox approaches to fostering innovating while ensuring robust investor protections.

Regulators should be proactively involved as many of the new innovations are still in their infancy, and a lot of questions need to be answered, including questions around verification and cyber-security.

New technologies, such as blockchain, and a surge in application development impact all aspects of the Commission's tripartite mission.

How does the Commission ensure that it caries out its statutory mission to protect investors, maintain fair, orderly, and efficient markets, and facilitate capital formation in a digital age?

For some time, I've called for a new approach to incorporating data and innovation, such as through the

Commission having an office of data strategy, and through task forces that examine current issues such as a digital disclosure task force.

These can be an important part of responding to change in a proactive, constructive, and coordinated way.

So, I'm excited to be here today and to be learning from today's panelists about potential benefits and challenges of new technologies. I look forward to the rest of the forum.

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(Applause.)

MR. VanGRACK: Thank you, Commissioner Stein and Chair White and Commissioner Piwowar, for those insightful remarks.

I see we're running a few minutes behind schedule, which is, I think, par for the course for these types of events, so we're going to go ahead and bring out our first panel to discuss the impact of recent innovations on investment advisory services.

As the panelists come out, I want to provide the general disclaimer, which many of you have probably heard before.

This is for all SEC staff participating at today's forum, including myself, that the views we express today are our own and do not necessarily reflect the views of the Commission or our colleagues on the staff.

The last several years have seen a rapid rise in the use of automated investment services provided by both traditional asset managers and standalone online platforms. That evolution presents an important need to deepen the understanding of the range of services provided, as well as the challenges associated with different automated models.

Our moderator, Kristin Snyder, is the co-head

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of our national exam program, where she oversees over 500 attorneys, accountants, and examiners whose responsibility is to inspect SEC-registered investment advisors and investment companies.

Kristin?

Ms. SNYDER: Thank you, Ryan, and I want to thank our very esteemed panel, who I'll introduced in just a moment.

As Chair White and the Commissioners mentioned, we are seeing a rapid growth in Fintech, and one segment of Fintech where we're seeing incredibly rapid growth is in the advent of digital advisors who are providing advice to primarily the retail client based.

You'll hear these digital advisors refer to themselves in kind of a different -- you know, different ways, depending on who you speak to on the panel, but they're commonly known as robo-advisors in the press, and there have been projections that this advice model, while

still relatively small in the overall investment management space, could grow to as large as 2.2 trillion dollars in assets under management by the year 2020.

So, rapidly expanding space, very interesting and important issue, and we have a lot to cover on our panel today.

We'll start with kind of the current state of

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play in the industry. We'll move into some of the business and regulatory issues robo-advisors face, and we'll wrap up with our panelists' predictions for where we may be in the future.

So, with that, I want to turn to our panelists.

Immediately to my right is Jim Allen, who is the head of Capital Markets Policy Group for the Americas of the CFA Institute, and there Jim is responsible for developing and promoting capital markets positions and policies from investors' perspectives. He also leads the organization's capital markets outreach with policymakers and regulators in Washington, DC, and importantly, he has been a CFA charter holder since 1987.

Next to Jim, we have Ben Alden, who is the general counsel at Betterment, which is an independent automated investment service that manages $6 billion in client assets and has nearly 200,000 accounts. In his role as general counsel, Ben provides legal counsel to the in-house team, as well as -- and also manages the firm's outside counsel.

Prior to joining Betterment, Ben worked in private practice, and he also served as a law clerk to The Honorable Colleen McMahon on the United States District Court for the Southern District of New York.

Next to Ben, we have Mark Goines, who is the

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vice chairman of digital wealth management firm Personal Capital. Mark has over 35 years of experience in the financial services and technology industries from his time at Charles Schwab and Intuit, as well as working with startups Mint.com and Passmark Security, and importantly, Mark notes that innovation and rapid growth are his passions.

Next to Mark, we have Bo Lu, who is the co-founder and CEO of Future Advisor, which is the digital advice arm at BlackRock. Bo launched Future Advisor in 2010 with the mission of providing high-quality investment and retirement solutions to retail investors, and Future Advisor has a both direct-to-consumer retail platform and several partnerships with banks and broker/dealers since its acquisition by BlackRock in 2015. Prior to founding Future Advisor, Bo spent over five years at Microsoft in various roles.

So, we will turn to Bo first, and Bo, could you please give us your take, in a few minutes, about what you're seeing or doing in the digital investment advisory

space, including your thoughts on what is driving growth in this sector.

MR. LU: Certainly. So, I think it's interesting that many more people in the U.S. would benefit from advice than receive it today or have ready

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access to it today. Indeed, my friend John and I started Future Advisor almost six or seven years ago, because we were seeing at the grassroots level that individual friends of ours were unable to get advice.

Some of them, for example, thought that they didn't necessarily, at the beginning of their careers, have the investable assets to garner the attention of some of the more experienced financial advisors in their local area, and if you look at that kind of broadly, many consumers who believe that might be right in the current service model.

And so, with the advent of digital advice, I think there are two main value propositions to our -- to the consumer and to our industry that are complementary and go hand in hand.

The first is that digital allows you to scale the service model of the existing financial advisory ecosystem by taking some of the workload off of financial advisors so they can focus on the unique differentiation and unique value added in terms of coaching, relationship building with their clients, and second, that digital allows us to improve the client experience, you know, for all clients, regardless of where they choose to place themselves on the kind of digital to human spectrum of their service model.

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MS. SNYDER: We'll turn to you next, Ben, if you could give us your perspective from Betterment.

MR. ALDEN: Sure. Absolutely. First of all, thank you very much for having us. It's very neat for a technology company to be here in these halls right now, with the Commissioners opening for us. So, thank you for that.

First, I agree very much with Bo. There is a lot of opportunity here where technology, not just robo-advisors, can provide high-quality investing services to even more people, especially in a time right now where that's in greater need, I think.

Kind of implicit in what a lot of Bo was saying is that there is a retirement savings crisis, that we have a generation of people who won't have access to defined benefits quite the same way that past generations have, where maybe Social Security Administration has told people not to depend on the full benefit today, and that, with that gap, something needs to be there, and what it seems like people would like is advice, not just saying here's a supermarket and a whole group of securities you can buy, but what should I be invested in? Am I on track

to meet my savings goals? What should be my savings goals be? In what accounts should I be actually saving? And technology has the ability to provide that very

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repeatably and scaleably but, importantly, very transparently, as well.

I think one of the things that kind of gets overlooked sometimes is that what we do is perfectly reviewable to our regulators, to our clients, and it's repeatable and knowable and it's testable and it's iterable and can change over time, and that not only do we have the ability to reach our customers all at the same time, whereas a human advisor might have to pick up the phone one-on-one but that we can do so, and with the data of over 200,000 clients, we can learn about their behaviors and deliver a richer experience and a better real-time service, so that while kind of the word "robo" gets thrown around, really what this will be is advice, and it will be really good advice, and it will be data driven, testable, transparent advice, too.

MS. SNYDER: I'd be interested, Mark, to get your perspective. You've had a career both in technology and financial services. What are you seeing, you know, as we kind of move into this age of the robo-advisor?

Mr. GOINES: Thank you. It's a pleasure to be here. Thank you to the Commissioners for your kind words about the developments in our industry.

When I think about the rapid evolution of the development of technology, I really center on this

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device. It's where I live my life, and historically, for example, when I was managing the Turbo Tax business, we struggled to get software into people's hands. We had to mail it. They had to load it. Then they had to find that their dot matrix printer wouldn't really print out the forms adequately to file their taxes.

And so, technology has evolved so rapidly that you can do all of that with the swipe of a few screens, left or right, depending on your pleasure.

So, what we see is that the advent of the digital revolution of the delivery of information enables you to have a -- an interactive dialogue with consumers about their financial lives, and frankly, most people lead unexamined financial lives. They just don't know where they stand.

It's very hard to know where you stand, and the digital delivery systems have enabled us to help people figure out where their money is, how it's doing, how much they're spending, and what they should consider as an appropriate investment alternative.

But we don't like the term "robo." We really feel that it sort of discounts the value -- and even robo-advisors aren't really robo-advisors.

Sure, they automate certain tasks, but the

tasks are automated by humans who figure out what the
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algorithms are, assign strategies, interpret data from people, and you know, they're not really advisors unless they can develop a personal relationship with their client to help them make appropriate decisions, and so, we call that digital wealth management enabled by digitization of transparency that you get, but the massive data that provides insight into how people are really leading their financial lives and make recommendations about where they should go based upon their own behaviors, to me, is very, very powerful.

Regulations haven't kept up with that, and we're excited to see that evolve, because we think consumers deserve the value of insights, along with the interpretation of their data, to help them improve their financial outcomes.

MR. ALDEN: Just to jump in there, I do think there are obviously some areas around, you know, data sharing information and access -- consumer access to data which are critically important to flesh out, but I think one of the greatest secrets is that, you know, this building has been sitting on the Advisors Act since 1940, and that is actually a broad, flexible, principles-based regime which actually fosters not only a diversity of business models which you see today but actually innovation, as well, and that those principles of
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disclosure and fiduciary duty actually are great rules and great principles under which to grow not just compliant by high-quality technology and advice offerings.

MS. SNYDER: So, Jim, I think we'll pivot to you at this point, of the CFA Institute, and what would be helpful, I think -- because one of your goals is investor protection and -- similar to the Commission -- if you could give us kind of a sense of what the CFA Institute does, what you do, and then I know that the CFA Institute released a study in April 2016 where you were looking at Fintech and, in particular, robo-advisors --

MR. ALLEN: Yes.

MS. SNYDER: -- or digital wealth managers.

MR. ALLEN: Thank you, Kristin, and I'd like to thank the Commission for taking the time to consider the investors' perspective as we talk about these developing technologies and the regulatory structure that they will spawn around them.

I'm here as a representative of CFA Institute. For those of you who are not -- do not know our organization, we are a global not-for-profit professional association of more than 148,800 investment advisors, analysts, portfolio managers, and other investment professionals.
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We're located in 158 countries around the world, and our members are affiliated with 147 member societies in 73 countries and territories, including 67 of those societies here in the United States.

We represent the views of these investment professionals before standard setters, regulatory authorities, legislative bodies, worldwide on issues affecting the practice of financial analysis, investment management, the education and licensing requirements for investment professionals, and on issues affecting the efficiency, integrity, and accountability of global financial markets, and probably what we're most known for is the CFA charter and the chartered financial analyst designation. It's an arduous three-year examination that many -- many hundreds of thousands of individuals worldwide take on an annual basis.

So, with that, just -- one of the things that we have sort of -- robo-advisors had come -- or, excuse me, not robo-advisors --

MR. ALDEN: No offense taken.

MR. ALLEN: -- came into the focus in many ways as a consequence of the Department of Labor's fiduciary duty rule that came out -- it's going on two-and-a-half years ago. I think it was April or February of 2015, and there was a lot of talk about how this would migrate a

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lot of lower -- people with lower levels of assets under management to these kinds of advisors, and as the -- as the cost of the -- of serving such investors could grow as a consequence of these regulations from the Department of Labor, should they actually remain in place after last week's election -- that's not entirely clear, but should they remain in place, the robo-advisors are seen as a viable means of -- for many advisors and firms to provide basic financial advisory services to many of these low-AUM clients.

So, back in February, as Kristin said, we did a -- we decided to do a survey of our members just to get some -- some sense of where they thought that the technology -- financial technology world was going.

We looked at -- we surveyed 33,800 of our members. Sixty-six percent of them had been in the business for a while. They'd had their charter for at least two years. Fifty-six percent came from the Americas. Fifty percent were either somewhat familiar with automated financial advisory tools at the time or very familiar, and just 16 percent were not at all familiar.

So, from that, in general, our members saw that the most -- the segment of the market that was going to be most affected was going to be the mass affluent, and

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not only were they going to be the most affected, but they were going to be affected positively so, positive in

the sense of it was going to be a reduction in costs for them, as well as access to advice.

On the negative side, there was -- there were two areas where they saw -- saw these technologies hurting investors. That would be in the quality of service, as well as a potential for market fraud and mis-selling, so -- and then, beyond that, in the institutional investors, ultra-high net worth individuals weren't really seen as having that much benefit from the new technologies. That's just these specific technologies.

So, I think, to sum up, CFA Institute does not see the use of these algorithms as necessarily harmful to investors, though we will get into some -- a discussion of some of the risks a little later on, but in many ways, we see them as being potentially beneficial to low-AUM investors.

MS. SNYDER: Again, I'll pivot to Ben. I think Jim touched on some of the demographics that the CFA Institute, you know, saw in its study in terms of who would be attracted to this advice model.

We often think of robo-advisors as -- or digital wealth managers -- as being attractive to

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millennials, and so, are you finding that that -- that kind of hypothesis is borne out in your work?

MR. ALDEN: Sure. I guess, first question, just quick survey -- has anyone here either have an account with a robo-advisor or seen a live demonstration of a robo-advisor? Maybe a third of the people in the room.

Has anyone of those third actually seen or have an account with two different robo-advisors? There's my friends from Betterment and Mark there.

So, it's really not that many people, and I think that's important here, as we do these surveys and as we kind of build our assumptions that, you know, some people seem to have a misconception about how sophisticated these services are today and can be in the future, and that is that these are not just great for low-balance customers; these are great for sophisticated customers today.

As a matter of fact, sometimes the more sophisticated you are, the more you appreciate how we've automated and brought the cost down of those services, whether that's asset location, tax loss harvesting, or even the very basic goal-based investing where you can come to us and tell you about your goals instead of having to construct a portfolio and manage it yourself.

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But in terms of our client base, the average age is around 35, which is on the cusp of millennial, but around 30 percent of our business comes from people over 50 years old.

So, I don't think it's quite fair to say that this is -- you know, that it's right or it's not right for a certain type of customer. I think it depends on what that customer is looking for. I think that depends on whether or not they believe in passive investing and are comfortable with some level of technology.

And you know, I think we're always back to the old phrase. If you had, you know, surveyed people at the turn of the 19th century and asked what they want, they would have probably told you a faster horse and not a car, and we're in the process of that right now, where as these things emerge, I think we have studies, we have perceptions, we're talking about it, but not a lot of people yet have still experienced it and tried it, and I would really encourage everyone in this room, if you're interested, to do so, because I think what you might find is, as good and as valuable as these surveys are, that the actual experience itself will teach you a lot.

MS. SNYDER: Mark, is that your experience, as well, at Personal Capital or are you attracting a different demographic?

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MR. GOINES: We certainly have a wide range of users. What I find most interesting is that customers seem to love the most about our platform, as I mentioned earlier, is the transparency that having all of their accounts consolidated in one place provide them to get insights into their financial life, their spending and their investments, and they go together.

We have a range of investors. Over a third of our assets are held among households who have us managing over a million dollars for them, and the reason we think that's the case is because they are getting a combination of transparency and neutrality in the advice that they really respect, but they're getting daily access, and as we look at their access to our tools, it's interesting.

The accounts -- our average account is about 300,000, but we have accounts down, you know, as low as 5,000. The more money people have, the more assets they have, the more they use the technology, the more they come back and look. How am I doing today? What happened with that deposit?

And they can do that all in one place very, very quickly and efficiently and know where they stand.

And so, it's a wide range. We actually have some people who aggregate -- they're not our clients, but they aggregate literally billions of dollars of assets on

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our platform, because they can get clean visibility like no other.

It's very hard to get your broker and your bank and your insurance company and your mortgage holder to give you access to the account information and to go get that with five different logins is a real hassle.

And so, our aggregation platform provides a level of transparency and efficiency that our users and clients really love and use very actively.

So, I think that's the transition towards transparency, that it's critical, and then because they can also get help from an individual, we have advisors who talk to every client, they are comfortable that if they have a question, they can either look in the tools and technology and look it up themselves, or they can get on the phone with somebody who has both a deep knowledge of who they are, because we have the same data that they have, and then match an answer to their question to our understanding of their circumstances.

So, that combination of, you know, a duty of care for the customer's interests and real data about who they are really makes them comfortable using the platform ever more extensively.

MS. SNYDER: So, Bo, I know you talked a bit about this in some of your opening comments. But if you

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could expand how robo-advisors are -- or how you're seeing them transform the way that financial advice is given and what some of the benefits might be, just to amplify on that point.

MR. LU: Certainly. I think what you've heard, I think, both Mark and Ben talked about, is that it's worth noting that digital advice actually underpins a whole spectrum of delivery models. And there will be places where, you know, you'll have an almost exclusively digital relationship, and places where you'll have what appears to the end user an almost exclusively human-based relationship, underpinned by digital that the client never knew about, right?

As an example, long before the term "robo-advisor" really was coined, I think, by the press and by our industry, BlackRock as an asset manager has offered technologies such as iRetire -- it's an iPad app -- and professional services such as portfolio construction that work hand in hand with investment professionals to serve their retail clients. And though their retail clients may never and will never know that a bunch of the mathematics and analysis that robos do were done by a professional services organization or by a set of tools that were provided to their investment professional, it nonetheless improves the quality of the experience that they have.

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And so, I think it's interesting. Because if you actually kind of break down the value in a consumer experience of robo -- I'll just use the term that everybody uses, I guess, for us,with apologies to Mark. That, you know, if you look at a bunch of things like standard processes such as client enrollment, on-boarding, tax-aware transition management, which I think Ben touched on; rebalancing, tax loss harvesting, kind of ongoing

portfolio management. A lot of these things are actions where the advisor, by partnering with a digital platform, either an advisor in-house, in Mark's situation, or maybe an advisor who partners with a technology provider like ourselves, they can have the digital platform take the workload off of them and focus on things where they add the unique value, such as relationship-building, trust-building, and coaching with their clients. And I think that, back to Jim's earlier point, allows us to have our industry serve more people, right, to bring in net new clients who might have otherwise not been able to be served under the old, less scaleable service models.

MR. ALDEN: Just to put not too fine a point on that, you know, if we're to be judged by our impact, on how we're doing in terms of retirement savings and people comfortable, there's a lot to be done, I think, to have a protected investor but to have them not be an investor at

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all, to have, you know, 30 percent of households or 25 percent -- some horrible statistic I read -- have under $1,000 of savings and to have the majority of households not really on track for a comfortable or on-time retirement -- that's also a statistic we need to be judged by, and that's also a risk of not doing enough, of not providing that advice in a quality way and at a price point that multiple different people can afford.

It would be wonderful if we could afford, you know, human advisors. We'd hit asset minimums if we could, not just hit the minimums but afford to pay the -- you know, maybe a percent on average, depending on which study you look at.

But we don't always have that choice. Most Americans don't get that choice.

And so, something needs to fill that gap so that not only are investors protected but they're actually investing, and not only are they actually investing, they're investing well.

MR. ALLEN: I just wanted to clarify. With regard to our survey, our survey wasn't necessarily asking them if they wanted to use these things.

They were -- these are investment professionals, and they were saying -- and these are investment professionals who have -- they have, you know,

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a rather stringent code of ethics and standards of professional conduct, and they're saying how do you think these things are going to work on behalf of investors?

And like I said, it was a reasonably -- it was a reasonably positive outlook in that sense.

With regard to the -- you know, who is going to adopt it and the like, I think in some ways -- and both of you just kind of touched upon it -- I think there are some generational issues here.

I mean, I know my mother, if I tried to talk

with her about finance, her eyes would glaze over and she wouldn't -- you know, she wouldn't necessarily listen to me; talk with her about technology and it's even worse.

So, she's -- you know, she doesn't speak either language.

So, I think -- and I'm reminded of a -- it was back in the -- must have been the early 1990s, for some of you who may remember the old First National Bank of Chicago tried to migrate their retail customers and retail teller customers to ATM machines, because it was much more efficient for them to do it that way; it was much more cost-effective.

So, instead of charging a fee at the ATM, they started charging a fee at the teller. It lasted a day before the outrage from the clients -- I mean, it had

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gotten to the management of First Chicago and sort of got them to -- to -- I mean, to change it back.

You know, I think there may be some generational issues here. I don't think that it's necessarily going to last all that long.

I think, you know, these -- these are particularly useful for do-it-yourself investors.

My question is, how long will that be -- will it be useful to them?

At some point, usually the DIYers tend to migrate to a personal wealth advisor in many cases because they're -- as they accumulate wealth, the complexity of their situations and their circumstances kind of require a more hands-on approach.

You know, frankly, I think, from my -- my particular perspective as a CFA charter holder, I don't necessarily want somebody holding my hands, telling me what I'm going to do.

So, one of these types of structures would be useful for me. But once again, for my mother, I'm not sure.

MR. ALDEN: It makes sense. I think, just to be clear, I think everyone is using ATMs now, and like that's just what we do, right?

MR. GOINES: Not everyone.

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MR. ALDEN: Fair enough.

MR. GOINES: Right.

MR. ALDEN: That's a very good point. Not everyone is using ATMs, but also note that not only are -- a lot of people are using ATMs. People use their phone to deposit checks, and if I could find a way to get money on my phone, well, I'd probably prefer that, too.

MS. SNYDER: So, Jim raises an interesting point, I think, about the client experience, and so, maybe it would be helpful for us to understand a little bit better, you know, what can clients expect when investing with a robo-advisor? What level of human touch,

you know, is there?

And maybe we can start with you, Mark. And I know, you know, different business models may lend themselves to different answers, but if you can start us off, that would be great.

MR. GOINES: First, I really believe that both Betterment and Future Advisor have terrific business models and have built great companies, and you know, I should say that I'm personally an investor in both companies. I invested in them before the term "robo-advisor" was developed.

I was working at a venture capital firm at the time, and you know, I just felt that this category was

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going to become very, very large very quickly, and that there's room for many, many different business models, and you know, both of these gentlemen have slightly different business models than we do.

Our model is to first get to know the customer as deeply as we can. We give away free technology for them to connect all of their accounts together through aggregation, and they can add anything in there by hand that they choose so that they can see how they're doing, and then we provide deep analytics and insights into how they've been doing, how is their portfolio allocated, where is their money going, how much chance do they have of meeting their particular retirement goals, and we provide tools and calculators, insights. We look at the fees that they pay. We look at their portfolio allocation.

And we try and help folks understand if they could do better and how they could do better, and we have a fairly broad set of data around that. We're tracking about 280 billion dollars worth of clients' assets and spending accounts, and that gives us the tool to use, you know, artificial intelligence, big data, whatever you want to call it, to develop a pretty deep understanding of how we can help them improve their financial lives, and we disaggregate into, then, a plan, and we provide

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each one who wants to talk with us -- and we have -- in addition to all that technology -- everything I've said to this point is free and available online. You don't have to talk anybody to get to use all of that.

But then we will engage and present an alternative view of how they could perform and how we might help them if we become a financial advisor for them, and that is also free, that consultation, and we get people of all ages, all asset levels, all levels of complexity into that.

We have over a dozen different frameworks that they can fit into.

And then, we -- because of our interest in a duty of care, we will go all the way to then even

customize, based upon what they tell us and the goals that they present and the data that we have about them, the implementation for them.

So, for example, if a client says I don't wan to be in oil or I don't want to be in firearms, or if they happen to be at Google and they have a lot of technology stock in their portfolio, we will adjust the allocation of the portfolio that's recommended to them so that they have a balanced view and a balanced implementation on a go-forward basis based upon who they are as an individual, and you know, that doesn't take

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much time, frankly, because the technology sets up our representatives to do what both of these gentlemen illustrated, to very efficiently provide insights and recommendations so that when somebody becomes a client they are moving to a program that is right for them individually.

Then we implement that with a very significantly developed automated back office that keeps it balanced and tax allocated and tax harvested and all the things that robos offer as terrific benefits, because the automation is key to delivering that efficiently.

And so, our client experience is a pretty robust on-boarding experience, but then once they're on, maybe we talk to them once a year, because they get everything delivered electronically.

They get messages. They know where their portfolio is. They fully understand what we're doing for them and where they stand.

MS. SNYDER: And what if a goal or financial circumstances for a client changes? At what are they prompted?

MR. GOINES: We actually have three very robust technical infrastructures around that. Because we're monitoring the activity every day, we can send them a customized message, hey, you know, we saw a large deposit

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or we saw that you changed jobs, and you know, maybe you should be thinking about what to do with that 401(k).

So, we see things that have us provide insight to the client to suggest actions that they should consider, and then, we, of course, are in touch with those who are clients on a regular basis, both with outbound communications, but then we schedule calls with them -- it depends on the client. Some want it annually, some want it quarterly, some want it every day if they can get it, and we do provide that.

And so, if their financial circumstances change, because we have a dialogue with them, we hear about it. You know, I had a death in the family. My children have decided to go to community college instead of Harvard, so I have a few extra years to plan for college.

Those kinds of things come up, and then we adjust their investment portfolio accordingly.

MS. SNYDER: Bo, what about for Future Advisor?

MR. LU: So, I think, as Mark was saying earlier, our model is that we work with large financial institutions to deliver a digital solution that underpins the overall offering that they offer to their retail clients, and I think, if you think about what that allows us to do, right, it allows us to do what Mark is talking

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about, having digital technology underpin the experience but in different ways customize to the different financial institutions. So, for example, we'll customize to the scenarios and surrounding support systems that each of the financial institutions may provide to their clients, especially client -- the different segmentations or clients who already have existing relationships versus those who are coming in.

And I want to actually address something that Jim said earlier about, you know, that technology is itself a language and that, you know, maybe not everybody speaks the technology language at a particular time, and I would put the onus on us as the tech industry, that it is not actually the client's job to speak technology; it is technology's job to speak in the client languages that clients are already familiar with.

I mean, for example, if you look at the evolution of computing in the last 30 years, it's not that everybody learned Fortran or that everybody got really good at command line systems; it's that we got better than Fortran and we got better than command line systems, and it turns out, for example, natural capacitive touch devices turn out to be much more closer to people's natural point and touch language than what we used to have in the past.

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So, I would put the onus on us, I think, and especially, I think, as an ecosystem, to put the onus on us, to your example of pulling with great experiences rather than pushing and saying we'll charge you for this, more, so go over there, right, I think probably works better, and I hope that -- I hope that we as an industry will do that.

The mental model that you can think about in terms of how technology will, over time, continue to underpin more and more of the automatable and at least systematically controllably automatable segments of the delivery device is actually probably something that I suspect happened in all three of our companies, which is in the early days, where you actually have -- were a team of forward-thinking engineers following financial advisors and saying, whoa, whoa, wait, wait, why are you doing that? Because that's the 15th time you've done the exact same thing. Can I make you a tool that makes that

a little bit faster, and what parts of that can I make faster for you or what parts of it would you like to continue to do on your own, you know, together with your client on a one-on-one basis, and so, you get this -- you know, if you talk to enough financial advisors long enough, you'll see that there are certainly a list of things that they'll say, oh, I could use a little bit of

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help with that. Nobody says I would like to do everything manually, please, right?

And so, I think I look to technology to speak the language not only of our clients but also of our financial advisory partners.

MS. SNYDER: Okay. We're going to move on to some of the business issues in just a minute, but Ben, do you have any final thoughts on just client experience, you know, just from your perspective?

MR. ALDEN: I agree with everyone, and I'd just add that just because something is complex doesn't mean it has to be difficult or hard, and the best example really is just, you know, your phone.

It's unbelievable what gets packed in there, but to the average person, they just use it intuitively, and I think that not just as a technology company, is that our -- is that really our mission?

But really, as an advisory company, as a regulated entity, as a customer-aligned business, for any reason, is really -- the onus is on us to make sure that people understand what we're doing better so that they can make those decisions that have been too hard to do or too scary and we can make them accessible.

MS. SNYDER: Great. Okay. And we'll turn back to you now, Bo, and just talk about some of the -- some

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advice that you would give to traditional advisors trying to launch a robo-advisor at this point in time, and I realize you have perspectives, I think, from both sides of the table.

You began at a startup. You were acquired by BlackRock in October of 2015.

So, really, you've seen, I think, both sides, and we hear almost on a daily basis that, you know, sort of traditional asset managers are entering the robo space. What advice would you give them?

MR. LU: So, that's a great question, and one that I hope that our industry kind of discusses more and more.

I think if you look at what a traditional advisory firm might think about, I think the first thing -- and this is -- kind of applies to all of life -- is what are your goals, right?

And I think in the early days of any technology adoption, there certainly is a leading edge of folks who adopt technology for technology's sake.

That's, you know, not going to be the majority of the area under the curve, as it were, over time, and I think, for example, if, first and foremost, your goal is to scale your current practice, then I would start with that and focus on -- just like the model I said earlier -

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- think about your practice.

Think about what are the things that you spend the most time on that is least differentiated or least helpful to your clients, kind of per-unit effort you're putting in, and think about ways that you can, you know, build, buy, partner with a digital platform to take some of that workload off of the shoulders of your team.

If, instead, you're trying to reach a brand new segment of consumers that your advisory firm has not reached to date, I would look at a much broader practice management solution, right?

So, if you're thinking about -- it's not just the digital layer that services the client but also how are you going to do marketing, positioning, client engagement, kind of all the things to reach, engage, and address a new audience, because the mere presence of a digital platform won't, in and of itself, do that.

And so, I think I would start with every -- as with everything -- about tackling the goal and clearly defining the goal, because really, digital is a -- is an implementation vehicle for your practice to achieve a particular outcome, and if you set that clearly at the beginning, then I think you'll see that digital, in its many different flavors, can help you in slightly different ways that are more tailored to the particular

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goal you're trying to achieve.

MR. ALLEN: Bo, can I ask you a question about that?

MR. LU: Sure.

MR. ALLEN: You know, some of the -- many -- most investment advisors are going to be very small firms. You know, they are not going to have a whole lot of assets under management. They're not going to have a whole lot in the way of staffing within their offices.

How realistic is it that they could sort of take something (a) off the shelf -- find something off the shelf to be able to put it into, (b) how realistic is it that they can put it in sort of, in some way, seamlessly so that continue the levels of service that they have to their clients and still learn and understand how to adopt, implement, and apply these new technologies?

MR. LU: So, I think there's a -- there's certainly a now and a longer-term answer to that, and I think, as in the kind of earlier days -- not really early days for us. All of the companies that are on this platform have been around at least six, seven, eight

years, right?
I think sometimes we forget how long it takes to build one of these things, but I think, certainly

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today, there are not only the practices that are independents RIAs but there are also practices that reach the market as part of a larger broker/dealer network, you know, the large wires, for example, the regional independent broker/dealers, and those larger organizations have established heavy investments in technology that advisors who participate as part of those networks can avail themselves of.

I think there you will get a lot of leverage from the work that your home office does in building, buying, or partnering with a digital platform so that it integrates with the way you already work. It integrates with the CRM system you already use, integrates the contact center, all of those things.

And I think if you are a smaller practice, there are certainly already tools -- and I think Ben might have talked about this briefly -- certainly already tools on the market you can take off the shelf, but also, I think you'll see that the evolution to come in our digital industry will dominate the evolution that has occurred so far, and so, I look forward to the continual, ever faster innovation and iteration that will happen in digital tools both at the home office layer and also at the direct RIA layer.

MR. ALDEN: I was just going to add, we have a

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direct to advisor platform solution. I think the key question that you see that arises sometimes isn't, you know, how do you use this, but it's a question of what do I do now? And I think that that's forcing, kind of, maybe advisors to ask that question of what's my value proposition today if, you know, asset allocation is -- sophisticated allocation at that -- is becoming kind of table stakes and can be automated.

The question for an advisor will be, well, what do I do? And I think the answer is there's a lot. There's planning. There's hand holding. There's behavior management. There is an unbelievably important role for advisors, as Bo noted, and we view the same, but that as technology gets better, everyone has to adjust.

I think before Microsoft Excel, consulting firms would take whole war rooms and they'd use index cards to make spreadsheets, you know, on a 20-by-20-foot floor --

MR. GOINES: This is how I was trained.

MR. ALDEN: -- but that's how it was done, and now there's just Microsoft Excel and people crunch models and -- and there's even more sophisticated -- so people always move up the value chain for their customers, and being able to explain that and prove that

is something that's really going to be good for everybody
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in the long run.
MR. GOINES: I'd take it a little further, Jim, and I really feel that advisors must move forward and use technology in order to be holistically advising their clients properly.
I think if you don't utilize the technology and you try and do it kind of the 3x5 card way that you're going to miss something, and things happen too quickly these days, and clients' lives are too complicated.
Our average user has 15 accounts that they've aggregated on our platform that they're trying to keep track of, and it's really hard to do that on your own, and I can just imagine how hard it is for an advisor who is on-boarding a new client that's trying to get all those statements and trying to understand really where they were and how they got there and -- let alone having a conversation about where they're going, and so, I think it is essential for advisors to adopt the use of technical platforms, and they're available broadly, many free -- ours is free to clients to use -- and it's going to become, really, the ticket to the game to play as an advisor, to have a holistic understanding of people's financial lives in our complex world. So, I think they have to step up.
MS. SNYDER: If we can continue with you, Mark,
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Bo gave us the perspective of a traditional advisor perhaps entering this space. Can you talk a little bit about advice that you would give to a startup who might be thinking about coming into the robo-advisor space?
MR. GOINES: Well, I think one of the commissioners earlier said that like 20 billion has gone into Fintech companies in the past five years or something like that. I mean, it's -- it's become a real race. There's a lot of companies in the space, and rightly, because it's a very, very large market.
There's -- you know, we estimate 34 to 40 trillion dollars in the U.S. alone that is in some way advisable as investable assets, but as a startup, I think that the idea that we took and I think any startup took -- and when I first met with John and when I first met with Bo, they both had very different approaches to serving the market -- that you have to pick a niche that you really think you can be effective in.
The market is large enough that there are large, large niches that are available, and then make sure that you are being customer-centric.
In other words, I have something that customers really need, where there's a crease in the market that the technology providers today or the financial institutions today or the advisors today are just not
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effectively serving, and you know, I see a new -- I still do a bunch of annual investing.

I see a new Fintech idea every week, at least one a week. So, that's, just in my little sphere of the world, another, you know, 52 a year, and there are probably thousands more, but many of them are sort of tiny product ideas.

I think you really have to pick a niche that is large enough that your market can scale if you really are successful and then build on the technical strength that you have over the incumbents.

Most incumbents -- one of the biggest advantages were think we have as a company -- and I think these gentlemen have it, as well -- is that the incumbents are large and they're slow and their systems are antiquated, and it's very hard for them to be innovative on their own platform.

So, there's plenty of opportunity to innovate with technology.

MS. SNYDER: We're going to switch gears and turn to some regulatory challenges or conversations, maybe, that robo-advisors should be thinking about, you know, as they enter this space, and I'll kind of step back and -- Jim, maybe from your CFA perspective, could you tell us what regulators -- what you think regulators

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should be thinking about and focused on in this space?

MR. ALLEN: Well, there are a couple of, I guess you would say, bigger risks that I'd say we have, and once again, this sort of comes from our -- from our member survey.

Forty-six percent of them said that the biggest risk in the Fintech space is the flaws in the algorithms behind these technologies, followed by 30 percent who -- saying mis-selling of financial advice is a big concern. That's -- that's the bigger concern.

It's bigger than -- in the United States and the Americas than it is elsewhere, by the way. So, that one's there.

And you know, I think that's certainly one of those things.

You know, I know we've sort of mentioned about the algorithms and that they do leave a trail. That is one of the positive things about them.

They also can be changed on a regular basis, and as a client, I guess my -- my concern would be am I -- is there a conflict that's sort of embedded someplace within the advice that's being given to me?

You know, is the concern that you have with many advisors at this point, particularly the -- you know, I guess those who are bound by the Investment

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Advisors Act have a fiduciary duty, so you act under the assumption that they have your best interests in mind.

On the brokerage side, that isn't necessarily the case, and there's always the concern about where the conflicts are and what -- is that affecting what's being -- is that affecting the advice that's being given to us?

I think another concern that we have is sort of the difficulties in creating this investment -- client-specific investment financial plans.

We've talked some about and Mark had talked about how they could change some of their -- some of the plans for specific concerns about whether they liked -- they wanted to be investing in this type of market or not be investing elsewhere. I think that was a very positive thing, but the -- you know, it's just the many and varied circumstances of investors that they may not receive this sort of appropriate, personalized advice that you would hope that they would have, and of course, that similar lack of imagination, you know, affects personal or human advisors, as well, and in fact, in some ways, you've got -- you know, it's -- a positive thing about the algorithms is that they will learn over time to try -- from experience with the different situations, and try to mature -- get their algorithms to mature overall.

I guess the only other risk that I have is sort

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of related to, once again, kind of going back to the Department of Labor's fiduciary duty rule.

There was an implied preference that we saw, when we were looking at that DOL rule, for low-cost investment options -- index funds, exchange traded funds, and the like -- and this seems kind of going a long way toward, you know, satisfying that implied preference.

And we argued to the Department of Labor that that was not necessarily a good idea, for three reasons. It was that cheaper funds don't automatically lead to better outcomes, that not all index funds provide the appropriate level of diversification -- actually, I take it back. It was about four reasons.

Third was that the proprietary funds may not represent a truly low-cost option, and fourth and probably most importantly is that the index funds may not fulfill the advisor's fiduciary obligations to the specific clients, particularly if they just invest in something, put it in there and leave it and not pay any attention to it down the road.

That, we found, was probably one of the bigger concerns in that regard.

So, I think those -- and -- and you know, from the discussions we've -- that we've heard, the industry is taking those into account, and that's a very positive

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thing. We just want to make sure that it continues to be front and center as they develop these things, that the investor's interests need to be put, you know, sort of at the forefront of the -- all the decisions -- most of the

decisions that are made.

You have to make a business out of it so that you can continue to provide the business, but at the same time, to put the investors' interests first, we think, is a very important element.

MR. ALDEN: I'd say we totally agree with that, which is why Betterment was built around alignment with the customer, customer's interests first, and that can sound like a pitch, but it can also sound or be a very true thing.

We are independent from the funds we recommend. We're very transparent in what we do. We charge one very clear fee that's asset-based, so we have one source of revenue, and that's giving what we believe is the best advice we can give you.

Structuring those things from the start are actually probably almost easier for, you know, a robo-advisor business if only because you can amortize kind of the costs of delivering that high-quality advice not per -- on the client basis but over the cost of a large number of clients.

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So, we can take high-quality CFA-level advice and then actually use our technology to spread that advice to even more people.

MS. SNYDER: So, Bo, recently, BlackRock published a study on digital investment advice, and gave some broad outlines of things that regulators should be thinking about. Can you highlight just a few of those areas for us, and do you have any response to either what Jim or Ben has said?

MR. LU: Certainly. I think, indeed, that we wrote a digital viewpoint, and I won't rehash -- it's a long-ish paper, I won't rehash all the contents here, but I think one of the things that it touches is something that, Jim, you brought up, which was algo design and oversight.

And Ben is totally right -- I'm with Ben on this one -- that by taking CFA-level advice and packaging as much of it as you can -- and I believe there will be always the edge cases, and that's why I think all three of our firms and also all of the partner institutions that we work with have financial advisors ready to take your call and talk to clients, you know, either at the margins or as a portion of their overall service offering, depending on the service.

But I think algorithm design and oversight is

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certainly something that we focus a lot of time on, and if we're able to amortize all the structural costs of building and maintaining and having great governance procedures and processes in place for algorithms, then that allows us to deliver the value of those algorithms over a larger number of people.

And so, I think if you read the viewpoint, you'll see that we touch on both algorithm design and oversight, as well as disclosure standards and cost transparency, to Ben's point about all the different ways that a client may end up paying fees in any either human intermediate or non-human intermediate advisor solution, all the way to trading practices, data protection, cyber-security, so on and so forth.

MR. ALDEN: I'd just like to add these are all great items, too, for human advisors, and I think, for the most part, while cyber-security is obviously for digital, it's critically important for human advisors, too, which I think, you know, the SEC is obviously well across, but that, you know, as these kind of things that come across as risk come up, these are equally, if not more so, applicable to kind of human advisors, and that it's worth -- that that doesn't get lost in the middle of this, that while we build, we are not necessarily a break with what's happened in the past, it's just an evolution,

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and so, the same rules apply. We're happy -- and we do comply with these. It's not like some brand new thing.

MR. GOINES: I will add -- and I really think you've said it very well, but I think Barbara Novick said that robos need regulation differently, and the vice-chair of BlackRock.

And I think that the implementation of regulatory oversight needs to be different, there's no question, because they're very different business practices.

Building an algorithm, how it's constructed, how it's maintained and managed -- those are all areas of inquiry that I think are appropriate for regulations, but I think regulations allow for that, but it's the implementation of those examinations that may need to be adapted to this different implementation environment.

When I think about it, you know, there's conflicts in advice. There's also conflicting advice. I mean, you know, I can go to two different human advisors, show them my financial statements, and I will get two very different recommendations about what to do even if I said exactly the same thing to them, because they have different opinions about what the future holds for me and how to execute against that, and neither of them are necessarily wrong, but you know, they may be, depending

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on how it comes out for me, and I feel that it's wrong if it doesn't go well for me, and that might not be the right way for me to feel.

The nice thing about algorithms is they're very consistent about it. They take the inputs, if you have all the right inputs, and this is when I think the area of regulation that has not really been fully developed -- do you have enough of an understanding of the client to

be able to apply the algorithm, or is the algorithm actually collecting enough data to actually apply its applied rules effectively, and that's an area where I think, you know, we have to be very careful that the algorithms are very good but that the inputs are robust, so that we really truly understand the client before we apply it.

I think it's malpractice to not understand a client and make a recommendation to them, and algorithms with minimal input run the risk of not fully understanding the client.

So, that's an area where I think we need to collaborate as an industry and make sure that the standards for evaluating those algorithms actually make sense from a client perspective.

MR. ALLEN: You bring up something that's very interesting and very important about the consistency of

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how it's applied to different clients, and you know, you don't want to be treating one client in one situation differently from another one, per se, but at the same time, I think what you also talked about, about how you get two very different -- two different sets of advice, very different sets of advice from human advisors is actually quite interesting, because you don't -- I think -- I guess I'm thinking from a systemic risk standpoint, you don't want everybody going the same way --

MR. GOINES: Unless it's the right way.

MR. ALLEN: We could be like Thelma and Louise driving off --

MR. GOINES: There we go. Yeah, that's the right way. It's a short way, but -- it's a really good point.

MS. SNYDER: And so, turning back to you, Ben -- and we touched on this a bit, you know, but I think there is acknowledgement that the business models between a traditional advisor and a robo-advisor -- there are some differences, and so, how should -- how should robo-advisors be thinking about their fiduciary responsibilities, as well as their compliance with the Advisors Act and additional compliance responsibilities?

MR. ALDEN: Sure. Very seriously, obviously, right?

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MS. SNYDER: Good answer.

MR. ALDEN: We've really built our business around that, and if you kind of believe the Advisors Act is -- has at its core a fiduciary responsibility and to act in the best interests of your client, that's really what this whole movement is about.

It's not about selling a product. It's not about distribution. It's about providing advice.

By structuring yourself in a way to minimize those conflicts at the outset, you can help ensure that,

you know, what might be viewed as, you know, regulation doesn't really feel that way, because we're all looking at the same direction, which is how do we provide better advice to more people, more transparently?

But just very tactically, we have -- around 4 percent of Betterment's head count is in legal and compliance. We're embedded all throughout the process, whether that's through conception, through execution.

When you have a vision of startups with engineers in hoodies hacking late at night, you know, I hope you leave here with a picture of lawyers, right -- like I left my hoodie in the green room, but -- I hope you have a picture of lawyers with hoodies next to the engineers trying to help understand what these rules are and how they work and that if you -- the lawyers would

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carry with them that, you know, fiduciary spirit and rule, and then -- so, that gets built in.

These are really important things that aren't really just necessarily, you know, robo-specific, and like I mentioned, a lot of these rules and these principles and these guidelines really apply to humans, as well, and that as humans give advice, I hope that they work very closely and with the spirit of the Advisors Act in line with their fiduciary responsibilities, and I know that they do. I just would like to encourage people to think that we believe that, too.

MS. SNYDER: Okay. And Mark, you touched on some of this. I don't know if you wanted to amplify any further on just issues that we should be thinking about from a regulatory or compliance perspective, where there are distinctions between the robo-advisors and traditional advisors.

MR. GOINES: So, we really like the SEC's regulatory models, and you know, we chose to be specifically a registered investment advisor, because we felt that it fit best with the model that we have and we partner with a custodian who is, you know, doing the broker/dealer trading back office.

So, we're independent from that other than they hold the accounts and manage the assets.

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So, that's, we think, a very helpful model. We do think that there's the potential for conflicts when -- when those are combined. It's not to say that it's inappropriate, but there is that potential there.

So, we have built our business to focus specifically on the investment advisory delivery portion.

However, I do think -- not that the regulations need improving, but I think the implementation and examination areas where -- we're in a digital world now, where, you know, we are delivering advertising and getting recommendations from Twitter and from the blogosphere and, you know, all sorts of new digital

delivery channels.
These are not, you know, paper advertisements in the Wall Street Journal. These are different ways that clients find us, that we promote to or that third parties recommend us, because they like what we're doing.
We think that those areas are moving so fast that, although the harness is good, the examination methodologies around understanding how those things really work need some modernization from our viewpoint to be, you know, capable of keeping up with what's happening with digital delivery of information.
So, that's an area where we're interested in improvement from a regulatory viewpoint, and we also need

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to build infrastructure that, you know, allows us to monitor it carefully. We've got that, we think, but we're not quite sure what all the rules are there, so -- what all the examination rules are, in particular. But we like the structure.
Then the other area that I think is really important for us, anyway, has been, you know, making sure that -- that the accountability to the clients is clear and that that's fully disclosed, and we think that the regulations are there in a way that help us do that in a very robust way, a fully disclosed relationship.
We think the new DOL fiduciary rule will add some richness to that, perhaps, and certainly some other requirements that we haven't fully understood yet, as those get implemented.
So, we see continued change in what I would call disclosure and transparency. It's the foundation of our company to be transparent, and when we get into the retirement arena, that's an area where we're paying close attention to how that evolves. We think that will affect our business dramatically.
MS. SNYDER: Okay. We're down to our last few minutes. I realize we are what's separating you from the morning break, so I think, in our last few minutes, it would be great to get the panelists' takeaways on where

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you see the industry going in three, five, ten years, whether you think there's going to be broader adoption by some of the technologies that robo-advisors are introducing in the traditional space, and maybe we'll start with you, Ben.
MR. ALDEN: Sure. I think, at the outset, the term "robo-advisor" is just going to fade away.
I think what Mark did in the very beginning was very prescient about where he picked up his phone. Those things used to be called PDAs. Then they were smart phones. And now it's just a phone. It's just what it is. It's a good product. It's a phone.
We don't use "online brokerage" or "discount brokerage" quite the way that it was in the, you know,

'80s-'90s, and I think, similarly, "robo-advisor" will drop away. It's just technology. It's just the technological way of delivering high quality services kind of at affordable prices, and that's going to permeate in lots of different ways.

With what Bo is doing, he'll help large institutions kind of scale that. With what Personal Capital is doing, they'll give strong technology to advisors to give real-time information, and for us, too, which -- we'll do a little bit of everything. We'll do that, too, but for our customers, we'll be able to

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deliver a robust and rich advice experience to them based on their particular situation, having a holistic financial view of their life.

And that's important technologically, but also more importantly is there's just a need for this. There's a vacuum right now. There's a large portion of the country that's not saving for retirement or who are saving, but it's too expensive, and something is going to fill the gap, and our hope is that it's high-quality advice services that technology can make scaleable and affordable, and so, we really see this to be a one-way thing.

So, in three years, I think maybe you'll still hear the term "robo-advice," and in 10, this will just be, in some form and in some way, the way people invest and give advice.

MS. SNYDER: Mark?

MR. GOINES: That really sums it up well. Thank you, Ben.

I would add two things.

One is, you know, we believe every household should have a financial plan that's well informed by their financial life, and technology enables that in a way that makes it totally affordable and scaleable, so that as your life changes, your plan changes.

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Most people lead unexamined financial lives today, and I think, in part, it's because it's been inaccessible, and the folks who have money get advice, because people can make money off of managing their assets, and I think that's wrong.

I think the right way is everybody has full access to it, and these digital delivery systems make that totally scaleable and free for those who want it.

So, that, I think, will happen, certainly within 10 years, and it's happening today, to some extent, for those who are technically savvy, and so, I'm hoping that we can further simplify the delivery of that technology so that everybody feels comfortable using it.

MS. SNYDER: Bo, what are your final thoughts?

MR. LU: I think this group has very ably addressed, you know, a lot of the things that I would

have said.
I think there's another kind of vector to think about here, which is the enabling technologies that are the shoulders of giants on which we stand.
Those enabling technologies continue to get more and more giant.
And so, if you look -- I mean, obviously, predicting the future of a technology evolution is a good way to look bad in a few years, when somebody shows this
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video to you, right?
But if you look historically at how the successive generations of technology have transformed any given particular industry -- you know, e-commerce, kind of -- all the parts of our lives that technology touches today, I think you can apply that same mental model to the emerging technologies that aren't yet here but are on the horizons.
You know, we're talking about recurrent neural nets, retrieval models for text and speech interactions, connected digital devices that are, you know, always connected to the internet and ambiently available in your environment.
And I think how these technologies on the horizon and the other ones, you know, after it that we can't see yet will manifest themselves in our industry, I think, will be hard to predict, but I think they'll be interesting to see, and I think, to one of Jim's earliest points, I think many -- you'll see many of these technologies actually be interactive technologies, as opposed to raw compute technologies, so that we can more ingrain ourselves into the daily lives that people already lead.
And by the way, I loved what Ben said, the term "discount brokerage," because if you ask anybody, you
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know -- you know, and you say, oh, you're using, you know, a Schwab, you're using a discount brokerage, and they'll say discounted from what?
I think the same thing will be true for technology, right? You say this is a technology advisor. They'll be like, as opposed to --
MS. SNYDER: Okay. And last but not least, Jim, your final thoughts?
MR. ALLEN: Well, first, you know, I want to thank my other three panelists for their recognition of the need for putting investors' interests first in the fiduciary duties.
You know, investors are a very, very important part of our financial markets, and you don't want to do anything to scare them off, and this is good in this sense.
My prediction is a little, I guess, more pragmatic, because I see consolidation, and maybe I'm --

I guess I'm sort of showing my age again, but I remember the ECNs of the late 1990s.

They were very disruptive to the market structures, particularly the equity markets, disintermediated the traditional exchanges.

They lowered cost, they had faster execution, better liquidity, better information to their

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subscribers, and also reduced, in many ways, the front-running that was oftentimes happening in some of the different parts of the traditional exchange structure.

The cost of trading today is pennies what it was before, so it had some very positive benefits to the marketplace and to investors, but none of those original ECNs -- you think about Instinet, Island, Arca, and Brute -- none of them are around anymore as independent entities.

They've all been consumed by the larger incumbents, the NASDAQ's, the NYSE's, and the like, and I kind of, in some ways, sort of foresee a similar situation for some of -- I won't call them robos. I'll call them phone brokers. How's that? Phone advisors. How's that?

MR. GOINES: What's a phone?

MR. ALLEN: You know, I guess I'd say that, in many ways, Bo's position is a bit of a trendsetter in that sense. I would say that there will be some independents that remain, one or two, much the way that Amazon remained as an independent, those who have the best technologies, but many will find greener or better horizons by joining forces with some of the incumbents.

MS. SNYDER: All right. Well, thank you so much to our panelists. Please join me in --

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(Applause.)

MR. VanGRACK: Thank you again to our moderator, Kristin Snyder, to our panelists. I think you heard a great discussion that just shows not just some of the similarities but also some of the differences in terms of viewpoints and structures within these models, which is an important part of the conversation.

We're going to take about a 10-minute break, reconvene at 10:45.

(Recess.)

MR. VanGRACK: We're going to go ahead and get started, if everyone could please make their way to their seats.

As a quick reminder, no food and beverages allowed in the auditorium, so if you are finishing up that cup of coffee, if you could actually do so now or do so outside, that would be greatly appreciated.

(Pause.)

MR. VanGRACK: Welcome back.

Our next panel is focused on distributed ledger

technology with an emphasis on its impact with respect to trading, settlement, and clearance activities.

As such innovations progress, it is important to evaluate how the technology can safely, reliably, and fairly improve on back office operations.

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Our moderator to help us un-bundle these developments and their impact on the markets is Valerie Szczepanik.

Val wears a few hats at the Commission. The most important one for today is heading our distributed ledger technology working group. She also serves as an assistant director in the Division of Enforcement.

Val.

MS. SZCZEPANIK: Thank you. Good morning.

First, welcome to everyone, and thank you for joining us at the Fintech forum. I want to thank the panelists here for what promises to be a dynamic and enlightening discussion this morning covering recent innovations to trading, settlement, and clearance activities.

Really, the focus of this panel will be on a technology known as distributed ledger technology or what is commonly referred to as blockchain.

Most in the audience have likely heard of Bitcoin, a popular decentralized crypto-currency, but at the heart of the Bitcoin network is a technology that's called blockchain. It's a technology that's really captured the attention of the financial industry, and today we'll explore what makes this technology so captivating.

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Before I introduce our esteemed panelists -- and they represent, really, the vanguard in this area -- let me give you a quick overview of blockchain, just for context.

Historically, databases or ledgers of transactions have been centralized. That is, transactions are sent to and maintained by a central authority, often through a network of intermediaries.

In simple terms, blockchain is decentralized electronic ledger or audit trail of all transactions or activities in a network.

I mentioned the Bitcoin blockchain, which marks a turning point in the use and adoption of crypto-currency, but while the Bitcoin blockchain tracks crypto-currency, this technology behind it can track other forms of assets and activities, as well.

So, just as the internet was a medium for -- is a medium for information exchange, blockchain is a medium for value exchange.

A blockchain ledger is organized into blocks, each containing a batch of transactions, each containing a timestamp and a reference to the previous block, which

links them together in a chain.
The blockchain is a peer-to-peer network where participants share a single view of the distributed

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ledger so that every participant or node in the network can see the ledger at one time.
Now, a blockchain doesn't need a trusted centralized authority, because the network itself can take over this function and act as -- perform the functions of the central authority using mathematical algorithms.
The decentralized ledger is updated when multiple network participants agree or reach consensus on the validity of transactions.
The participants trust the accuracy of the ledger because of this consensus mechanism.
For example, in the Bitcoin blockchain, certain participants, called miners, mathematically validate that parties who want to spend Bitcoins have the Bitcoins to spend and haven't spent them previously.
Once a transaction is recorded, the blockchain technology ensures that blocks in the chain cannot be altered. Thus, the blockchain forms an immutable record of transaction activities on the network.
In this type of network, participants are willing to share control over the data that they want to distribute. In a fully decentralized or permission-less system like Bitcoin, anyone on the network is allowed to access the entire history of transactions, can create a

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new transaction, or can validate a transaction.
In between this model and the centralized ledger that we're all used to seeing is a hybrid or permission system where only certain parties have the right to validate transactions and write to the ledger but can grant others the right to certain privileges of the ledger, such as read privileges. The more permission-less or open a system is, the less trust is required between human participants.
Blockchains can also record what are called smart contracts, which essentially are computer programs designed to execute the terms of the contract when certain triggering conditions are met.
Now numerous proposals are being discussed for the use of this technology, ranging from fund transmission to voting to a registry for the provenance of art and even to securities transactions, which we'll talk about today.
We'll find out from our panelists how these technologies impact our regulatory space and their views about the technology and how it can be used consistent with the principles of integrity, resiliency, security, and reliability that guard our investors and our markets.
Let me now introduce our esteemed panelists.

To my right, Brad Peterson is the chief information officer and executive vice president of NASDAQ OMX since February 2013.

Brad is responsible for global technology, including product engineering and development, technology infrastructure and operations, common governance and architecture, information security, and technology platforms.

Before that, Brad was the chief information officer for Charles Schwab, and prior to that, the CIO at eBay. Following eBay's acquisition of PayPal, Brad's responsibilities included PayPal product development, as well.

Sitting to Brad's right is Professor Emin Gun Sirer. He goes by Gun. He is a professor of computer science at Cornell University and a co-director of the Initiative for Crypto-Currencies and Smart Contracts. His research focuses on distributed systems and self-organizing peer-to-peer services. He has played a key role in the development of crypto-currency with proof of work in 2002, having developed the first implemented peer-to-peer currency with proof of work in 2002.

He discovered fundamental protocol limits in Bitcoin and related protocols, and co-invented security mechanisms for blockchain assets at rest.

Sitting to his right is Grainne McNamara. She is part of the PWC Capital Markets team, specializing in delivering large transformation programs at top tier banks. She has more than 20 years of experience in running front-to-back programs across divisions at firms such as Goldman and Morgan Stanley.

Grainne has designed and managed large-scale implementations throughout their entire lifecycle. Grainne is responsible for PWC's efforts in blockchain solutions in financial services.

Chris Church is the chief business development officer of Digital Asset, a software company that builds distributed, encrypted, straight-through processing tools to improve efficiency, security, compliance, and settlement speed.

Prior to this, Chris spent more than seven years as the chief executive of SWIFF Americas and the global head of securities.

Chris was also part of the executive team that founded Radiance, Inc., the world's largest extranet. At Radiance, Chris' responsibilities included global sales and marketing.

Chris has held senior management roles at Reuters in both London and San Francisco, and has previously served as a board member and vice chairman of XPRL U.S.

Chris was also a member of the board of the International Securities Services Association.

Finally, Mark Wetjen is a managing director and head of global public policy for DTCC, which supplies the post-trade market infrastructure for the global financial services industry.

From October 2011 through August 2015, Mark served as commissioner on the U.S. Commodity Futures Trading Commission, and for part of his tenure was the CFTC's acting chair.

During his chairmanship, he oversaw approval of the first crypto-currency denominated derivatives instrument. Mark also sponsored the CFTC's global market advisory committee and, through that effort, convened a public meeting in 2014 to discuss developments in crypto-currencies and related distributed ledger technologies.

Prior to joining the CFTC, Mark worked in the U.S. Senate as a senior leadership staffer for Senator Harry Reid.

With that, I'd like to begin with a question for Gun.

Gun, some have likened the import of this technology to the advent of the internet. Others say it's just a new technology solution in search of a problem. How is distributed ledger technology different

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from other technological advances? How is it revolutionary?

MR. SIRER: Thank you, Valerie.

So, indeed, there are quite a few parallels between the development of crypto-currencies and the internet.

Just like the internet -- in fact, in any big technological breakthrough, what typically happens is you have a lot of components that are slowly and painstakingly developed by a group of sometimes academics, sometimes practitioners, that come together, and for the internet, this happened in the shape of the Mozilla browser, what you all probably remember.

Most of the people in this audience remembers the very first time they popped open that browser, and it opened a new window to a new world, and that brought together a lot of new ideas or a lot of ideas that were then actually explored in distributed systems to the actual end user.

Similarly, what's happened with crypto-currencies, in particular with Bitcoin, is it brought together ideas from distributed systems, it brought together ideas from cryptography, and from economics, all in the shape of one interesting and what ultimately turned out to be quite popular product.

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So, the three core developments, the three core ideas that are fascinating have to do with different

aspects of getting computers to agree and to manage money flows.

So, the very first one that Valerie also mentioned is this notion of consensus.

Anytime we have a large complex system consisting of multiple agents, we typically have their computers in separate locations that have to agree on what's happened.

As you can imagine, the entire world's banking system has to agree on who holds how much money, and today, the technology that we use for this -- or prior to crypto-currencies, the technology we used for this is what I would call the traditional distributed systems approach to consensus.

What happened in 2009 with Bitcoin's surge in popularity was that a new consensus mechanism was invented by this anonymous person called Satoshi Nakamoto, and that consensus mechanism allows anybody to participate, allows us to build open systems where anyone can join, and that system itself can enforce rules on transactions that follow.

So, that was an amazing breakthrough. It enabled us to build from out of whole cloth, from out of

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nowhere and without any centralized authority, a new monetary system, and so, that was what -- I think one-third of the amazing magic behind Bitcoin.

Another third, I would say, had to do with distributed ledgers.

So, yes, you have this consensus technology, but what do they agree on? What do these nodes agree on? And distributed ledgers themselves are an interesting invention that dovetail with consensus mechanisms. What they allow us to do is they overcome one big problem with any digital asset.

So, I'm sure you've all seen pictures of coins anytime Bitcoin is mentioned in the press. It's incredibly misleading. There is no notion of a coin in Bitcoin. If there was such a thing as a digital coin that I could give to you, there would be nothing to keep me from making 50 million copies of it and giving it to everybody else.

So, what we need is some scheme that's going to force me and everybody else to obey a certain set of rules about not making and manufacturing coins out of whole cloth and for those coins to obey any additional rules we might want them to obey.

And a distributed ledger is exactly that. It's a set of rules that we all participate in and enforce on

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each other that maintain the integrity of the system.

And the final one-third of the amazing thing I think that this new technology allows is smart contracts. So, until recently, you know, we would write programs

that, you know, essentially -- what do they do?
They produce output on a screen, at best. They perhaps actuate and do robotic things and so forth. But it was with smart contracts that we are now able to write autonomous programs that execute without interference and can direct money flows.
This has amazing implications. From a consumer perspective, until recently the best I could do was write a check. A check is a unilateral transfer of value from one person to another. It's fairly static as an instrument.
With a smart contract, I can write -- you know, the sky is the limit in what I can express. I can write a check that says, look, I'd like to fund your Kickstarter, I'd like to give you $5,000, but only if you have raised the $5 million that it's going to take you to shoot your new indie film. Otherwise, the money reverts back to me. This is a very complicated thing to express, and yet, I can do this very easily with a smart contract.
And on the flip side, on the corporation side, smart contracts allow us to build a new kind of entity

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whose legality has yet to be determined, and its interface to the legal system has yet to be sorted out.
But we can build digital autonomous corporations. So, these -- what I call DACs -- these digital autonomous corporations have a life of their own, where a computer program can take over the responsibilities of a traditional -- traditional corporation or trust and carry out instructions that have been preprogrammed into them, and that, of course, allows us to achieve greater efficiencies in financial affairs.
So, you imagine, for example, a royalty distribution from some sales of music, let's say, and I'm sure everybody here has heard of artists suing their managers for actually interfering in that process.
Well, with a DAC, it's quite easy to actually have a predetermined distribution scheme and to have the money flow according to a set algorithm ahead of time.
So, these allow us to explore all sorts of new territory, and of course, with any new territory comes scams and, you know, all sorts of abuse, and so, that particular mix of -- or finding that line where we allow, you know, the research community, the consumers at large to take advantage of these new technologies, while protecting them, is going to be an interesting space.
MS. SZCZEPANIK: Thank you, Gun. We'll explore

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how the broad promise of this technology relates to our industry, in particular, but that was very helpful.
I'm going to ask Grainne -- perhaps you can explain what business factors are really driving the attention of the financial industry to this technology right now. We've heard that, according to industry

research, venture capital investment in the blockchain since it began, really, has exceeded over a billion dollars.

So, tell us, what is the business case for this technology at this point?

MS. McNAMARA: Sure. Thanks, Valerie.

So, based on the work that we've already done, we know that there is huge promise for this technology in the area of financial services.

A couple of the things that both Valerie and Gun had mentioned, the decentralized share database, as well as the business logic that's in the smart contract layer that's being developed on top.

We can see already in work that we've done that there are many efficiencies in using this decentralized database protocol to be more efficient in recording and sharing information across market participants.

There are literally millions of dollars and thousands of people tied up today in reconciling what was

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actually done in the market by middle and back office processes across these participants and their agents and their custodians.

We know that the smart contract technology that is emerging can better enable the transfer of digital assets and better improve workflows through what Gun referred to as the shared automation, where participants actually agree up front on the steps that are involved in a particular lifecycle and what will trigger those steps to occur.

PWC and other market participants across the market have taken part in a number of POCs that have proven this out.

So, why now? What's causing people to act now, and what will actually drive banks to adopt this technology more broadly?

Well, we know it's part of the human condition to avoid pain, and there's certainly been a lot of pain for these banks since the crisis.

ROE is quite certainly depressed. Bank ROE for the large global banks is down about a third, from 14 percent a decade ago to about 10 percent now. Mostly this is due to higher capital requirements that are imposed due to global regulation, in particular in response to the credit crisis.

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Margins are also down. We have lower margins because of slightly more modest GDP growth in the majority of the markets, and bank stocks are trading at a multiple of one times book now, whereas pre-crisis they were trading at about two times book.

So, all of that has led to a relentless preoccupation across the C suite of these banks on the things that they can control, costs and being more

efficient.

PWC clients -- every single one of them in the banking sector, in the capital markets sector, has asked us to come with our ideas on cost-cutting, being more productive, and how to leverage technology to better drive to the bottom line.

But it's not all a story of gloom and doom. There are some real enablers that will also help the banks to absorb some of this technology.

At the same time as margins are being depressed and the banks have pretty much almost missed out on an entire business cycle of innovation, because they've been responding to all of the regulatory pressure that has come about as a result of Dodd-Frank legislation and similar legislation around the world, the technology has advanced.

Banks have been embracing digitization of their

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flows. The Cloud has become more understood and there's growing comfort level with putting data from banks into the Cloud and the associated security.

There's also an increased push from the banking clients, the clients of the banks that now want productive solutions that can help them, enable them, in a mobile economy, to have faster and better service.

There's also new ways of working together, and we'll talk about this when we get into some of the POCs and how they actually work, the frenemy economy, as I call it. Banks are looking for ways to collaborate now.

We're really seeing an increased focus on pushing out things that really add no value to the bottom line into utilities and working with other market participants to shorten the business cycle and to take some of the cost out of that process.

Customers want it, as I said. Consumers have definitely more demanding requirements now. Because they're working with real-time mobile applications, they're expecting that everything that happens on the back end in their banking system will also be more real time.

So, in summary, even though, you know, blockchain and distributed technology arguably is new to

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the sector, it really isn't.

There has been a very big push already into digitization, collaboration through utility offerings, and so on. So, I definitely expect that to continue over the next couple of years.

MS. SZCZEPANIK: Thank you.

Grainne, you mentioned POCs or proofs of concept. I'm interested to hear about that. We've heard a lot of hype about blockchain, but I'll ask Brad, Chris, and Mark to take us from the hypothetical, really, into

the practical. What are we actually seeing in terms of use cases with this technology, both now and in the immediate future.

Mr. PETERSON: So, great, and before I go into -- directly dig down, you know, deep into POCs, I think what Gun said is really profound, and that is innovation today oftentimes is what I would call innovation through combination, and it's the -- the coming together of the technology at the right moment with some creative spark around how you can build better products, and it really comes down to -- and I would say, as you listen to us and listen -- is this real, is this going to take hold?

Always think about the customer involved and the product improvement that can happen, and I think wherever there's significant advancement, there is going

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to be a great company that's going to be built or a new product that's going to be built.

So, I did -- you got a little history of where I came from.

So, I did come from -- and I liked the comments before on -- it used to be called a discount broker.

So, I was at Schwab twice, and the first time we were an online and discount broker; the second time, we're a full advisor. So, I think those comments were really spot-on on panel one.

At eBay, if you think about it, it was a garage sale and a swap meet.

So, garage sales and swap meets are things that have been, you know, markets around for centuries, and what came together was something in the U.S. called FedEx, and also the internet, and then, on top of that, PayPal provided the ability of the underserved small, you know, businessperson to actually receive payments and someone being willing to -- a very creative way to pay someone without giving up your credit card to some stranger on the internet.

So, it really was what Gun said. If you think about those three things, there were three things that enabled eBay to really just globalize what was garage sales and swap meets.

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So, these mundane business models, when the technology crosses over sufficiently and the creative juices come together sufficiently, you have great opportunities.

So, I would say look for that to happen here.

The other one is in telecommunications.

So, coming from telecommunications, Skype was a peer-to-peer network. It came out of the music sharing business and got applied to telecommunications by some really creative folks in the Nordics and Estonia.

So, there's this alternative.

I think the other theme that I'd like to

introduce is, whenever there's an alternative architecture, you want to -- you want to look at your current systems and say, does that alternative architecture provide something very unique?

As we sit here today in the SEC, if you go back to the '70s, the original architecture for money and certificates was distributed, because they were physical. So, they were in vaults.

They were in physical vaults, and that was what gave us all the assurance that they were there and that they were safe, and then you had the de-materialization of certificates, and the only technology that existed for that, for both money and for securities, was centralized

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databases.

So, if you look at the early literature, though, the SEC actually envisioned a distributed set of transfer agents.

So, it's pretty cool. They had it and then they compromised -- or we all compromised in financial services, because the only technology we could apply it to reliably was we replaced vaults with these centralized mainframe databases, and most of the industry still relies on that architecture.

So, with that, that's my little preamble.

What we're doing at NASDAQ -- and then we can hear about some of the other ones. We look at our architecture -- we're a technology business that provides the architecture for the U.S. markets, the Nordic markets that we own and operate, but then we're the largest seller of technology to other exchanges around the world, and it's a very distributed, fast, high-capacity, highly resilient message bus that you build applications on.

So, it's -- at the core, what NASDAQ became after it almost went out of business, because it relied on a centralized system, was a change of architecture that came to us via acquisition.

So, we built on that.

As we think about, now, customers and capital

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formation -- so, we're here at the SEC thinking about investors and capital formation -- we think those are the two constituents, really, that are important to keep interested in.

So, anybody that wants to tap the capital markets, they can do so today through traditional mechanisms, and -- and they give up some amount of ownership that gets kept track of in a very centralized manner.

The communication with their direct owners is in some ways obfuscated by products that were there to handle the scale.

So, as we heard earlier, a lot of the advisor -- the next generation advisor services is really about

scale, about providing one of the best benefits to -- you know, to those investors, which is lower cost, higher quality, and more engineered products.

So, what we're looking at is, at the core of our product, we have -- our record keeping system today is a series of any type of database technology that you need to store, and it's both open source and traditional licensed things from, you know, both Microsoft or Oracle.

So, we see blockchain distributed ledger technology as another alternative.

So, it's not a replacement for, you know, your

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data warehouse that might have -- be optimized for read access, transaction processing that may or may not be an open source, but more and more is a Cloud-provided relational model, you know, in an Amazon, Microsoft, or Google, as well as then this ledger technology that allows you to have -- to share and create a ledger that is distributed.

So, that's -- at the core of our technology, that's where we see it sit. It's not very sexy, but it's incredibly, I think, game changing in terms of the efficiency you can deliver.

The ones that you've heard about are the two -- and then I'll stop there.

The one is around the -- our Linq system for private markets, and there we really looked at record keeping is paper-based, still, so we thought that was an easy one, low hanging fruit that you could demonstrate the efficacy of this technology where there is no technology, really, and then the second one is -- that's external, that we've talked about is out of the Nordics, because we do have operations -- we own and operate markets in the Baltic markets and Nordic, so Estonia proxy voting, and that's when you're talking about the customer, the investor experience.

So, for them to bring more capital and to have

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more engagement, you have to be in country to vote.

So, this enables -- you know, with everything we have today with mobile phones and great Is -- the ability to keep track of and make sure you can validate and tap into their e-residency program that's pretty leading edge, and again, just to demonstrate and really get our hands on the technology to show how that can give even better outreach and direct connection with the end investor.

So, I'll stop there, and certainly we'll have a lot more to talk about, this technology, but it is -- I would -- my contribution, in addition to Gun's and your great definition would be it's innovation by combination, and it's an alternative architecture that we should all evaluate and see where it can help out and modernize.

MS. SZCZEPANIK: And just in a sentence or two,

could you tell the audience about the NASDAQ Linq system?
MR. PETERSON: Yeah, that's the -- NASDAQ Linq is for private market.
So, you could say, you know, a lot of companies, well, we've observed -- and with some of the rule changes specifically in the U.S., companies are staying private much longer, and so, there's actually more of a growing need to have a better record keeping system for those investors, and then there's also -- the

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more rounds you do, the more chances there is for an error in your cap table.
So, obviously, the immutable and the lineage, if you can track back the lineage of the original stock creation and change of ownership, this is a great use case for it.
MS. SZCZEPANIK: Thank you.
Chris, if you could cover a little bit about what -- what digital assets is and then the different use case scenarios that you're looking at.
MR. CHURCH: Hi, everybody. Thanks, Valerie.
I work for a company called Digital Asset, which is a software company. It's a software company that's focused on leveraging the distributed ledger technologies, really focused at the financial services community, specifically the wholesale financial services community.
I really want to pick up your point about the hype, Valerie. I think most people in this audience have been reading about blockchain probably since 2015, and there's, indeed, a lot of hype out there. Some of that hype is valid. Some of it is just confusing and wrong. And certainly I would put in the valid is this technology does have the potential to transform and make really, really positive changes to the financial services

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market. I'd put in the dubious hype of the -- and everybody's going to die and institutions are going to disintermediate tomorrow. I'd put that in the dubious category, and we can perhaps talk about that a little bit later on.
Specifically to the work we've -- the way we're doing, we're very much focused at the financial markets, with a focus on market infrastructures to begin with, and there's a reason for that, largely from a selfish reason that it's easier to get adoption if you're working with a market infrastructure.
So, although we're working with many banks, many financial institutions, and many market infrastructures, there are three that we've talked about publicly. I'm going to touch on a couple of them, and then Mark is going to talk about one of them, as well.
Let's talk about the ASX, the Australian Stock Exchange Group, one of the top 10 largest exchange groups

in the world.

About a year ago, back in December, we went down there and they were considering what to be doing next with their clearing and settlement system called CHESS. CHESS is the clearing and settlement system they use for cash equities.

It's a system that works. It works just fine.

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But as forward-thinking Australians, they realized that it was time to change.

It had been around for a while, and trying to find developers to continue to develop and evolve it to where they wanted to get to was increasingly tough, plus the regulators were asking them questions about how to make the Australian market more competitive, and the combination of these factors got that ASX to say, well, we should explore alternatives, and they chose to embark on a journey of distributed ledger technology.

They evaluated lots of companies, and they're now engaged in building -- or we're building with them a system -- a system that will go into production in 2017 for the cash equities, and at the heart of what they were trying to do is some of the benefits that Grainne mentioned.

Driving down costs. You can't live in a post-2008 world and have a conversation with anybody in the C suite who isn't worried about costs.

The point that Grainne was making about ROE. This industry is struggling from a depressed ROE at all of those metrics that Grainne mentioned.

And distributed ledger technology will provide the Australian Stock Exchange with the ability to drive down their own costs, but more importantly, from their

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perspective, the ability to drive down the costs of their member firms, and this will be done in a number of ways but predominantly through reconciliation.

It also will provide increased transparency, so we'll probably talk about regulators a little bit later on, but the regulators like this technology because of the increased transparency.

Everybody likes this, because it reduces risk. It takes risk out of the system. In fact, the Australians are looking at -- are exploring how you can leverage this technology not only to reduce risk, to drive down costs through reconciliation, etcetera, increase transparency, improve security, but also to consider maybe the settlement cycle.

They just moved to a T-2 settlement cycle. With this technology, you could do T-when you would like it, and that's an option that they're considering, as well.

So, in short, they're pioneering this technology. They will be one of the first, if not the

first, major market infrastructure to go live with a major system using this technology.

So, that's one of the use cases.

We're working on two others, one which is the DTCC, which I'll touch on very briefly, because I

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believe, Mark, you're going to go into the U.S. Treasury repo.

The DTCC, like the ASX, is a very forward-thinking market infrastructure, and they've realized that -- the power of this technology and the power of this technology to positively transform and change the markets for the good of their members, and they've taken a very real but very simple use case, which is the U.S. Treasury repo market, and are deploying this technology to basically drive down costs and to have real balance sheet savings.

I'm going to hold there, because it's really Mark's story to tell. I'd rather he does that.

The third area that we're working on is we're working with the SIX Group, which is the exchange group in Switzerland.

They're also, like these other market infrastructures, have recognized the power of this technology, and they're looking at how can this technology improve the efficiency and the management of the lifecycle of bonds, for all the same reasons I mentioned before.

Let me just pause there, and I think we'll probably hand it over to Mark to cover some other use cases.

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MS. SZCZEPANIK: Thanks. And Mark, pretty early on, DTCC published a white paper and you're also looking into these areas and working with Digital Asset. So, if you could tell us kind of about the projects that DTCC is looking at in this area, that would be very helpful.

MR. WETJEN: Great, I'm happy to do that, and thank you, Valerie, and the rest of the personnel at the SEC, for pulling this forum together. It's a pleasure to be here and explain to the audience some of what all of our firms have been up to lately in terms of implementing this technology.

Chris mentioned one proof of concept that we are working on with Digital Asset related to the Treasury repo market.

I'm going to start, actually, by describing a different proof of concept, and I thought I would focus on that in my remarks, at least at the outset, because much like some of what was said earlier here in the panel, it's actually a pretty straightforward application, and what I've found is that it's -- what you really have to understand is the basic processing that's

underway today with respect to these different services, and only then can you understand whether or not DLT as an application is going to bring efficiencies and

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improvements along the lines of what a lot of people have predicted.

So, DTCC, back in -- it was actually before the financial crisis -- started a service called the Trade Information Warehouse, and it's a pretty basic service.

What it does is it takes in and stores the economic terms of credit default swaps and basically serves as the source for the golden record for those transactions. So, that service has been around for close to a decade now, and it's worked reasonably well.

The other thing the service does, in addition to keeping the core economic terms of the contracts, is that it will process lifecycle events for CDS contracts.

So, if there's any kind of governance or corporate change that impacts the contract, that information will be processed by the service, and the users of the service will have that updated information.

We process compression and an assortment of other related lifecycle events for CDS.

So, what's happened -- and again, it relates to comments made earlier about sort of the combination of events happening all at once.

Since the -- since the reforms from the G-20

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back in 2009, the CDS market has changed rather significantly. For one, more of the marketplace is being cleared, and number two is some of the dynamics that were mentioned earlier about increases in capital requirements and other regulatory obligations.

So, the upshot of that is that the CDS market has been gradually shrinking, and so, the cost per unit, if I can put it that way, of the TIW services at DTCC operates has gone up.

There are fewer transactions that are being ingested and stored and processed in that service, and so, the demand, in other words, for achieving greater efficiencies in the TIW service has increased quite dramatically.

But the TIW service is pretty straightforward. Again, it's storing data and the it's processing lifecycle events.

So, the sort of computing or business logic needed to perform those services, especially on the processing side, is not terribly complicated in the end, but given where we are in time and given where we are with the development of distributed ledger technology, it made a lot of sense to consider whether or not this technology could deliver more efficiencies than other

improvements to existing technology that DTCC has been
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using to offer the service.
And so, earlier this year, basically a test was done with a variety of industry participants, including large banks, as well as the company market, who provides an electronic confirmation service for CDS, and a software -- a consortium of software vendors that we're working with basically used or developed DLT software and created smart contracts based on the information provided by the market for the CDS contracts, placed the contract information, economic terms, on a distributed ledger hosted in a Cloud environment, and basically the test was remarkably successful.
I think there were 80-plus different scenarios and -- and lifecycle events that were run through the smart contracts to see whether or not the software would work, and in fact, it did.
So, then the next step has been -- the company, DTCC, and our technology partners have been going through a pretty rigorous cost-benefit analysis to determine whether or not it actually does make sense to take the next step, which would be to basically re-platform the entire TIW service that's been run now for, as I said, close to a decade, and we're getting close to making a decision on that, and hopefully, I would imagine, in the coming days or weeks, we might get official news of what
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we plan to do, but again, it's a very basic application that we're looking at the technology to help us with.
It's simple data storage and some very basic lifecycle processing services that are being offered, and so, instead of that being done in a mainframe computer owned and operated by DTCC, we're seeing whether or not that can be done instead through DLT software that's being run as an application, probably not just mainframe but also some Cloud-hosted computing power, as well.
And the expectation -- if we go forward, the expectation will be that that will drive our costs down, eliminate some of the reconciliation issues that arise from the users of the service today, and instead, if they adopt basically a node running the same software, they can have synchronized updating of information, and they could see the results of these different lifecycle events being processed and eliminate some of the reconciliation costs that the firms that use TIW today have.
So, pretty basic application, a different architecture than what's being used today, but definitely holds some promise from an efficiency standpoint.
MS. SZCZEPANIK: Thank you.
Grainne, what is PWC seeing with its clients? Could you give us a broader context, even a little bit outside the financial industry about what you're seeing?
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MS. McNAMARA: Sure, Valerie. So, we're actually demand and engagement across all of the sectors. We're working in the health sector. We're seeing applications for record keeping and also keeping information around clinical trials. Public record keeping. I think the State of Delaware is a particularly well-known example, but it's creating a roadmap for how governments and regulators -- and we're talking to many of them -- might use the blockchain to register assets but also to supervise the activities of folks in their market, and we'll talk a little bit more about that later.

Energy. We're working with energy companies who are looking at use cases around, in particular, the creation of virtual grids to track distribution of energy. We're also working with some new startups in that space.

Inter-government agencies. We're part of the United Nations ID 2020 initiative, looking to give digital identity to people, a very noble goal when it comes to tracking resources that are available to people and also where those people are in the world.

A very exciting one that's come to the fore -- and we're talking with a number of industrial companies now around this on what we're calling a supply chain,

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connecting their internet of things.

Many of these industrial companies have very sophisticated technology attached to their physical assets, but when it comes to tying the cash for suppliers and customers in the back office, it's quite rudimentary and manual, still. So, we're looking at exploring -- using the blockchain to connect the physical world of assets moving around to the internet of value, if you will, to the cash through the back office.

Financial services. We've talked about a number of them, but we have also seen activity in the area of real-time payments, corporate loans. Trade finance is a particularly hot topic. We've done a number of POCs across the world in that area.

Also in collateral. We've worked with one of the large custodian banks on how the blockchain might improve collateral tracking and usage.

And also in insurance, we see a lot of demand coming from the insurance sector, and particularly as it relates to the management of claims.

In terms of, you know, what are people actually doing, well, it's running the gamut from looking at what does this actually mean for my business model, do I need to -- as a strategy point of view, do I need to take an offensive approach or a defensive approach? What is the

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art of the possible as it relates to the blockchain? We are running those sorts of engagements.

And then we're also running engagements where we're literally building applications to either solve a particular business problem or help a corporate or a bank figure out how they might use an asset that they already have and continue to be relevant in the context of a blockchain ecosystem.

How might they -- for example, one of our engagements is a company that has a very large corporate connectivity network, and they help corporates connect to the banking infrastructure.

And so, their question was how might we limit the disruption to this set of corporate clients as the blockchain technology evolves so that we could provide some of that value of being on the blockchain to our clients without having to have them rip out all of their infrastructure, so a wide variety of things.

The other thing, as I mentioned, in terms of who is participating in these POCs -- and I'm finding this part particularly interesting. We're seeing bank-to-bank activity. We're seeing bank-to-corporate. We're seeing corporate-to-corporate when it comes to supply chain, and we're also seeing that people in the ecosystem are very interested in collaborating with each other,

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including Fintech startups, embracing some of the more advanced and really good ideas that are out there in that sector, and then also huge participation from large tech and infrastructure players.

So, we are running proofs of concept, proofs of value, in some cases with all of those participants being at the table, if you will, at the virtual table.

So, the amount of coordination and cooperation and collaboration that's actually required to pull that off and to figure out where the value actually is emerging from this new technology and then how do we actually fund that and then what's the business case for that, what's the commercial model or the impact on the commercial models of the various players.

So, very, very fascinating space.

MS. SZCZEPANIK: Thank you.

Brad, how does distributed ledger technology stand to benefit consumers of financial services and investors?

MR. PETERSON: I think the main one, you know, is cost.

So, this is -- when it is fully embraced and designed into the systems, you just see the record keeping -- the enemy of record keeping and current database technologies is reconciliation on both sides,

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and you just look at our current financial system, and it -- the interoperability was not designed in.

Everything was designed as -- you know, around a company and their walls and their security model, and

then you have to go to -- make sure that you get it right and you understand what your counter-party told you is right and you have tons of reconciliation waste in the system.

So, I think the end one -- and you just look at what happened with our prior panel. The cost of engaging in advanced financial services has come down, because financial services really applied technology very aggressively and brought the cost down.

So, I think it continues. That continues. And this is not the sexy part of it.

So, the things in the middle, between the investor and what they're investing in -- it's hard. It's a lot of reengineering to work. But the thing is there's the opportunity to do it, and it's probably worth the price at this point.

That's what I would say. We've crossed over to a point where it is worth that.

So, cost is going to be the other one.

The last piece, I would say, is there's a fellow who joined Google from Berkeley named Hal Varian,

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and I like to introduce the Varian rule, and he says -- economists -- they say that, you know, you're always wrong, and so forecast, you know, as far out as possible so people will forget, you know, what you said, but he is a little more pragmatic and has a rule that I like to call the Varian rule. I don't know if he would like that I called it that, but he says, look, if you want to know what's going to be popular, look at what people who have no real impediment to paying -- and that's the wealthy -- look what wealthy people have today, and if there's something that's enabled or improved by exponential, you know, compute -- like compute is exponential improvement in cost and performance -- in 10 years kind of the middle class will have it, and in another 10 years, everyone on the planet will have it.

And you think of the cell phone in the mid-'90s. The cell phone was the purview, you know, from the -- the Wall Street -- you know, it was the brick phone, and then -- but 10 years later, it was pretty ubiquitous in, you know, our kids and middle America, and now everyone on the planet has one, and you don't live without it.

So, I think financial service is also -- and individual investors are the benefactors of that -- that exponential technology that's being applied to financial

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services.

So, the notion of someone who has private wealth management services, a family office that had that 20 years ago -- I think we're -- everyone has very inexpensive, very high-quality financial services today.

Everyone in the world -- you're going to be able to do this down to the dollar.

You're going to be able to split your dollar and say, today, this dollar is for transaction, for living, and this dollar is for investment, and you can get asset allocation and diversification at a very low cost, and you could split it at -- certainly, maybe it's extreme to make my point that it's down to the dollar level, that you'll split a dollar for spending and for investment, but I think it's possible, and that was -- before, only -- that type of advice was only available to the very wealthy.

I think this can -- there's certainly issues with that that we heard earlier about the algorithms, is there some bias in the algorithm, but I think algorithms -- the beauty is there is an audit trail. You can see what the algorithm did, in many cases, and you can go back and show that it actually is biased or it isn't biased.

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So, I think for regulators that's an audit trail. That makes it incredibly exciting to now think about the costs managed for investors, the high quality, and the ability to really understand whether someone is looking out for their best interests or not.

So, I think regulation gets incredibly more interesting, more mathematical and science-based, and more scaleable.

So, that's pretty exciting for the SEC, I think.

MS. SZCZEPANIK: Thank you. We'll get back into that a little bit later, but you did mention -- you alluded to this concept of disintermediation, and I want to cover that briefly.

Who stands to lose out if DLT is widely adopted? So, will there be changes to the entities currently populating our regulatory landscape, and if so, how?

MR. PETERSON: Do you want me to do that one, too?

MS. SZCZEPANIK: I thought maybe Chris could cover that.

MR. PETERSON: Okay.

MS. SZCZEPANIK: And you could chime in, too, if there was some time.

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But Chris, will certain services and service providers become obsolete or will this technology be adopted into the current infrastructure? What are your thoughts?

MR. CHURCH: So, this is one of the areas where you can get some really good press and some really good hype if you talk about the death of various financial institutions or intermediaries, because it gets

everybody's attention. We believe this is pretty much over-hyped, and there's a number of reasons that I'll come to.

So, if you think 2015 was when most of us got to grips with what distributed ledger technology was -- a few people a little bit earlier on in financial services, granted, but it became mainstream in financial services in 2015.

That was kind of -- you can draw a comparison to 1995 when the internet -- when we all started waking up to the internet and what it could bring.

I don't know if you remember, back then there was a lot of discussion around, well, what's this really impactful technology going to do?

Well, what's this really impactful technology called distributed ledger and the internet going to do, and there were lots of discussions, and you know,

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certainly, for financial services, there was this bricks and clicks debate, you know, there weren't going to be branches anymore and, you know, the end of banks, etcetera, as we know them, certainly branches.

That certainly hasn't happened in the town that I live in. It certainly hasn't happened in New York. What's happened is the role of those branches has changed, and I think that's -- it kind of gives you an insight into what's going to happen with this technology. The roles of those institutions will change.

Now, there will be people who are casualties to this. Those that don't wake up to it won't be as competitive. Those that don't make those changes will die. I mean, I don't know if you remember, back in 1995, when you first downloaded your movie, it took a very long time, and by the way, you probably went to Blockbuster to get videos. We don't do that anymore now, right? Two minutes and you download a movie. So, yes, there will be a few casualties, but it's not as exaggerated as I think the hype would let you believe.

So, yes, there will be changes, and I think positive changes, transformative changes to the processes, not necessarily the institutions. Custodians will still be -- like bank branches, they will still exist. They'll just be doing different things. There

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will be a lot asset servicing going on.

Market infrastructures such as the DTCC will still exist. They will be doing different things. And suddenly if you -- I've got -- one of my daughters just graduated from college, and if she said to me, Dad, I'm going to go into the back office of a financial institution in their processing arm, I would have ripped my hair out, because that's not where the jobs are.

Those jobs will disappear, but that doesn't meant to say the institutions are going to disappear.

Why do I not think that market infrastructures are going to be completely disintermediated? There's a number of reasons.

I think the very top of it is regulation. Since 2008, I think regulators are feeling a lot more comfortable with the regulation they've put in place. I don't think they anytime soon are going to turn around and give up that regulation.

So, regulation is one of the barriers to stopping this happening, but of course, that can change.

You could also say, well, market forces is one of the reasons why you'd want to get rid of some of these intermediaries. Yeah. Well, why is that? Well, because they're expensive.

Well, you know what, some of these

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intermediaries will shift and change and their costs -- the Australian Stock Exchange, if they were on this panel, would happily tell you -- well, I don't know about happily, but they would certainly tell you that their clearing and settlement revenues will decline.

That doesn't mean the end of the Australian Stock Exchange. It means they'll be figuring out how to do other services.

They're already working on how can we drive down our own costs? How can we drive down our participants' costs, which takes away some of the drivers of people saying, well, let's disintermediate those types of organizations.

They're also working on revenue-generating services. So, their revenue mix will change.

Their roles will change, and I think that's true of a custodian, that's true of a market infrastructure, it's true of many of the organizations that are potentially going to be disintermediated by this.

The processes will change. The organizations will change, but they will not go away anytime soon.

MR. WETJEN: Can I just add one thing to that? I absolutely agree with what Chris just said.

The other thing that I think is important to

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point out, though, it's not just that the regulations won't change, necessarily. You have to dig a little bit deeper, and what I would say is that the policies that led to the regulation in the first place -- that's what's most likely to not change. You could see some revisions to existing regs on the books, for example, but I think what Chris is also saying is that the policies that underlie and from the foundation for these regulations -- that's what probably will stand the test of time.

You just can't imagine that the SEC or the CFTC or the Fed or other regulators around the globe are suddenly going to decide that risk management isn't

important anymore, we don't care about that, just to use one example, or transparency, that just doesn't -- suddenly doesn't matter anymore.

So, the way those things get implemented or those policies become implemented could change, and a conversation might get started as technologies like DLT and others come to the fore.

Actually, another interesting example is Cloud computing. That's not a terribly new technology, but I think it's forcing the SEC, the Fed, the CFTC, all these others to think about, well, how do you do -- how do you enforce compliance when you're a financial market utility that starts to rely more and more on Cloud computing? It

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can be done, but it just raises a lot of different questions, mostly around compliance. Again, the policy doesn't change. Financial market utilities are still risk managers or providers of transparency, and those two things or mandates are going to remain.

MS. SZCZEPANIK: I think that's a great point. You know, a regulator's mission is -- specifically, our mission is to protect the markets and investors, but also, we don't want to hinder the advent of new technology that can help investors.

So, how do we best accomplish this, and how will the adoption of this technology potentially affect the job of regulators and others serving oversight functions?

Maybe, Grainne, you could cover some of that?

MS. McNAMARA: Sure, Valerie. I think it's a great question, and I'll make my remarks, I think, relevant to both audit firms and regulators, those of us who are involved in supervising the activity in the financial services system, and it was interesting.

A client of PWC's actually approached us and asked us if we would participate in a POC with them to try to understand what it might mean to audit a blockchain system, and we sort of felt like the Queen of England did when she was told that the stocking frame

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knitting machine was invented and that we thought we'd all be out of jobs, but -- so we started a journey to try to really understand, you know, what does that mean for a very large audit firm that has 100,000 people working in audit services?

If a node on the blockchain is going to do it for us, we'd better figure out what that means and what that looks like.

So, our point of view, having been engaged in this work, is that regulators and auditors can actually use the block chain to move themselves into a more reactive -- I'm sorry, a more proactive versus reactive look-back type of audit arrangement.

Instead of having processes and people that are

sucking data out of various parts of the ecosystem, it's our view that this process could actually be streamlined and that they could have, actually, a node -- they could be a node on the ecosystem and that they could effectively monitor from there.

So, what we're seeing is that there are actually intrinsic characteristics -- Gun mentioned some of them -- of distributed ledger technology that will actually make this real-time audit strategy a bit easier for us.

There's more relevant transaction-level data

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that we could apply to the data going into the blockchain that would facilitate the ongoing audit to make sure that, actually, the rules of the system are being observed.

The ultimate goal, as we know, is more trust. So, to the extent that, in the past, we might have actually looked at the underlying system itself and provided an assurance opinion on the system, in the future we'll be able to, we think, look more deeply at not only the system and how it's constructed and how things are actually moving through it, but also at the data as it's moving, as opposed to looking maybe at the control environment afterwards or some sample of that data.

So, in fact, I think our view is that this can really facilitate and help the job of those who are in the business of actually supervising both the systems that are moving financial assets around and also the resulting positions that will end up on these ledgers, because you have the opportunity of actually having a copy, a full copy of the ledger yourself, if you're the auditor or the regulator, and actually participating in that way.

MS. SZCZEPANIK: Thank you.

The implementation and regulation of this

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technology is going to call for people with very diverse skill sets, people versed in financial services and systems, programming, cryptography, regulatory oversight, and the law. What investments should regulators be making in knowledge, technology, and skills necessary to understand and regulate this technology?

Gun, do you have any thoughts on that?

MR. SIRER: Sure. I think if we look back, the last few decades has seen the rise of a new class of all sorts of government employees who are bringing essentially IT technologies to their particular fields. We've seen law enforcement, the FBI, attorneys general who are much more savvy that they used to be 20 years ago when it comes to computer crimes, and I think we're going to be seeing the same thing.

We have been seeing the same thing, of course,

with greater adoption of computers into finance, but we're going to now see it with crypto-currencies, and so, this can be a daunting field, because it's so diverse and so expansive. So, it ranges from economics on the one hand to the depths of impossibility results in computer science on the other end, so bridging the gap might be difficult.

There are resources available, and so, there are academic centers. I am a co-director of one of them.

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At Cornell, we have the initiative for crypto-currencies, and that brings together about 18 PI's, 18 professors or researchers with Ph.D.'s, with about 40 to 50 students, Ph.D. students, and at MIT, there's the DCI, the digital crypto-currency initiative.

There are other colleagues in other universities. I would have to say not that many of them, although the interest in the space is quite high and growing by the day.

Overseas, if there are any European attendees at this -- among the audience, I have to say Europe tends to lag behind the U.S. on this front, in the sense that when it comes to academics or working on crypto-currencies, sort of the centers of excellence are mostly in the U.S., although we have great colleagues in Israel and in London and in Switzerland, as well.

So, any one of these groups essentially runs a series of programs. We certainly do. We run summer workshops and so forth, and we'd be delighted to cooperate with people who might be interested.

Other than that, there are many, many resources on the web. The problem here isn't so much finding resources; it's really sifting through them to find a definitive one. In such a fast-moving field, that can be a challenge in and of itself.

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The proper documentation for many of these systems doesn't exist. In some cases, the people developing them actively resist documenting their systems, saying that code is law and, therefore, there is no separate description or definition of what an investor or what a user should see. They are expected to read code, a row code, and that can be a daunting challenge.

So, we're at the beginning of this, so I don't have a great, super-positive message saying, oh, you can do this and then be done with it. It's not going to be that way. But the people who do make the investment -- they will be amply rewarded, because the world is changing, and those who keep up with it are going to be at the forefront.

MS. SZCZEPANIK: Thank you.

Chris.

MR. CHURCH: I'd just add, it's interesting to see around the world how regulators are embracing this

technology.
We've been working with the Australian Stock Exchange, and they've been working with their two primary regulators, ASIC, which is similar to the SEC, and RBA, and one of my suggestions to you, if you are a regulator, is why don't you talk with other regulators, because there are a number of them out there who are doing some
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really good stuff -- the Brits with their sandbox stuff, the Singaporeans.
In fact, this week my boss is at a Fintech conference in Singapore where they're pushing the envelope and raising awareness. It's great to see the SEC doing this event.
But certainly, chat with the Brits, chat with the Canadians, the Singaporeans, the Australians. They've really -- they've got teams of people working on this stuff. So, that would be a suggestion that I would really encourage.
MS. SZCZEPANIK: Thank you.
It seems clear we won't be flipping a switch today to tomorrow's back office blockchain infrastructure. So, I'm wondering, what are the challenges to the widespread adoption of DLT?
Is it just that the technology is too immature, or are there other hurdles?
Maybe Grainne and Chris, you could weigh in, and others could weigh in to the extent there's further topics.
MS. McNAMARA: Sure. I mean, I do think there are some significant challenges to the broader-scale adoption, Valerie. We think this technology will go through an adoption curve like many other technologies
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have gone through in the past, what we call the four Ps.
So, there's a proof of concept phase which many of the large global banks have already passed through, so obviously they've proven that the technology can work.
There's a prototype phase in which we start to really get serious about a particular production use case.
Then there's the pilot phase where we're actually moving into production and trying to -- it's very challenging here, because we're trying to interoperate with everything else that exists in the production environment, because everything cannot move to the blockchain, obviously, at once.
And then there's a production application where you really are trying to use this technology in production and deal, obviously, with all of the security and scaleability concerns that hopefully you've addressed in the prior three phases.
So, immaturity of the technology does come up. I think lots of people are working on how do we take it

out to scale, how do we make sure that the nodes can scale in and of themselves and that the network can also sustain the volumes that we'd need to go through for financial services.

I think the way the technology will be adopted

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peculiar to particular asset classes may also slow us down a little bit.

There's a lot of complexity in the legacy infrastructure and how these asset classes actually work and transforming that will take us some time, going sort of asset class by asset class.

One of the big areas that's also challenging -- and we see firms getting stuck here -- is the impact on the commercial model. I mentioned it a little bit earlier.

How do you actually get interest from an ROI perspective? How do you prove internally that the technology is worth investing in, if it's a large investment? Do you bring other players to the table to help you fund through that adoption curve?

Who might those players be? Are they currently people that you're in competition with, and if so, how would that work? And then, you know, what does that transaction model really look like in terms of how do you price for it in the future, in the future model?

Standards, which I'm sure Chris is going to cover, because I think Digital Asset is really trying to help in this space, trying to get us to a place where we have interoperability across either different blockchains or different implementations of blockchain, different

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types of ledgers, different protocols that are out there, is definitely going to be challenging.

And we mentioned it already, just sort of having our regulators keep pace, keep up, frankly, and be convinced that we're not damaging anything that's been done over the -- in particular, the last several years, post-crisis, to really impact the safety and soundness of the overall system. That's something that I think is just going to take some time for the industry to work through.

So, those would be mine.

Chris.

MR. CHURCH: I think you're exactly right. I'd put these into three categories.

Regulation -- and we've talked a little bit about this, but you know, let's be clear, if you were a regulator, what isn't to like about this? This technology is fabulous. It's going to give you the transparency. It's giving you a window into a market that you haven't seen before.

Unintended consequences? Well, provided you continue to operate a regulatory framework and tell the

market, such as the ASX, to continue to those, you can get all the benefits with seemingly little downside, and in fact, when we're building to the ASX, the whole brief

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is being -- you know, there is no requirement for the ASX to go to their regulator or for the regulator to change any of those policies, must all work within -- this is technology that must make sure it maintains and preserves and meets the policy requirements.

So, regulation is clearly one of those hurdles that we had, I think, originally thought was out there and was a challenge, and as I mentioned earlier in my comments, I think you're seeing varying degrees of understanding from regulators who are still -- probably not anymore, but Bitcoin -- oh, my goodness, I don't have anything to do with it, opposed to realizing now DLT can give these -- many of the benefits that we've talked about.

I think, under the regulatory umbrella, I think the -- many regulators are still getting to grips with the security and the privacy piece of it. One of the reasons why we have built our solution to ensure that the privacy and security -- so, for example, the contents, the detailed confidential information of a transaction is not carried over the distributed ledger in the configuration the way we deploy the technology.

That's done for a number of reasons. The advent of Quantum computing is going to change things, and we want to make sure that we were thinking ahead of

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that, plus we don't want to have any questions from regulators around confidentiality. So, that is a solution to get around that.

So, regulation is one. I think there's two other categories that I want to bring to your attention. One of them would be the network effect and the second one would be standards, and Grainne's absolutely mentioned -- in terms of standards, I'd like to sort of put a shout out -- there's a number of organizations pushing the standards story very well.

The Linux Foundation -- I'm sure you're all familiar with Linux. Linux runs a foundation to promote open source, and they run a Hyperledger project, which is designed in the open source world to get everybody to contribute for the common good.

Why do we like this? We like this because it will, we believe, advance the adoption of standards. There is no financial incentive.

It's a not-for-profit organization, and the people such as ourselves as others are competitors, big technology companies like IBM, big banks like JPMorgan, big market infrastructures like the DTCC, are all members of the Hyperledger project.

It's a good organization, trying to figure out

how do you get to the standardization. Part of that will
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be trying to come up with some standards and facilitate interoperability in the fullness of time, and we've just most recently put forward some white papers and some ideas which we thought proprietary, but we said, you know what, it's better to get these out there.

So, I would encourage you to go and have a look at the Hyperledger project, the GSL, which is the latest technology that we've contributed to it.

So, that's one area.

The final area would be what I call the network effect. How do you get this -- everybody has to use it, right, to make the benefit of it. No, that's not true.

You can -- this is what we've designed for the Australian Stock Exchange -- a way that they can phase in the benefits of this technology so it doesn't have to be a big bang approach. That's one of the ways that you mitigate against the network effect.

Another way is that we're working with market infrastructures, because market infrastructures have the ability to drive through that change. If you're a market infrastructure like the DTCC, the ASX, or others, to go around to your constituents and say we're going to drive down our costs, we're going to drive down your costs, we're going to increase transparency, make it easy to do regulatory reporting.
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You know, it's not that difficult of a sell, and certainly, the Australian Stock Exchange has been engaging with their community and telling that story, which has been well received.

So, three challenges out there: regulation, the network effect, and standards.

All of them are surmountable, partly because this technology is and has the potential to be so impactful and the prize is so great that people will figure out ways to overcome them.

MS. SZCZEPANIK: Mark?

MR. WETJEN: Can I just add to that? Chris mentioned how to get around the issue with regard to the network effect.

Just to provide another example of what's happening in the marketplace, I think we envision -- if we go forward with our use case related to the trade information warehouse, our expectation is that we would approach it very similarly. So, probably what we would do is start with DTCC's own node, where the software application would be run, and then, over time, as the users of the service see fit or when the cost-benefit works out in favor of their adoption of a node, we would imagine that's how it unfolds over time.

And the other point I was going to make -- the
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other evidence of these issues that Grainne and Chris both mentioned is -- is, again, regulation is an issue, and as consequence, I think what we're starting to see more and more is companies that have started -- perhaps with the intent or expectation that perhaps they would disintermediate some of the incumbents -- what we're seeing now is a lot of those same firms are choosing to partner with firms such as DTCC -- I presume that's true of NASDAQ, too -- who have the infrastructure in place to deal with the regulatory environment, to deal with some of the governance issues and the like.

MS. SZCZEPANIK: Brad, is that what --

MR. WETJEN: That might not always remain so, by the way, but again, it's just an example of some of the dynamics that are being described here.

MR. PETERSON: I think Gun has some thoughts, as well, but -- so, I think those are all important, and by the way, the networks effects is the prize. So, you want to stimulate and accelerate and get that going.

So, I think the fact that it hasn't means it's somewhat troublesome for this technology, but where it comes from, when it occurs, that is a brilliant accelerant to adoption. So, whoever gets there first is going to have a huge business.

So, that's interesting, and that is, in fact,

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you know, what happened, obviously, with Skype and with eBay and companies like that that get the benefits from networks effects.

So, the one thing on the adoption front is very practical, though, too, and that is when you first have developers that started to develop for the web and then they started to develop -- they first developed for the web and then mobile came along and then you heard mobile first, and on the -- if you just back up a little bit, you had client server, then you had developed with web services, and now we're at the point of developing for the Cloud.

And so, the very practical side of the adoption is you have to have your product managers and your engineers confident that when they're under -- when they're going to have to deliver and that's what they do and they're under intense pressure to deliver -- everyone always is -- that they have confidence that -- that they can do so. They have the skills and they have the ability to build a solution.

So, I would say I'm not that concerned, because I think everyone is acquiring the skills now. We're in the skills acquire phase, and it will be likely that point when you have some leaders that have the skills and can demonstrate success and get the projects done, that's

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why these are so important for the early POCs to have success, so people say, okay, I can do that, too, how did

you do it, and then people start to learn, and today, with the internet, you can learn pretty virally.

So, this will be probably the fastest cycle of skills adoption in new, I would say, patterns of building solutions that will be shared, and it is -- the beauty is it's being shared. It's not being holed up in one organization. It is absolutely being shared, which will, I think, benefit most folks.

So, Gun, I know you had a couple of comments, too, and you've been quiet.

MR. SIRER: I was going to mention the challenges. I see a couple of challenges on the technology side. One of them has to do with the performance of blockchains. It's not actually easy to build a blockchain that can live up to the requirements of the clearance systems of today, for example.

Bitcoin itself clears about three to four transactions per second, which is nothing compared to what Visa would require. Visa levels would require three orders of magnitude, at 2,000 transactions per second.

Luckily, we know how to address some of these challenges. I'm not concerned about tackling that challenge. My group and colleagues have actually made

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large steps forward in that space.

The second issue that I see as being a bit of an impediment is the security of digital assets. They're very hard to secure.

If you've got securities whose controlling private key, so to speak -- that is, the end points that actually manage how they move -- if they are online, then they become vulnerable to hacking, and I'm sure we've all heard about ransomware.

In fact, at Cornell, when I created the -- when we created the institute, we had to hold currencies, crypto-currencies, and it was actually kind of difficult to get that on the books at Cornell.

It's a large institution. You can appreciate how tough that is.

And just as we were trying to do that, the Cornell treasury came to us and said I need to hold crypto-currencies today, and we were like what got into your bonnet, and it was interesting.

The thing that actually prompted the call was the fear of ransomware.

So, the problem here is our infrastructure is nowhere near -- the computing infrastructure that we have -- our operating systems, our servers, and so forth -- is nowhere near secure enough to hold highly valuable

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digital assets at the moment, and this has led to a series of thefts and hacking attempts and so forth.

So, we need to address that. There are some technological fixes that we can apply, maybe on the

systems side, to deter some of these attacks, but this is an ongoing and difficult challenge.

MS. SZCZEPANIK: Thank you.

Mark, we've heard debate over permissioned versus permission-less systems. Has the debate been essentially settled in favor of permission systems when it comes to trading, clearing, and settlement systems? Is such a system necessary to deal with, for example, KYC, AML, privacy concerns, and methods of recourse?

MR. WETJEN: I don't know that the question has been settled today once and for all. Certainly the view of DTCC is that a permission-based network is more appropriate for the sorts of things that we would do and that is currently being considered.

Again back to the trade information warehouse example, that would be a permission-based system. DTCC would effectively govern and operate the network, so to speak, and decide who participates and who doesn't, and again, that's a pretty straightforward service offering. It's not nearly as fraught with the sorts of risks that you would find if you're in the business of clearing and

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settling, which of course we're also in.

So, I think, for now, it seems the most appropriate way to approach some of these -- some of these service offerings, but again, it's still pretty early days. It's conceivable there could be ways for people to get comfort using these applications on an open network.

MS. SZCZEPANIK: So, in just a relative fraction of time, we've seen digital -- we've seen the distributed ledger technology evolve from the Bitcoin blockchain to the use cases we've discussed here today.

I wonder if the panelists could imagine for us the blockchain-enabled world of 5 to 10 years from now and any predictions about the next phase and how far this technology can take us?

Brad?

MR. PETERSON: So, maybe we'll go down the line. I'll start off, and I absolutely think that, with financial services being one of the slower industries to accept -- to adopt to the Cloud for security reasons, likely, my prediction is that blockchain services, because of interoperability and because they're going to be -- this is how we build next-gen technologies, the main blockchain services will be resident on Amazon, Microsoft, and Google, and that will be -- and maybe

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someone else.

Maybe there's one other one that -- if we need one just specific for financial services, but I think for the time being, those three are going to shore up security sufficiently, and most of our interoperability will -- because they're global entities, they will be the

big winners for blockchain and distributed ledger technologies.

MS. SZCZEPANIK: Gun?

MR. SIRER: So, let's see. This is a fun game to play, to make predictions.

So, let me start by, I guess, riffing off of Brad's point.

So, the topic of disintermediation came up and getting rid of middlemen came up.

That also had come up, as Chris mentioned before, in the '90s, that we thought the internet would allow us to go immediately to the source, and what instead happened is all these B2B businesses came up, and instead of going to the source, we went to a different intermediary, a new class of intermediaries were born, and new sets of companies were born.

So, I suspect that blockchains of the future, if they, you know, flourish -- and I hope they do, and I expect them to -- will not be under the control of well-

established entities that we know and love today.

So, I don't know that it's going to be the IBMs, you know, and the Microsofts and Googles of the world that will actually dominate this space.

So, that's -- I think there might well be many other players in this space. There's a lot of money that has gone into startups, and I suspect that quite a few of them will come up with very interesting offerings.

I also expect that there will be many, many, many, many absolutely horrible systems and lots and lots of disasters in the news.

So, many applications of blockchains just don't make sense and/or they are misapplied. A core idea might be sensible but the application domain does not make sense.

A simplest example, again riffing off of Mark's point earlier with permission systems, we see many applications where people deploy the same software at five different institutions.

Well, that's really nice, but it bought you no security. It's the same software running at five different places.

You could have run just one instance of it and with some slight changes in network environment, you're not really getting all that much diversity. This is not

a sound distributed systems design or deployment.

So, that's -- those are two interesting areas. I think a third and final area that I want to mention that I think is going to be really exciting is -- has to do with smart contracts.

We're going to see them deployed. We're going to see traditional companies replaced by contracts, and by smart, they're really the opposite of smart. They're

preordained, that's what they do, and in that sense, they're dumb.

What they do is entirely known in advance. They will not do some automatic magic for you behind the scenes, and that's where they get their power from.

The design of such contracts turns out to be very difficult, and we're going to see failures, you know, drastic failures. We've already seen some. We'll see more. But we'll also see some great successes.

We'll see actual industries -- insurance being one -- being disrupted by people who go into the space with new tools and new technologies and new architectures.

MS. McNAMARA: So, I want to build off of the one point that Gun made in terms of, you know, you don't always need a blockchain to do this. We get asked that question all the time when we're engaged by clients who

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are on a digital transformation journey, and we answer the question as follows.

A blockchain could be useful to you when the following things are true: Multiple parties share the data. Multiple parties update the data. There's a requirement to validate that the data, in fact, is correct. People need to be able to trust the data because there is value associated to it.

Intermediaries in the flow are adding complexity and slowing things down or, said a different way, if we removed some of that intermediation, things would speed up. Interactions in the flow are time-sensitive. There's value in shortening the business cycle. And transactions in the flow interact and there is dependency between them, so we have a multi-party workflow.

When those conditions are true, it makes sense to use a blockchain.

I can't think of an area in financial services where those things are actually not true. So, my prediction is that this technology will really be a game changer for us.

I mentioned at the beginning that, you know, I've spent over 22 years working in operations and technology systems that precisely -- this block chain

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will disintermediate, arguably, jobs that it will remove. I've done those jobs.

But I've never quite seen what I've seen happening since I've latched onto blockchain in terms of that cooperation across business to business, supplier to customer, bank to bank.

It's really quite something astonishing and new, and you know, we have to believe that there's huge value there, and whether the adoption on a grand scale takes, you know, 5 years or 5 to 10 years, it's coming,

and we're very big buyers of this technology, from my perspective.

MR. CHURCH: Under the predictions heading, I just want to go back to the previous point around permissioned and permission-less. I don't see anytime soon that financial services will be using the permission-less or the private versus the public.

I think there's a stack of reasons, but I think, yes, in the fullness of time, lots of things are possible. In the short- to medium-term, financial services will use permissioned networks, would be one prediction.

I'd absolutely echo Grainne's points about this is a game changer. This definitely is not a question of if this is going to happen, it's not a question of where

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it's going to happen. It's a question -- this is already happening. It is already happening in places. Don't be fooled.

In fact, if you're not engaged in it, you really should be, because what we're learning is that the people that roll up their sleeves and get involved with this stuff are recognizing all the benefits that you've heard on this panel -- reconciliation, cost savings, transparency, etcetera, etcetera.

One thing that hasn't been mentioned which I think is a prediction, a little bit like the analogy back to the internet -- when you first started using the internet, you were sucking down information. That was primarily what you were doing, and a bit of email.

But then people started to build businesses, revenue-generating businesses. All the benefits that you hear right now are about cost saving -- cost saving, transparency, increased security -- but you will see a point where the -- where people will start to focus on revenue-generating services, and some of the people we are working with are already doing that, and there will be advantages to those.

That's definitely coming. There's definitely coming a revenue side of this equation.

The other prediction is -- disintermediation --

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don't think it's going to happen to some of the organizations -- don't see it anytime soon, for the reasons that we've mentioned.

The other prediction which we haven't touched upon would be we started off, I think, as is often the case on these types of discussions or panels, by grounding the audience in, oh, there's this Bitcoin thing, because that's how most people started to hear about Bitcoin, and then people have worked out that, you know what, it's that technology that powered Bitcoin that's now being used in many other areas, and not a crypto-currency.

Well, ironically, I think this panel is going to do a full circle.

Certainly my prediction is that you will see fiat-based, central bank currency that will be digitized.

Now, is it going to happen tomorrow? No, because those sorts of organizations don't move quickly, but that will happen.

Can a distributed ledger technology achieve a lot of benefits without digitizing central bank money? Absolutely. And systems are being built. Will it be more efficient? Absolutely. Will it happen? Absolutely. When? It's out there.

That's it from me.

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MS. SZCZEPANIK: Mark, we have just a couple minutes for your final thoughts.

MR. WETJEN: Well, we joked on the planning call ahead of time that my prediction was that I'd be collecting my paycheck from Chris Church probably in about 5 or 10 years. I'm not actually predicting that today.

But the one thing I was going to -- it's not so much a prediction, but we've referenced it in different ways, including when you asked the question about permission-based versus permission-less networks.

At the core of that question, I think, is the issue around governance and what type of governance structure people are going to be comfortable with, especially folks who have tremendous amounts of assets that they're managing, whether those be asset managers, whether those be custodians, whether those be a whole assortment of other intermediaries for some amount of time and during the lifecycle of a trade, for example.

And the other question related to that is, to what degree will policymakers be comfortable with non-human governance structures?

You look at this really fascinating example -- I think Gun mentioned it before, but this example with DAO or decentralized autonomous organization, the

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incident over the summer where there was a glitch in the software application that was exploited, and $50 million of crypto-currency was diverted away.

How that was resolved was, I think, fair to say, less than elegant, and I'm not sure it was really predicted in a way, and there wasn't anything clear in the governance structure of DAO as to what would happen in the case of an incident like that.

So, you can imagine -- there's been -- in the meanwhile -- I'm not terribly familiar with it, but there's this new application called the super DAO, and that application, as I understand it, is trying to address some of the same issues raised in the previous incident from the summer, and so, they're trying to drill

down more in an automated way these governance questions, but at the end of the day, our policymakers and, again, those who have funds at risk -- are they going to be totally comfortable without any kind of human governance whatsoever, and I think, as time goes on, that will be predictive in some way, too, in terms of how this all shakes out.

MS. SZCZEPANIK: Well, I want to thank the panelists today for such a great job in just laying the issues out for us and giving us a lot to think about. Thank you so much.

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(Applause.)

MR. VanGRACK: So, we're now going to take a break and be back up at 1:30 to start the next panel.

(Whereupon, at 12:19 p.m., a luncheon recess was taken.)

AFTERNOON SESSION

MR. VanGRACK: We're going to go ahead and get started.

Welcome back to the Securities & Exchange Commission's Fintech Forum.

Our next panel is here to address recent innovations in capital formation, namely crowd funding and online marketplace lending. In addressing these developments, it is important to consider what core information investors need to make informed investment decisions made on or through crowd funding and online marketplace lending platforms.

That's a lot to cover, but we have a moderator up for the task.

Sebastian Abero Gomez heads our Office of Small Business Policy within our Division of Corporation Finance, which promotes capital formation for small businesses. He also serves as a liaison to the Small Business Administration and to state securities regulators on corporate finance issues.

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Sebastian.

Mr. GOMEZ: Thank you, Ryan. I'm very excited to have such a distinguished panel today. If any of you were wondering why was it that we had seven microphones with many of them pointing down, now you know the reason for it. We are the largest panel of the day, and we have a lot to cover.

I'm very grateful of all of you taking your time to share your expertise with us.

I'm going to start with some brief introductions of our panelists, and then we'll jump right into questions, because we do have a lot to cover.

Sitting to my right is Matthew Burton. Matt is the CEO and co-founder of Orchard Platform. At Orchard, Matt and his co-founders are combining their expertise in auction dynamics and bidding behaviors, extensive

knowledge in credit risk and underwriting analytics to re-imagine the future of credit.

Before focusing on lending, Matt helped build and scale and optimize the internet's top advertising exchanges at Google, AdMeld, and LiveRail.

Next to Matt is Conor French. Conor is general counsel at Funding Circle. In that role, Conor leads U.S. legal, regulatory, and government affairs. Funding Circle helps investors lend money to small businesses

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looking for financing.

Since 2010, Funding Circle has helped 50,000 investors lend more than $3 billion to over 20,000 small businesses globally.

Conor previously served as the CEO of Indego Africa, a social enterprise and lifestyle brand that supports artisan women through economic empowerment and education. He began his career in the private sector, where he was a member of a firm's corporate department.

Conor is the founding director of the Marketplace Lending Association, a trade association created to support the responsible growth of marketplace lending and the Responsible Business Lending Coalition, a member organization dedicated to driving responsible practices in small lending which also offer the small business borrower's bill of rights.

Next to Conor is Javier Saade. Javier is managing director of Fenway Summer, a venture capital firm that invests in entrepreneurs innovating at the intersection of finance and technology.

Javier recently served as associate administrator at the Small Business Administration and ran investment and innovation programs there that invested in more than $120 billion in over 320,000 high growth companies. Prior to public service, he spent 20

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years in various investment, entrepreneurial, and operational roles.

Next to Javier is Karen Gordon Mills. Karen served in President Obama's cabinet as administrator of the U.S. Small Business Administration from 2009 until August of 2013. She is currently a senior fellow at the Harvard Business School, focusing on U.S. competitiveness, entrepreneurship, and innovation, and was previously a senior fellow at the Mossavar-Rahmani Center for Business and Government at the Harvard Kennedy School.

Karen is an expert on the impact of online lending industry and small business financing, and released in July of 2014 an article entitled "The State of Small Business Lending: Credit Access in the Recovery and How Technology May Change the Game." She's currently working on an update to her 2014 paper.

Prior to the SBA, Karen held a leadership

position in the private sector, including as a partner in several private equity firms.

Next to Karen is Ram Ahluwalia. Ram is the CEO and founder of PeerIQ. PeerIQ is the leading provider of data and analytics to the marketplace lending sector. PeerIQ is focused on improving investor confidence by offering tools to promote transparency, standardization,

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and liquidity.

Previously, Ram was the senior vice president at Bank of America and Merrill Lynch and member of the cards and deposits executive management team which was responsible for managing a $120 billion consumer and small business credit portfolio. Prior to this role, Ram was vice president at Merrill Lynch Global Bank Group.

Next to Ram is Sara Hanks. Sara is co-founder and CEO of Crowd Check. Crowd Check provides due diligence, disclosure, and compliance services for online capital formation.

Sara's prior position was general counsel of the bipartisan Congressional Oversight Panel, the overseer of the TARP program. Prior to that, Sara spent many years as a partner at Clifford Chance, and before that, she was here at the SEC, where she served as chief of the Office of International Corporate Finance.

And finally but not least, Michael Pieciak. Mike Pieciak is Commissioner of the Vermont Department of Financial Regulation. In that role, he serves as the chief regulator of Vermont's financial services sector, including the insurance, captive insurance, banking and securities industries.

Commissioner Pieciak previously served as deputy commissioner of the department's securities

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division, and prior to this service with the department, he practiced law at a New York law firm where he focused on mergers and acquisitions.

Commissioner Pieciak serves on the board of the North American Securities Administration and is a member of the National Association of Insurance Commissioners.

Thank you again, all, for joining me today.

So, Karen, I thought I would start with you and open up the panel with a general question, recognizing that there's many differences between crowd funding and marketplace lending, but I'd like to begin by getting your thoughts more generally about capital formation and how financial innovation has impacted capital formation.

Ms. MILLS: Well, thank you very much, and thanks really go to the SEC and Chair White for convening this group here today and allowing us to focus at this really important time on this notion of innovation technology and how it affects this most important piece of our economy, capital formation, and particularly on this panel and in your work, I know, capital formation in

the small business sector.

Now, this is the area that I'm most interested in based on the experience I had running the U.S. Small Business Administration and starting working for President Obama those very first days in 2009 in the

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financial crisis.

So, it was quite clear at that point what the importance was of access to capital, because capital markets froze for small businesses, and most small businesses are credit-dependent. They depend on the bank structure. The bank structure froze.

Now, as we were able to unfreeze that and get SBA lending going, get some access to credit, it became apparent that there were still gaps, and I think it's important to recognize that those gaps persist today.

In 2014, we looked at the recovery and we said, in this white paper that you referenced, why can't small businesses -- are small businesses creating the kind of robust recovery, growth in the recovery that we might hope for and expect, and if so, what is preventing them, and we came to the conclusion that there was, in fact, a gap in access to credit to small business, and the gap was in small dollar loans. That's loans under 250,000, really under 150,000, and that happens to be the size of loan that 74 percent of small businesses want.

In addition, there has always been a gap in access to capital in the equity side. Seventy percent of venture capital in this country goes to three states -- California, Massachusetts, and New York -- and there are terrific small businesses in need of equity capital,

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really, all across the country.

The SBIC program that Javier ran at the SBA provided a number of ways to drive more capital into those parts of the country, but crowd funding then emerged in the JOBS Act as an other really powerful mechanism.

So, fast forward to today. We have seated here some of the great entrepreneurs who have entered the lending market and the crowd funding market to take advantage of, I think, technology and also entrepreneurial innovation to meet this gap, and it's quite an interesting moment, because although the numbers are not big yet as a percentage of the total, the interest, particularly in online lending, is greater than expected.

According to the Federal Reserve survey in the end of 2015, 20 percent of the small businesses looking for capital had gone to an online lender. So, we are seeing an explosion of activity, more on the online lending side, I think, than on the crowd funding side yet in terms of entrepreneurs entering the business, but one of the questions I think we'll spend some time on today

is what are the risks, what are the downsides, and how can we make sure that this new set of innovators actually provide the kind of capital and that small businesses

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benefit and are not taken advantage of in the process.

MR. SIRER: Sara, you've seen it from the crowd funding standpoint. Can you provide us your thoughts?

MS. HANKS: Yeah. I think one of the most important things that's happening is innovation in the type of instruments that are being sold.

With all due respect to the Small Business Administration, most loans have to fit within a certain box, and what crowd funding is able to do is try and offer different types of instrument.

One of the things that we've seen -- despite the fact that everybody's talking about equity crowd funding, some of the most interesting and important things that are happening in the crowd funding space are, in fact, varieties of debt.

So, you see these types of security that are revenue shares, which give a company the ability to start repaying when a thing happens, like they've built a new bar or they built the second muffin shop in their chain.

They don't start having to repay until the cash flow comes on, and then the cash flow is divided between the crowd funding investors and the company such that you take 10 percent off the top or 7 percent off gross.

I mean, everything is being tested as we speak, and so, you've got a flexibility and ability to innovate

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and try and work out what works that is really useful for small companies.

Now, there are probably going to be issues where investors don't quite understand what they're getting themselves into, and we can talk about that later, but that's one of the most exciting things that we're seeing, is not just the fact that companies that weren't being funded are now being funded but that they are being funded with instruments that are completely experimental and may or may not work.

MR. GOMEZ: Ram, from your side at PeerIQ, you see a lot of data.

Could you tell us about that?

MR. AHLUWALIA: Just to add a little bit more to Karen's observation that, in 2008, many banks and capital markets were frozen, I think it's worth noting that securitization is the primary financial innovation that has enabled consumers and small businesses to access the capital markets.

So, what securitization is doing is transforming illiquid credit, whether that's mortgages, auto loans, student loans, credit card debt, small business loans, into marketable securities which can then be sold into a broader base of institutional investors,

namely that are not banks, and by virtue of that process
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and the diversification of their funding sources, then in turn enables banks and non-bank originators, including marketplace lenders, to extend credit and expand credit to traditionally under-served consumers and small businesses at lower rates.

Now, one of the challenges, of course, with securitization is that that market can be challenging to access.

So, for example, in 2008, we saw institutional investors pull back from securitization because they did not have confidence in the data or in the collateral, the representations, and the warranties that are associated with securitizations.

In Q1 of 2016, we saw a widening in credit spreads and also limited issuance activity.

Now, that is a policy concern because of the $17 trillion in loans outstanding, over half of that, according to SIFMA, is funded via securitization.

So, it's in our interest to ensure the smooth functioning of the securitization market, and I think we'll talk more about the tools that are needed to encourage that, whether that's the standardization technology and other tools to promote investor confidence, later in the panel.

MR. GOMEZ: Mike, from your standpoint as a
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regulator, you have also a unique perspective, and you've seen how Fintech has evolved and the financial innovation has impacted small business capital formation.

From your standpoint as a securities regulator, how do you view that progression happening?

MR. PIECIAK: Well, thank you, Sebastian, and thank you again for allowing me to speak today.

Just to pick up one thing on what Karen mentioned earlier that I thought was really insightful, I mean the small business lending segment of the market -- I mean, that, to date, you know, putting my banking regulator hat on first, is traditionally been the least automated, the most paper-intensive, the most time-intensive segment of the -- of the sort of lending market.

So, where marketplace lending can come in and provide some automation, provide some efficiency, the small businesses that we talk to, when they say -- when they're thinking about getting funding, getting lending, their two primary questions are, when am I getting approved or am I approved and when am I getting the cash, and you know, those are sort of their primary drivers, and marketplace lending is able to sort of meet their needs and meet what they're looking for in the marketplace.
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So, I think that's one of the reasons why see sort of that, as well as securitization, as Ram mentioned, helping that segment take off.

In terms of the crowd funding space, I mean the state, since 2011, have tried to be innovators in this arena. Kansas was the first state to adopt a state-based form of crowd funding in 2011.

Right now, there are 34 states that either have state-based crowd funding implemented or are in the process of implementing it, and in trying to sort of push forward this idea of crowd funding at a local level, I think the states have been very innovative in the way that they approach it.

We see in Vermont a number of the instruments that Sara mentioned, whether it's royalty or revenue sharing or a debt instrument with some sort of kicker in the event that some sort of dramatic revenue increase happens, and that has all been great and fine and terrific, and you know, we're continue to monitor it, but I think one of the reasons why you see, even on the crowd funding side, why debt is so -- you know, debt has become sort of the primary mechanism in which a lot of the businesses are being funded, it's just -- it's easier for the investor, it's easier for the business to know sort of a defined timeframe in terms of when is this

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investment coming in and when is it due, and you don't sort of mess up your capitalization table.

So, it would be really interesting to see, sort of as crowd funding evolves, you know, what that breakdown will be between debt investment and pure equity investment or those mixed instruments that Sara mentioned.

MR. GOMEZ: Thank you, Mike.

I wanted to switch tracks just for a minute and go to you, Conor, and ask you to share with us ideas that you may have on ways to improve or facilitate the ability of industry participants to access the capital markets while still providing appropriate investor protections.

MR. FRENCH: Yeah, well, you know, in the absence of Karen Mills, I have been accustomed to quoting or citing her work several times, so I can skip past the small business credit gap statistics, which is sort of large part of why I do what I do.

You know, I think that the simple to how marketplace lending can strengthen our financial system is it provides better access to safe and affordable credit for consumers and small businesses, and second, it provides access to attractive risk-adjusted returns for investors.

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However, in the U.S., in particular, it's worth probably mentioning that there's one challenge that the

marketplace lending industry faces, and that's the relative uncertainty or regulatory burden that's associated with facilitating certain types of investments, and probably most relevant for this context, retail investment.

You know, the consequence or one consequence of this has been a reliance on institutional credit intermediaries, which has been a development that critics have been very quick to point out about our industry.

The roots of our industry were actually peer to peer, as many people know, and we think that the promise of lowering the cost of credit and increasing access to capital and providing us opportunities for investment to many different types of people would benefit from having a more efficient way of accessing retail investment.

In the U.K., you know, as Sebastian alluded to, we have 50,000 retail lenders on the platform, and that's been able to help us become the fourth largest SB lender in the U.K.

Obviously, it's a very different banking environment there, so that would be a little more challenging here in the U.S., but it is very noteworthy that we've been able to, for instance, boost the economy

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there by 2.7 billion pounds. We've been able to create 40,000 new jobs there.

You know, as this panel unfolds, we'll discuss how these different types of investments require, you know, correspondingly different types of investor protections, but you know, we're really excited, as Funding Circle and as a marketplace lending association, to have the SEC sort of refocusing on Fintech.

Folks may recall that historically the SEC was seen as the primary regulator of the peer-to-peer lending space, and while the role has been a little bit less prominent recently, we think that today is an incredibly important first step in us working together to, you know, streamline effective retail investment in a way that also observes important customer guardrails.

MR. GOMEZ: Matt, I want to go to you with a similar question, because you're also in the marketplace lending area, but you see it from a slightly different perspective than Conor. So, could you share with us ideas you may have as to ways we could facilitate this capital formation for small businesses while still maintaining investor protections?

MR. BURTON: Yeah, of course, and I also want to echo my fellow panelists that I applaud the SEC for putting on this event. I think it's a big step forward,

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and I think that the demand that Karen mentioned on the borrower side is really why we're all up here today.

This is the driving force, is that small businesses really need access to better products that

suit their needs, and so, it's really up to this industry to put the necessary infrastructure and ecosystem together to facilitate that in a really productive way.

And to go off Conor's point earlier, I think one of the things that's been very difficult -- as more of an infrastructure provider, at Orchard, we're not a lender, nor are we an institutional investor.

We provide a lot of the technology that sits on both sides, and it has been difficult to understand where the industry is going, because there hasn't been clear communication from a regulatory standpoint to which agency is going to oversee this, and so, I think, in the future, being able to work more closely with agencies like the SEC is going to be an important step forward for us to figure out what are the good ground rules to make this industry grow in the right way, because I strongly believe it's going to be 10X the size in less than 5 years from now, and so, we really have to put the best practices in place now or we'll have to deal with the consequences later.

MR. GOMEZ: Javier, from your standpoint, you

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have a very unique perspective, being formerly at the SBA and now looking at it from the standpoint of both an investor and also seeing companies that need that capital. So, from your standpoint, what are ideas to facilitate that capital formation while maintaining the investor protections?

MR. SAADE: Well, thank you for the question, and usually when I quote stuff from the SBA, I take all the credit, but most of the stuff I used to say came out of Karen's brain.

Let's step back for a second.

One of the reasons that innovation, broadly defined -- what we've seen in the last 30-40 years in almost every other single industry has lagged in financial services is because of the complexity in regulations, and that complexity exists because there's tug of war between protecting mom and pop investors or buyers of debt, or you name it, with the needs of capital formation, and those two things, while seemingly at odds, are now being put into question because of a massive confluence of events.

The cost of ones and zeros, storage or processing them, is almost nothing. The business formation in the United States, while down, is actually still the engine of our job creation.

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If you step out into the world, you have a significant number -- and by significant, I mean somewhere between 2.5 and 3 billion people -- that are under-banked or un-banked. The numbers in the United States are somewhere between 60 and 80 million, and small businesses in the United States are something like 30

million small businesses, but worldwide, there's about 300 million small businesses.

And out of all those businesses in the United States alone, less than 1 percent get any kind of equity financing, angel or venture capital, which is what I do for a living now.

On the lending side, the numbers are equally significant, and in fact, the reason why there's so much demand for these small dollar loans is because a small business today could be somebody that used Uber the is morning, gets into -- that's a solopreneur, micropreneur that needs the capital.

So, it's a long answer/non-answer to your question, because these things that are happening right now in financial services, broadly defined, ultimately will benefit consumers and ultimately will benefit small businesses, because the current -- the current infrastructure and the current system which provides for the capital formation enterprise for the players, broadly

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defined, is antiquated, slow, and broken.

So, I don't want to seem all doom and gloom. I think that it's great that it's slow and broken, because innovators, like most of the people up here, will find more interesting and more efficient ways to do it.

If you ask anybody under 40, of which I am not anymore, sadly, if they want to walk into -- and nothing wrong with banks, I love banks, but if you ask them if they want to walk into a branch to do business, the answer invariably is going to be no.

So, if, now, all of that infrastructure sits in every one of our pockets, that is amazing type of innovation waiting to happen.

So, that's my answer/non-answer.

MR. BURTON: And one other point that makes Javier's job so interesting is that a lot of times you just hear about the very large platforms, either the ones who went public, like Lending Club and On Deck, or many who have raised a lot of VC money, but there's actually hundreds of these lenders who have popped up in the U.S., and I meet two to three news ones every single week, and if you look on the international side, there's thousands of them, and really, if you drill into it, in some areas internationally, the U.S. is actually behind when it comes to digital lending or mobile-based lending.

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So, it's good to kind of think about where we are in the stage of the evolution of this industry, as well as the players who are currently participating, as well as, you know, in the future.

MR. AHLUWALIA: Just adding to the point that Matt and Javier made, it's been difficult for banks post-2008 with strict capital and liquidity charges and consumer protection obligations, as well as more

difficulty trying to develop a customer experience that is as competitive as what you see with the non-bank lending sector, and to Matt's point, this is a global, secular trend that will be intact for the foreseeable future.

So, if you look at non-bank lending, that growth rate across every single credit asset class is in the double digits.

There was an article published in the journal two weeks ago that talked about over half of mortgages are now funded via non-banks.

So, then going back to the earlier challenge of capital formation, non-banks do not have access to cheap, sticky deposit financing. Therefore, they are tapping securitization markets which offer permanent capital at low cost and at scale.

However, the transmission mechanism

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underpinning securitization can be very fickle, and so, we need to spend more time discussing what it takes to improve the robustness of that transmission mechanism through standardization of data, through transparency in the collateral pool, as well as improving liquidity and securitization markets.

So, dealer inventory desks are also very low because of capital and liquidity charges, and the limited ability to find liquidity may itself create challenges in providing orderly markets during periods of distress.

MR. GOMEZ: So, Ram, you alluded to information, and I wanted to take a step now and jump more in-depth into marketplace lending for a minute and talk specifically about information, and what information do investors need, whether institutional or retail investors, in order to be able to make an investment decision in the marketplace lending arena.

Javier, I thought I would start with you to provide us your standpoint as an investor who look at investing in businesses. What type of information are you looking for?

MR. SAADE: So, I mean, investing in paper that is -- which has as underlying securities or loans is different than what I do for a living, which is

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essentially making bets on young companies and young entrepreneurs that don't necessarily have yet a track record or have a great idea with no profits yet.

So, I don't think that the information needs to either buy some of the paper that is produced by marketplace lenders or a crowd funding platform, regardless of the instrument or vehicle being used to provide capital to small businesses, is different than what's required today from normal -- more traditional players, incumbents.

The difference is that there is a cost disadvantage. There is -- because of the sticky deposits and because of the fact that you have to resort to securitization, you're never going to have the cost advantages of incumbents.

So, that's leading towards a equally good but different ways of underwriting credit that are not necessarily FICO scores, that are not necessarily Morningstar or S&P ratings on a stock. There are different ways of actually arriving at a risk rating for a particular instrument or vehicle.

But in terms of the information that an investor would need to make the investment, shouldn't be that different from that which is used in current, more traditional instruments.

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MR. FRENCH: There's certainly a number of things that would be helpful to know in evaluating, but just to pick out a couple kind of major buckets, I think the biggest one is sort of loan level disclosure or having some degree of simplicity so you're avoiding, you know, the opaque pools of loans that were more prominent in the recent financial crisis.

I think, ideally, that we would move towards a standardization in the way that that loan level disclosure is done so that investors really understand what they're purchasing into, whether it's a portfolio or an individual asset.

I think the second major bucket is in making sure that there's fair allocation mechanisms or at least that the investor understands how the vehicle that it's participating in is going to acquire assets.

You know, we want to make sure that we're avoiding adverse selection, or if someone is okay with that and willing to pay a premium, that they understanding that they are getting adversely selected assets, but making sure that you have both robust governance around the allocation but that it's communicated effectively.

I think the last one is ensuring that there's adequate disclosure around what would happen in the event

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of a bankruptcy or with business continuity, because you know, the irresponsible marketplace lender would put in place, you know, plans that would be able to link the investor to the assets, you know, through a backup servicer or other sort of orderly wind down plan, and I think that's really critical, again, to making sure the investor feels protected or at least understands the level of risk that they're taking.

MR. GOMEZ: Karen, I see you nodding, and I guess the question for you is, if you agree with the data that you think an investor needs, do you think that information is readily available right now?

MS. MILLS: Well, the problem with small business loan syndication is that, unless you have a government guarantee in which you're just buying government paper, you're really buying this underlying risk around those individual small businesses, and they're very heterogeneous. You know, it's really hard to assess risk in this set of pools with the current kinds of data and analytics that we have.

So, I think it's not impossible, but we have some work to do to figure out how to speak to investors about this kind of risk, the ability to repay. Is this the only loan? What is the priority of this loan?

So, I think if we are to go forward and have

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the securitization of this kind of assets, which is going to be critical to having more fluid pools of capital come into this market, that we're going to have to become smarter about the data that we have and what it says, and we're going to have to live through some downturns, because things that looked absolutely great in 2005-2006, those pools of loans which were FICO-scored at the time looked really pretty dismal in 2009 and 2010.

So, this is not impossible.

I was nodding about a point Conor raised, though, which is, having had the experience with the mortgage pools, it is absolutely critical that we've got loan-level understanding of what happens in a failure context for an institution, one of the players in this marketplace, whether it's the lender or whether, somewhere down the line in the securitization, this loan, you know, needs to get back to the original -- the person who -- the small business needs to know who holds their paper, and we know what happened in the mortgage market. That was a horrible thing for a homeowner. Well, imagine this happening to an underlying segment of our economy, like small business owners. It could be disastrous. So, these are critical pieces of what needs to happen as these instruments are created.

MR. AHLUWALIA: Just to add a couple of ideas

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here, so the trend over the last several years has been a shift towards private securitizations or Rule 144-A securitizations.

So, in the marketplace lending sector, all of the securitizations are private securitizations, as opposed to publicly registered securitizations which are attached to higher disclosure requirements, including subject to Reg AB and Reg AB-2, which provides for loan-level transparency, and what's interesting is, when you talk to issuers and investors in the market, they do want more data.

However, the higher relative cost of publicly registered securitizations has shifted issuance to the private securitization market where there is a paucity of

data and a lack of standardization.

The loan level data is necessary for investors to develop a view on the risk. You have hundreds of thousands of small dollar loans across the United States, and the number one question an investor needs to have before they purchase securitization is what are the expected cumulative losses on the collateral pool, and then number two is what's the correlation of those losses?

So, to analyze correlation, you need to have the loan-level data.

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And then, related to Karen's point, ensuring that there is a clean chain of title on the set of transactions governing a loan, from origination to financing to its packaging into the ABS market, to its ultimate owner, would also substantially improve investor confidence.

MR. BURTON: One other piece that I don't think is talked about enough is that because these pools of data are so fragmented, no one has been able to really stitch them up to provide a comprehensive market data level view.

If you ask somebody how much kind of outstanding marketplace lending small business loans there are, if you ask five people, you get five completely different answers, and so, that is kind of a big step for the industry to take forward, to have our version of kind of Bloomberg where you can log in and see the aggregates. How big is the lending that's going to small business from these non-bank players? How fast is it growing? What are the charge-off rates? Being able to drill down into segments and really understanding what's going on needs to be widely available not only for industry participants but also for regulators, as well.

MS. MILLS: I want to jump in on that point, because one of the things that is missing in the small

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business lending market is any data on loan originations, and this is really unconscionable.

In order -- if you go to other countries and you say, you know, in the U.S., we actually have no idea what the gross level of loan origination is, not just in this new market but for all of our banks -- we don't know what we're lending in the small business market.

We know what assets are on the banks' balance sheets of loans less than a million dollars. That's our proxy.

So, if you say, well, how is access to credit for small business, is it getting better or worse, what's happening in this new market, what share is it taking, we don't have that data.

Now, in Dodd-Frank, in section 1071, we did put in a provision that requires pulling that data together,

and the CFPB, after five years, has said they will do this.

So, remains to be seen how we are going to collect originations, but at this moment where we've got new participants in the industry who are eager to start having some kind of reporting and you have banks who have the ability -- they collect this data anyway.

So, this is not data that they would need to collect otherwise.

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This seems to be a really important first step, which is just let's have some transparency upon the basic level of data on loan originations to small business, and as we know, transparency in data collection sometimes leads to being able to highlight other areas where the industry can move together and can even avoid regulation, because having the transparency just creates the good acting in the environment.

MR. GOMEZ: Conor, at Funding Circle, you have different type of investors in the U.K. versus the United States.

When it comes to the question with respect to data and what information investors need, is there a difference between retail versus institutional investors when they are looking to invest?

MR. FRENCH: You know, I think it probably depends a little bit on the structure by which, you know, you're soliciting retail investment.

You know, certainly, there are metrics that we put out on a loan-level basis. If you're investing in a certain asset, you're going to want to see that.

Our sort of philosophy around this is we want to put as much information as possible out there. The limitations or restrictions, from our perspective, are more often to do with requirements of the credit bureaus

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or things that are protecting the privacy of a borrower or a guarantor, and so, if there's any sort of information missing in that respect, that's generally why it's the case.

I also think that we could -- there are ways in which the government could help us have access to more information quicker about these borrowers, which would allow better access to capital, as well as the ability to have standardized information, and that would be by releasing small business tax returns through an API, which we understand is possible and is something that the government has been considering.

MR. GOMEZ: I wanted to switch tracks a little bit towards crowd funding.

As of October 31st, fewer than six months since the regulation crowd funding rules into effect, we had seen almost 140 companies seeking to use regulation crowd funding. Just last month, also, the Commission finalized

rules to modernize the framework by which intrastate crowd funding offerings take place.

Sara, I wanted to start with you and ask you, from your vantage point, what are the biggest challenges for investors, issuers, and intermediaries in the crowd funding area now that these rules are live?

MS. HANKS: Well, thinking first about the

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challenges for the investors, one of the things that has been a constant as we've gone through this four-year development of getting the rules ready, people are like does everyone understand the risk? Do people really realize that they can lose their entire investment?

And from that point of view, I would say the cover page of the offering document says you could lose all of your money. The bottom legend on every intermediary says you could lose all of your money.

When you click through to say, yes, I would like to invest some money, there's a little popup that goes, did you realize you could all your money?

I think that investors have kind of got that message now, but the areas that are challenges sort of tie into the thing that I mentioned earlier, which is a good thing.

There's a huge amount of innovation in the types of instruments that are being sold. I'm not sure yet that everybody has the tools to be able to look at company X who is doing this revenue bond and company Y who is doing this one, on different platforms, possibly using slightly different documentation.

There's a wide range of different types of investments that can be made. I am not convinced yet that investors have completely understood this, because

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some of them are fairly complex.

We're seeing, for example, the use of SAFEs and KISSes and all of that sort of, you know, convertible note-like instruments or the instruments that are being used in Silicon Valley. Sometimes they're being used for muffin shops, and muffin shops are never going to do an IPO, in general.

MR. GOMEZ: Sara, could you, for the benefit of several of us and the audience, could you explain a little bit what you mean by some of those instruments?

MS. HANKS: Okay. So, SAFEs are simple agreement for future equity, and KISSes are Keep It Simple Security, and I think there's sort of variations on all of those.

Some of them are structured such that it is merely a contract. It's not actually a security, as such.

But the agreement is, when you do a future financing, company, so like when you come to sell preferred stock, you agree that you will sell these early

-- you will sell something similar at a discount to the guys who gave you money in the early stages, the crowd funding guys, the crowd funding investors, and sometimes those are just a little bit too complex for either the company to understand what it's selling or for the

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investors to understand what they're buying. So, you have to be very careful in using them.

On the other hand, as I said, you've got -- you do not want to limit the type of innovations that are happening here, because we're developing new instruments and we will eventually reach some standardization, but in the meantime, I think the area from the point of the view of the investor is they really do have to understand, do you know what you're investing in, and do you realize what the risks of it are, and do you realize that, in certain circumstances, even if the company doesn't go bust, you don't lose all your money because the company went bust, you lost all of your money because the company never went on to do the qualified equity financing that triggers the other rights.

So, that's kind of important for people to understand.

I would say the other things that investors have a challenge understanding is the nature of dilution. Under what circumstances do they have a bigger piece of -- a smaller piece of a bigger pie?

The challenge in understanding what it means to have a minority position in a company and the circumstances in which other -- say you've got common shares. What can the preferred holders do to you? And I

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think those -- that's one area, when we look at the disclosure that's made already, it's one of the areas where lack of compliance across the board is most obvious.

People are not describing the various types of securities a company has and how they all play off each other.

And then the biggest thing in investors understanding what they're getting into is when you look at the valuations of some of the companies that have been raising funds -- I'm using the word "whimsical," because it's the best -- it's made up of thin air.

This is what we wish the company was worth. We have this brilliant idea. We think it must be worth a couple of million of dollars. So, there is a lack of discipline there.

One of the areas where we see some discipline being imposed is the intermediaries themselves. Sometimes the intermediaries are like that's just ridiculous, we're not going to let you list with that, because it's fraudulent, don't do it.

So, those are the challenges for the investors.

Looking at the challenges for the issuers, we've taken a level of regulatory complexity that maybe the company wouldn't have encountered until such time as

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it did an IPO, and we've moved it very early into the company's lifecycle, and so, we are now taking companies, basically two guys in a garage, and saying, all right, give us -- explain to us who your beneficial shareholders are, and they're like beneficial what? What's beneficial?

Or tell us how many shares you have authorized and how many shares you have issued. We had this conversation with two companies last week. And they're like what's the difference between those?

And so, all of those are fairly normal questions for a couple of guys in a garage to ask, but you've got to get them right when you're selling to strangers on the internet.

So, that is a challenge for the companies.

From the point of view of the -- there's another issue I would like to raise that sort of ties into this morning's panel on the company side, which is we are seeing a lot of companies who are not quite sure what their cap table is, not the fact that their cap table is messy, but they're not even sure who is on it.

Some of the companies doing regulation crowd funding offerings -- they're raising funds from 3,000. One of my clients has 3,300 shareholders. They are thrilled to have those 3,300. They are planning to go on

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to do a Reg A offering and get even more shareholders.

The challenge when you've got something like that is having a way of keeping track of them all, because you know that if you're not getting enough information about who the shareholders are, some of them are going to die, some of them are going to forget, and you're going to have, in the end, maybe 500 shareholders when you come to do your IPO or your M&A transaction that you just can't find, and maybe blockchain can help with some of that, although we're also seeing some very innovative stock transfer agents who are purely online and who are able to cope with these very large numbers of shareholders. So, that is a challenge for the issuers.

For the intermediaries, I think the most important thing is recognizing that Fintech is tech and fin, and the fin bit is really very regulated, and sometimes we have discussions with folks who come from the technology side whose attitude is, well, your rules are just stupid, so we're going to ignore them, and we understand that -- the slogan, you know, move fast and break things, but when the things you are breaking are the securities laws, this gets kind of important. And so, I think keeping technology guys, the guys in the hoodies, focused on, yeah, we know those are stupid

rules, but seriously, you do have to comply with them --
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that's probably one of the biggest challenges we're facing right now.

MR. GOMEZ: Mike, Sara described, I think, the challenges that you probably hear on a daily basis as you hear both directly from constituents who are small businesses that need the capital and you are also hearing from investors who invested in a company and they have questions as to what their investment means or how they can sell it or what they can do with it. So, from your standpoint as a regulator in Vermont, how do you see the companies and the investors threading that appropriate balance between capital formation and investor protection when it comes to crowd funding, intrastate crowd funding or federal crowd funding?

MR. PIECIAK: It's a great question, Sebastian, and just to echo a little bit of what Sara mentioned, you know, from an investor perspective, I mean, you know, the traditional things that you worry about like fraud risk or, you know, business risk, the fact that these are traditionally businesses that don't have a lot of operating history, businesses that are startups, that are new, that have more propensity to fail than a more established business -- so, from, you know, fraud risk, less so, to more of a general business risk, those are some of the things you really get thinking about as a
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regulator, but I think, as Sara pointed out, oftentimes those are disclosed in as most a prominent way as you possibly can, and those types of risks are well-known.

I mean, we also get concerned about liquidity risk. I mean, there's no real way right now, state base level or federal crowd funding, to efficiently sort of, you know, get out and get your money back, and we sort of make sure that our businesses that are registering in Vermont make that point as clear to an investor, because just because the investor might get his money back in 10 years, he might need it in 2 years, and that's not very good for him or her. So, I think that liquidity risk is also important.

On the investor side -- sorry -- on the business side, on the issuer side, when we meet with small businesses, I mean, one of the things that we tell them is, you know, it's a very costly process, and I don't mean just cost in terms of money, I mean cost in terms of your time.

So, when you're a small business owner or a startup entrepreneur trying to put all your blood, sweat, and tears into your business, all of a sudden you have to break away and put together a prospectus or put together an offering memorandum, think about how you're going to strategically raise the money if it's a state-based, you
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know, crowd funding program, how you're going to go out and pound the pavement, how are you going to get the investment, how are you going to advertise your investment, how are you going to get interest in it, and then even once you are successful, how do you manage that, to Sara's point?

I mean, most companies that have 3,300 shareholders probably have someone in charge of investor relations, and when you're a small startup company, you know, that's the least thing on your mind. I mean, you're just trying to meet your payroll every whatever period.

So, you know, I think that shareholder management, both in terms of knowing who your shareholders are and then also disseminating information about your business -- I mean, those shareholders are going to want information.

If you don't have a formalized communication method, they're going to call you, email you. They'll probably do that anyway. But you know, I think that's something that businesses don't often think about when jumping in.

And then the last point, which is, you know, a point that Sara brought up with the capitalization table -- so, what do you do when you have, you know, hundreds

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of investors on your -- you know, on your capitalization table, and all of a sudden, it's time to get the next round of financing and, you know, the angel investors don't like that there's 200 investors or -- you know, there's ways of working around that and providing mechanisms up front to deal with those issues, but if the investors -- if the issuers aren't sophisticated at the beginning, you know, they might not do that forward thinking.

So, you know, to answer Sebastian's point, I mean I think the needle is very sort of -- it's a very delicate balance between getting the right disclosure, getting the right education out to investors, but also educating the small business owners that are contemplating bringing in outside money, as well.

MR. GOMEZ: I wanted to go back to the marketplace lending area, and specifically, Ram, I wanted to start with you.

There's a large focus on the use of algorithms and other proprietary ways of evaluating borrowers, and we've heard arguments on both sides as to whether the existence of those models provides adequate disclosure to the investors. I wanted to get your thoughts on that question.

MR. AHLUWALIA: So, the algorithm is used at,

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really, a couple of different points in the process.

So, the originators will use advanced

underwriting techniques incorporating machine learning and alternative sources of data to improve their credit risk decisioning. That's one step. I think that enables people to extend credit at a lower operating expense base than a traditional lender that may have to rely on judgmental decisioning and have a higher cost associated with that.

The second is institutional investors may use algorithms to select loans from particular platforms. I think Conor brought up this point earlier. In the act of that process, they may have a unique advantage and ability to do so or they may not, and they may be adversely selected by other competitors that have the ability to do so.

I think, in general, as long as you have disclosure around the rules of how that market works, I think -- and investors understand that -- then I think that's an appropriate minimum requirement.

Overall, though, I would add that we see the market moving from active loan picking to passive vertical slice purchasing, which makes sense, because if you're a large institutional investor and you want to put billions or tens of billions of dollars of capital to

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work, you want to not compete against a nimble, fleet-footed small asset manager that has access to some proprietary algorithm.

So, I think the question around the algorithms are really -- are increasingly less relevant for the institutional investor market.

MR. GOMEZ: Matt, I think you wanted to chime in.

MR. BURTON: I think the most important piece of it, which Conor mentioned earlier -- and I think, as the industry evolves, we need to make sure that the right safeguards are put in place, which is the ability to understand how the loans were allocated after they originated, meaning if Funding Circle has five different buyers and one is a bank participation vehicle, one might be a pool that would be securitized, another for retail, and another for whole loan buyers, that the rules that exist on how the loans are being divvied up are actually known to the participants who are buying and can be verified over time, because I think that's what creates a lot of deep trust.

It's one of the areas that we've been focusing a ton on, because we think that that's a place where having an independent third party kind of verify the logic that goes into allocation is one in which we can

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build a system that scales without any of the potential issues that could come up with adverse selection.

MR. FRENCH: I just wanted to tie it to actually something that Sara mentioned, which is, you

know, I think one of the great risks, you know, potential risks to investors is the platform that's all tech and no fin, and you have, you know -- this is another example.

You can have the world's best machine learning, but if you don't have data, I'm not sure how you're going to effectively price risk.

So, in order to responsibly facilitate investments in a loan product, you really need to have sort of robust internal controls like risk model governance. You need regulatory compliance systems. You need a sort of proven track record, I think, that would allow someone to evaluate to minimize some of those risks. Otherwise, whether or not the algorithm works or not may not particularly be relevant.

MR. GOMEZ: Javier, from your standpoint as someone who actually invests in marketplace lending from the venture capital side, for an institutional investor, does it make a difference whether you have an algorithm or some other proprietary way of evaluating the loans and the borrowers?

MR. SAADE: I mean, I think I'm going to echo

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what everybody here is saying that an algorithm is a fancy way of saying a decisioning system. That, to me, is the price of admission.

The question is around the value chain, and what's being -- I hate to use the word "disrupted," but let's call it disrupted, is actually the entire value chain, and there are inflection points and weaknesses across the value chain, from originating it to offloading it, in London, Hong Kong, and New York.

So, it used to be part of the secret sauce in the beginning, because of where we were in the cycle, but now it's sort of the price of admission.

So, I would say it's not something we would lead with, no.

MR. GOMEZ: Karen, a slightly different question, switching tracks a little bit.

From the standpoint of the small business itself, that it's considering marketplace lending as a way to get capital, what are the considerations for those issuers, and does it matter whether the ultimate purchaser is a retail investor or an institution?

MS. MILLS: Well, from the small business' point of view, you can actually see what it is that they're responding to, if you look at this recent Fed survey. They absolutely love the fact that the process

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is quicker and easier. So, what they hate about going to their bank and their -- whether it's a community bank or a large bank -- is that banking hasn't really changed in the last 50 or 100 years.

You know, you Xerox all of your paperwork. You walk down to the bank. You know, you give them this, and

then you wait weeks or months, and you get a yes or maybe a no.

More than half of potential borrowers don't get the full amount funded, and the smaller you are, the less likely it is that you'll get the full amount of the funding.

So, to be able to go online, to be able to automatically allow access to other kinds of information which, you know, might, with an API, be your tax returns, but now it's also your bank statements, your credit card statements, a whole variety of things by different technology players have made this quite easy, and then you can get funding in your bank account in minutes, hours, days at the most.

So, they absolutely love that.

What do they hate on that survey? They hate the price. It's too expensive. And the reason it's too expensive is that, at this moment, the access to capital by some of the new players is expensive, and it's because

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these investment vehicles haven't been perfected. They don't have access to the low-cost deposits.

But we are at a inflection point in the evolution of this marketplace. We are at the end of phase one, which I called the wild, wild west, and we're into phase two, which is really all about partners, partnerships.

Last week, I was with the small business banking consortium, got together, and we asked the room to raise their hands if they were considering partnerships with an online lender, and more than half of the bankers in the room raised their hands.

So, why? Why would these groups be getting together?

In phase one, the online lenders were going to take over and produce 70 percent of the new loans. Now I think the conventional wisdom is that the partnerships are going to be the next vehicle, because it's very hard to find a small business ready to borrow.

Finding customers, customer acquisition is extremely expensive. That also has gone into this expensive pricing.

So, if you have a bank, a bank has low-cost deposits and a bank has customers. A bank does not have this new customer-facing technology that the small

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business wants.

So, there are a whole series of ways a bank can partner. They can just refer their declines. They can refer people to an online lender. They can borrow or buy or license an online application. They can white-label the whole thing, which is what you saw JPMorgan do with On Deck, and all of those are in play, and eventually they can buy an online lender.

The overriding thing on their mind as they make these decisions are about regulatory compliance, because the online lenders, to date, have slipped through the cracks in terms of regulatory oversight, and banks have to comply.

If you do any kind of partnership, you're subject to a whole series of third-party vendor rules which require that basically the new lenders provide this kind of regulatory infrastructure, and I think everybody has sort of finally realized it's not going to be about regulatory arbitrage and being outside the system. This is going to be part of the cost of doing business, and I think that's where the industry is evolving.

MR. FRENCH: Just to add there, not all of us slipped through the cracks. I'm book-ended by two of my regulators just on this panel.

But no, just to add to what Karen is saying, I

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think, you know, what we've seen is, you know, a decline in the -- there are half as many banks now as there were 30 years ago.

The vanishing banks tend to be the community banks that were -- sort of did these smaller dollar loans. The CDFIs are not filling that gap.

So, where we are -- and again, these are the smaller dollar loans -- we lend up to 500K, but the average loan size is about 135,000 dollars -- is actually not necessarily in competition.

I'm not sure banks are trying to take that market or feel threatened, and so, there is a lot of opportunity for collaboration.

I also think that what we're trying to do is not new. These are advantages and resources that all big business in America has always had, and we're just trying to level the playing field and bring those non-bank alternative -- capital alternatives to small businesses.

So, you know, I feel like we are moving in a good direction, and I'm also glad we're beyond the wild west.

MR. GOMEZ: Ram and then Matt.

MR. AHLUWALIA: Sure. Just to add to that, so you know, we live in a negative real rate world. There was a study published recently that showed that banks

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globally and also here in the U.S. are struggling to earn their cost of capital, and banks that do fund marketplace lending loans or partner with non-banks can achieve their ROE objectives. So, I do agree with Karen's point that you will see banks that will work with marketplace lenders as a utility to achieve their portfolio duration and return objectives to round out their portfolio.

MR. BURTON: Just to continue some of Karen's thoughts, I agree that we're in phase two. You saw kind of the clash of the new upstarts and the traditionals

over the past kind of five to seven years, and now we're moving into a new stage, which is really about maturity.

Where I'm watching the closest is actually in the personal finance management tool set, which we have no representation up here, but I think that credit decisioning is going to become a lot smarter and proactive.

You're seeing now easy tools that can -- you saw the robo-advisors earlier -- that can now pull all your financial information together and allow for lenders to proactively push you products the time that makes sense for your business at that moment, and I think that that's really where the battle is going to be fought over the next 5 to 10 years, is not on the traditional side where you walk into a bank branch and fill out a bunch of

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paperwork but actually having apps on your phone that are smart and able to push you opportunities to improve your financial life, whether you're a consumer or a small business.

MR. SAADE: I want to react to something in this really interesting discussion.

We're seeing -- we get a lot of deal flow with young companies. We're seeing a lot of innovation in insurance, which has very similar kind of construct as lending in terms of underwriting risk, pricing a product, for consumers and small businesses.

Small businesses -- the small business insurance marketplace is extremely broken and it's a significant -- you know, it's into the hundreds of billions of dollars.

I think there's some analogies here, something that -- to kind of thread the needle here -- to what we saw with the biotech industry, let's call it between the early '80s and the early '90s, where it was pharmaceutical and chemical-based, you know, life sciences businesses are going to be upended by biological-based businesses, and it was all this race to disruption, disruption, disruption.

And what ended up happening, if you fast forward 30 years -- and I think there's a lot of

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analogies -- and financial services is very -- sometimes hard to look outside, just because financial services is the second-largest sector of the economy, but there's a lot of analogies as to what happened in the life sciences industry where biotech -- and I know biotechs are actually one of the most active IPO sub-industries that you deal with -- is that there is a lot of coopetition, which is kind of what the -- the one word that describes what's happened here in phase two.

I don't know if it's the wild, wild west. Now it's the wild, wild X.

But there's a level of -- the big players, like

in the case of the life sciences industry, is you're -- pharmaceutical company, and an upstart trying to cure cancer. So, they don't have all the resources and the costs of capital, and they end up making partnerships with these very large companies for all kinds of reasons.

So, I do agree that not only in lending and in all aspects of capital formation, but I think you're seeing that across the field.

The other area that I think is interesting is reg tech, and that's kind of a hot buzz word right now, and reg tech is essentially -- it's ones and zeros -- decisioning on ones and zeros, and when you ask a very large bank how are they doing with compliance, the way

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they answer is, well, we just added 1,000 people, which is sort of typically -- if you hear -- if you hear that in any other industry, that's sort of antithetical based on all the tools that exist.

So, I think there's a lot of opportunity, also, when it comes to complying with regulations, because I agree with Karen. Regulatory arbitrage is not a business model. But figuring out how to maneuver and understand where business is going -- it's critical, and technology is going to be critical to that.

MR. GOMEZ: Sara, let's think about that issuer that decided not to seek a loan through marketplace lending but decided to try to get financing through an equity securities-based crowd funding. What are the considerations that that issuer should keep in mind before it jumps into crowd funding?

MS. HANKS: A really good starting point would actually be incorporated or organized. As an issuer, we have seen this, and to know what it is they're planning to sell.

And to go back to one of the things I said earlier, these are very small companies. They don't necessarily know -- they don't know corporate law. They don't know securities law.

Sometimes the platforms are not guiding them as

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much, and so we see LLCs trying to sell common stock, which is kind of not going to work, and that sort of thing.

So, you know, first make sure that you are organized in the state. Make sure you are in good standing in that state. Make sure that whatever it is your selling is permitted to be sold by you, both in terms of corporate law and in terms of your own internal corporate governance.

Then you get to the stuff about going through the disclosures.

The disclosures are -- at first everybody was saying, oh my god, this is terrible, this is far too much disclosure. It's not causing a lot of companies as much

grief as you'd think it would be.
The areas where we do see problems are proper disclosure of what the risks are. You don't need 30 pages, but you do need more than 2 bullet points with 1 sentence each, and you do need what I talked about earlier, which is knowing what classes of security you already have and how those impact whatever it is that you're selling.
Working out all of those things does enter into the type of intermediary that you choose, which of the platforms, and there are several really reputable ones

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doing great business.
Do you go with one of those? Are they going to help you through the whole process? I think that's a very important thing for a company to consider, because you can't do this completely on your own. You can't do it without at least somebody who's got some legal expertise, somebody who's got some accounting expertise.
And on the accounting issue, we've seen some horrendous thing happen with accounting. There was one I dealt with just last week where the accountant had issued a review report. They got the name of the company wrong in three separate places, three separate names, and I'm so used to accountants getting really mad at you because of commas in the wrong place, but here there's a lot of low-cost accounting going on.
They even got the date of the financial statements wrong. So, the review report referred to a date at which the company hadn't even existed.
So, you kind of have to have your professionals or your support system somewhere. Either you can get that kind of support through the platform or you can get it through established professionals, but there's a lot of shoddy professionals out there, which is really sad.
MR. SIRER: Sara, in many ways we've always -- I personally always looked at crowd funding as an area in

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which the intermediary would be the gatekeeper, the adult in the room, the entity that it's regulated.
So, how much of the challenge that you describe are things that an intermediary should consider, just taking it upon themselves to act as the gatekeeper, the adult in the room, when they're dealing with unsophisticated issuers?
MS. HANKS: They absolutely have to be. They have to explain to the issuer just how important it is. To go back to what I said, you're selling securities to strangers over the internet, and that's only a good idea if you know exactly what you're doing and you're not making any misleading statements.
So, the role of the intermediaries is crucial, and we're seeing a very wide range.
I mean, we're seeing some intermediaries who

are absolutely on the spot, making sure that the company is not making misleading statements, making sure that the company goes through a rigorous diligence process, and at the other end, we're seeing some platforms, one of which we talked about earlier, no longer exists -- well done -- which was not doing that at all, and I think it's necessary to keep an eye on the intermediaries to make sure that they know what they're doing and that they're doing it.

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MR. GOMEZ: Mike, thinking about what the biggest obstacle for growth or more widespread usage of crowd funding, both at the federal level or at the state level, could you walk us through what, in your mind, may be some of the biggest obstacles for growth there?

MR. PIECIAK: I'm happy to. I'll start at the state level, because I think there are some specific issues there.

I mean, of the 34 states that have adopted crowd funding, 33 of them have utilized Rule 147, and as you may or may not be familiar with, Rule 147 basically says when you're acting as a state within the four corners of your state, you know, you're exempt from SEC registration under certain conditions, and then you only have to deal with your state regulator.

So, those certain conditions that were involved in Rule 147 previously were that the offer and sale had to be within the boundaries of the state, so the offer component of it meant that it was difficult to use the internet or use social media or otherwise get the word out about your offering, your crowd funding offering, which is intended to incite a crowd to sort of come to it and raise money.

Other, you know, issues that were of less significance but still significant were the fact that 80

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percent of your revenues had to come from the state in which you're offering it, 80 percent of your assets of your assets had to be located there, and 80 percent of the revenue that you raised had to be spent in that state.

So, it also narrowed the type of companies that were applicable to Rule 147.

So, if you were an internet-based company in Burlington, Vermont, and 100 percent of your revenues came from outside of the state but all of your employees were based in Burlington, you couldn't take advantage of Rule 147, because you didn't hit all of the matrix that were required.

So, the SEC, you know, with the leadership of Sebastian and the Commissioners, I mean, recently put out final proposed rules that I think will very much help the state-based crowd funding regime. They got rid of the focus on both the offer and the sale, and now the

focus is simply on the sale.
So, if you're a Vermont resident, assuming that you're complying with the other state regulations that are in Vermont and elsewhere, you can now publicly talk about -- once the rules go effective, you can publicly talk about your offering through social media, through the internet, in ways that are compliant with state law,

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but previously it was almost impossible to use those avenues. So, that will be a very big step forward.
Additionally, this new Rule 147-A will allow -- not that you have to hit all these 80 percent tests that I talked about, but you have to hit one of them, plus you have an additional prong of having 50 percent of your employees located within the state. So, in essence, it's expanding the types of businesses that can utilize state-based crowd funding.
So, I think it's going to help tremendously. From 2011, I mentioned earlier, to now, we've had about 166 offerings across the states. Seventy-five of those offerings came within the last year.
So, there's been an up-tick in localized offerings at the state level. I think Rule 147-A will tremendously help that when it becomes effective.
The reason I think, though, you know, to -- something that goes across both federal and state crowd funding and something Sara talked about earlier as to one of the greatest impediments, I think, is investor education but not in the sense of informing investors about the risks of the investment but informing investors about the mechanics of the investment and what crowd funding means and the fact that it's even available and that you can do it, so both informing the investors and

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informing the small business owners that might want to take advantage of it.
I think there's a real knowledge gap there, which is kind of a funny concept, because if you would think of a small, you know, local person in their community wanting to invest in their local coffee shop or local business, you know, for a very long period of time, that was very difficult to do, and now it's relatively more simple to do, but people are either not comfortable doing it or familiar doing it yet.
So, that investor education component I think is important, whether it's a federal crowd funding offering or a state-based offering, to get momentum in terms of investment and completed and successful offerings.
MS. HANKS: If I could add to the investor education, I've got a great story, which is one of our clients doing a regulation CF federal crowd funding offering put some ads on Facebook, and they got responses back from people saying we know you're not allowed to

sell shares on the internet, which was great, because you know, you've got that kind of skepticism, but you do need to sort of move ahead and say, yeah, actually, here's this new thing that permits that. But I thought it was a good story, actually. People should be suspicious.

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MR. GOMEZ: As many of you have experienced interaction with the SEC staff, including staff in the Division of Corporation Finance, historically about marketplace lending, thinking about the future, how can regulators and the industry work together in this area? I'd throw it out to Karen.

MS. MILLS: Well, I'll pay the SEC a compliment, because what I've heard from many of folks in this is that you have been sort of proactively working with everyone from syndicators and investors to sort of keep an eye on this marketplace.

I think there is a -- there are a set of regulators, though, who are having -- who really have to come to the table in a much more coordinated way in order for online lending and online lending in partnership with banking to work effectively, and it is right now a spaghetti soup of regulators, even at the federal level, and that's not even to mention what's happening at the state level.

So, one of the things that we're going to propose in our upcoming white paper is a regulatory action plan that has a couple of simple steps that we might see the OCC, the Fed, the FDIC, the FTC take, and the CFPB, in order to provide some clarity, and for instance is joint guidance on third party vendor

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relationships.

There are now at least three folks with differing guidance, and it's just very difficult for the industry, the new and emerging industry, and the traditional banking industry, to move to this next phase without the regulators coming together, and I think this comes under the rubric of less regulation, certainly clarification of regulation, and it might be, in the case of a charter, a non-bank charter, the one place where small business could benefit from another regulation.

So, if we now had some kind of charter that allowed the new entrants to not have to go state by state by state, but it was appropriate and didn't, you know -- and created a level playing field, that might also be another area for innovation. The idea is to, I think, make sure that the kinds of things we've been hearing about here get to the next stage, because small business needs that access to capital to grow and create jobs.

MR. BURTON: I think one other area -- and I agree with what Karen just spoke about -- is just -- specifically because we're at the SEC right now -- is there seems to be a lot of confusion within the industry

on whether these loans originated by marketplace lenders are securities.

And when there's kind of confusion on such a

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key, crucial issue out there, it makes the conversations on building a strong ecosystem difficult to go through, because to your point, it's kind of -- it's difficult for them to know who they should be talking to and who they should be working with to put best practices in place.

And so, I'm hopeful, over the next couple of years, that that's just one of probably many issues that Conor can probably speak to more deeply on, that it would be good to get to the bottom of in order for us to move forward.

MR. FRENCH: Yeah. I mean, again, echoing both of them, I mean, while probably most of the focus today will be on investor protection, it's critical to remember the SEC's mission is far broader than that and also is for fair, orderly, and efficient markets and for facilitating capital formation.

So, in that sort of spirit of how do we -- how can the SEC fulfill its mission in that way, two things sort of jump out.

The first is what I spoke about earlier, is trying to find a way to streamline a little bit facilitating retail investment, and that is, you know, a conversation that we can have around what are the disclosures and specific risks that we should address, but I think where you have issuers with proven track

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records and a willingness to disclose, you know, how they operate and those track records, we should be able to find a solution that is able to balance investor protection.

The second is a little bit harder for the SEC to do, admittedly, but what Karen was speaking about -- and particularly about the regulatory uncertainty or the fact that we have, you know, 25 Federal agencies that are involved in consumer finance and additional state counterpart, you know, 50-plus state counterparts, is it's had a real cooling effect on the flow of capital to early-stage platforms, and that's both equity and debt capital, and so, encouraging -- whether it is in the form of a Federal non-bank charter or the ability of states to passport licenses, you know, to other states and have that be honored -- whatever form that takes, the more we can put a little bit of pressure on there to be some certainty, I think that the SEC will then be able to play a role in helping facilitate, you know, capital formation for some of these younger-stage platforms.

MR. AHLUWALIA: I would add that the SEC is aware and engaged in thoughtful dialogue with industry participants. We're now 10 years past the financial crisis. We've implemented a host of regulations governing

securitization. We're now in a position to monitor
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what's working and what's not working, and historically, what we've seen is that regulators and technology typically go hand in hand, right?

For example, the XRBL really enabled the standardization of public company financial statements. Risk metrics pioneered value at risk, Vantage score and FICO score, and these are all tools that we use to monitor and measure risk, and I think that you'll see continued collaboration between regulators and industry.

I also would add that there are a number of self-regulatory efforts to advance transparency and standardization and improve the functioning of the securitization market. I'd point to SFIG as one example of that.

MR. VanGRACK: Sebastian, I think we're close to running out of time. Do you have one final question for the panelists?

MR. GOMEZ: We do have one final question in the -- since this is the Fintech forum, I was going to ask each of you to give us, in 140 characters or less, which I will not hold you up to that, a perspective as to where are we going to both in respective areas -- crowd funding, marketplace lending -- in five years from now, if you could just very briefly, 140 characters -- I'm not counting, but if you could very briefly just tell us
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where you think we're going to be five years now, Matt, I'll start with you.

MR. BURTON: Yeah. I mean, if you look at the data today, marketplace lending represents less than 1 percent of the credit to consumers and small businesses. I think if we fast forward five years, that 1 percent is going to grow to 10 percent, like many other industries have.

So, we're going to see huge amounts of growth, continued fragmentation within the market, additional partnerships as banks move into the space, as well, or try to build their own, and it's really going to be an interesting ecosystem to watch, because I think all of that competition is really going to benefit the end consumer and small business in ways we haven't even imagined yet.

MR. FRENCH: You know, I think -- I can't help but think that the frustration with the status quo for small businesses accessing credit is only going to get worse over time, and people are going to demand solutions, and that's going to be either in the form of collaboration or cooperation between Fintech players and banks, as Karen had suggested earlier, or it is just figuring out ways to compliment one another in addressing different markets, but our small businesses simply
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deserve better.

MR. SAADE: I think we're at the top of the second inning, and in five years, we're going to be at the bottom of the fourth, so there's a hell of a lot to do. That was 139 characters.

MS. MILLS: Impressive. I talked about two stages and that we're at the end of the second phase of the marketplace. So, if the first phase was the wild west, the second phase is partnership.

Actually, the third phase, winners and losers are going to emerge, and we don't know exactly who that's going to be, but if you look at China, platforms that do a whole series of financial transactions in some kind of central place -- so, whether it's Alibaba or an Amazon -- look to be a possible winner in the winners and losers.

And then we go to phase four, which is my personal favorite, small business utopia, access to equity and debt capital at affordable rates in an efficient manner.

MR. AHLUWALIA: So, five years from now, we will likely have traversed a full credit cycle. That will lead to consolidation.

I'm not sure that the market requires hundreds of small, non-bank lenders that do not have the scale to acquire and underwrite customers and also acquire capital

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at low cost. I would expect that.

Now, the second is that we will then have, through the cycle, data which will help those originators that survive to thrive, because investors will now have a more accurate assessment of what likely cumulative loss expectations will be through the cycle.

I would also hope that we -- marketplace lending becomes more mainstream, that we refer to it more as lending in general.

You know, today there's risk premiums that investors earn for buying securitizations consisting of marketplace loans that are the same types of loans that banks originate. However, there's a new business model attached to that.

And I think, to conclude, I think strengthening the transmission mechanism linking non-banks to capital markets through discussions like we're having today would be another hope.

MS. HANKS: Standardization of investment instruments, direct involvement by venture capital funds as investors, and machine learning to flag problematic disclosures.

I think that was 140 characters.

MR. PIECIAK: Well, Karen, I was under the impression after last week that there would only be

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winning and not winning and losing, you know, in the financial service sector and others, but I think we'll

see continued collaboration between marketplace lender and traditional lending.

You know, marketplace lenders bring a huge segment of millennials with them. Traditional borrowers have their balance sheet borrowing, have a lot of ability to withstand credit cycles, have a lot of incumbency in terms of their ability to fund IT projects, their ability to navigate regulations.

I think we'll see further collaboration and hopefully get into that third and fourth phase that Karen mentioned.

And I think on the crowd funding front, similarly, you know, more of a mainstream approach from both local businesses trying to raise money within states and federal crowd funding, as well, as a more mainstream alternative to family, friends, or commercial financing.

MR. GOMEZ: Thank you, everyone, and I think we brought it to a finish only 140 seconds over our deadline. So, thank you so much. I appreciate it.

(Applause.)

MR. VanGRACK: Thank you, everyone. That was a great discussion about two areas that are helping to facilitate capital formation.

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We will meet back up at 3:15.

(Recess.)

MR. VanGRACK: When monitoring and evaluating these technologies, investor protection is and must remain a paramount concern for the Commission and all market participants, and who better to navigate that issue than the head of our Office of Compliance, Inspections, and Examinations, Marc Wyatt.

MR. WYATT: Thank you very much. We've just had the seventh inning stretch. We're going to try and bring it home in the last few innings of the day, to use the baseball analogy that Javier picked up on earlier.

Welcome to the panel on investor protection and Fintech. I'm Marc Wyatt. As mentioned, I'm the director for the Office of Compliance, Inspections, and Examinations, as we affectionately call OCIE. We're the eyes and the ears of the Commission.

We examine a variety of registrants, including investment advisor, broker/dealers, national securities exchanges, and clearing agencies. We're charged with improving compliance across these industries, preventing fraud, monitoring risk, and informing policies.

I've been with the Commission now four years after having served in the capital markets in both the buy side and the sell side.

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I would like to give a special thanks to Liz Blase and Tina Barry for their help in preparing for this panel.

I'm glad to have with me today four panelists

who bring a very different perspective on the two concepts we're featuring here, investor protection and financial technology and how they impact each other.

Let me start with Travis, to my right. Travis Schwab is the CEO of Eventus Systems, a software company that innovates in the Fintech space. His company develops solutions for firms in the capital markets industry to address a variety of issues from risks to surveillance to reconciliation.

Travis has worked in the capital markets for over 20 years and has firsthand experience in a variety of asset classes and each stage of the trading lifecycle.

As an aside, Travis is a Kansas City Royals fan.

Next to Travis is John Walsh. John is an esteemed attorney and partner at the law firm of Sutherland, Asbill & Brennan.

Before this, John served more than 20 years here at the SEC, including in the Division of Enforcement, in the Chair's office, and he actually sat in my role as the acting director for OCIE during the

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financial crisis.

In his current role, John advises companies on the topics of regulation and compliance, and he has published frequently on these subjects, including topics as big data, regulation, and regulator cyber-security enforcement.

John is an Indians fan, so he's in mourning.

Next to John is Nikhil Lele.

Nikhil joins us from Ernst & Young, where he leads their Fintech and innovation strategy practice here in the U.S.

In this role, Nikhil works closely with executive management teams of companies in the banking, capital markets, and asset management sectors, guiding them in how to utilize technology in their business.

He's armed with a technical background, having earned a degree in computer science, and suffers as a Mets fan.

Finally, we have Rick Fleming. Rick is approaching his third year as the SEC's first investor advocate. In this role, Rick is charged with the great responsibility of monitoring current policy initiatives for impact on investors, identifying problems that investors have with financial service providers and investment products, and proposing legislation or

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regulations that will benefit investors.

Before this, Rick spent 15 years as a state securities regulator in Kansas and then served as the deputy general counsel at the North American Securities Administrators Association, or the other NASAA, assisting the state securities regulators in the areas of

enforcement and corporation finance.
Rick is a Royals fan,
So, with that, let me give full disclosure. I'm an Orioles fan, and the first question I will ask is each of our panelists to define how you define Fintech and what are some of the benefits to investors from recent innovations in technologies.
Why don't we start with Travis?
MR. SCHWAB: Thank you, Marc. I really appreciate you putting me on the panel. Thank you to the SEC, as well. This is great and important, and I feel like there's been a lot of good content today so far. Hopefully we can add to that.
I would just start by saying we should stop saying Fintech. The notion of technology adopting -- or being adopted in the financial services space is a long, worn path that's happened many times before.
I think the notion of Fintech has been co-opted by, at least as of late, really focused on the idea of

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money and payments, you know, blockchain, you know, even questions the idea of what money is, but the way -- like even when we're describing ourselves to investors, potential investors, is we kind of shy away from Fintech and try to get more specific, which I think the industry is starting to do.
So, we are reg tech and there's insurance tech and I'm sure there's going to be a whole bunch of star.tech naming conventions out there to really start segmenting the market to different people in the space doing different things.
As far as benefits to this movement of innovation or different business models in the -- or the adoption of financial technologies in the capital markets, I think the last panel probably, you know, hit on one of the biggest ones, is access to capital to, you know, an underserved market, and I think that's a huge benefit that's really just starting to kind of come to fruition.
We are focused on helping businesses with their risk and compliance systems. Banks and the sell side are just starting to adopt some of these technologies, so I think there's not a lot of benefits that then translate back to the investor yet.
But with the adoption of these technologies, it

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will make the market safer, makes the market more transparent, which obviously helps protect the end investor.
So, I think we're just on the cusp of this and there's a lot of work to do, but there is an opportunity here that all of the technologies that, you know, are being looked at and adopted or potentially adopted by the capital markets are going to end up, obviously, assisting

the end investor.
MR. WYATT: John, how would you define it?
MR. WALSH: All right. Thank you. And Marc, before I begin answering the question, I should tell you, unfortunately I woke up this morning with a case of laryngitis, but I'm going to try and talk through it.
I would actually define Fintech much as Travis did. I think it's a very broad term, and recently a couple different applications have come to dominate the discussion.
I know we're all using baseball metaphors, on the last panel and this one, as well. If I were to pick a baseball point in the game for financial technology, I think we're somewhere in the fourth or fifth inning.
A lot has happened, and when you look at financial technology, the reality is it has already disrupted what we do. It has already transformed what we
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do.
And when you look at it from an investor protection, from a compliance, from an operational risk perspective, that each new development is not something that happens in isolation. It's cumulative.
Actually, you can see this, if you'd like to actually see it fairly graphically, is go to any large financial services firm, and you will find different technologies like strata going down in the firm until deep in the architecture there are things with green screens still churning away because they still work.
And so, I think, when we talk about financial technology, we need to throw as broad a definition as possible, and I think, actually, Marc one of the reasons why it's important from a regulatory context that you do it that way is I think a big value add that the regulator can have, that the SEC and the other financial regulators can have is their capacity to look outside any one firm and to look at the network effects to say, well, if we do this here, what are the knock-on effects across the network, across the business?
And so, I would be really troubled if you took such a narrow definition you were just looking at particular platforms, particular products, particular apps, where you should be taking as broad a perspective
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as you possibly can.
You asked, also, what are some of the benefits to investors, and I would just say I think investors today, using this definition, are in the same place that everybody else in society is.
We have access to incredibly new levels of information we never had before. We have access to applications, to apps, to services, and the question we have is, well, how do we use them? What do we do with them? Can we trust them? Who can give us advice that

will help us figure out what it all means?
And I think investors are really in the same boat as everybody else.
MR. WYATT: Thank you.
Nikhil.
MR. LELE: Great. And Marc, thank you, and thank you to the SEC for having us here today. This is an absolutely incredible forum and of an incredibly important topic.
Because I agree so much with Travis and with John -- I'm going to say something that sounds like I'm disagreeing with them, but just to put a finer point on generally the same theme, the way I characterize Fintech no longer is of a term or a topic or an entity, but it's really just now the definition of a movement which is

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driving innovation pervasively across the financial markets.
And so, back -- dating back into the late '80s/early '90s when you had a ton of technology-driven innovation, really on the sell side of the business, right, in sales and trading, especially, you know, automating virtually every aspect of how, you know, trading decisions are being made on the front office of the business, there has been a significant lag period between the age of that innovation and the age of what we're seeing right now, and right now, what we're seeing is really at the intersection of this constant pace of change, right?
And so, when you look at trends like Cloud computing, which are effectively making very large fixed-cost infrastructures be extremely fast, you know, almost infinitely scaleable, nimble, with the proliferation of new technologies that are effectively democratizing data, right, so advanced data analytics and machine learning and artificial intelligence and all of the next-generation methods in which we manage information and insight, with the evolution and maturity of the way the financial ecosystem treats the way it runs its organization, right -- so, this is the way firms are organized, from the structures to the processes to the

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way they deliver their software and products and solutions to their end customers.
And net cumulative effect of all of this is an environment where the consumer themselves or the investor themselves have established a significantly greater expectation on what they want to get out of their financial institution, whether it's a consumer, you know, from a direct-to-consumer business or an institutional investor.
The expectation has been raised to such a level that now we find ourselves in this really, really unique point where the financial institutions themselves, as

very large, complicated, highly regulated, global, legacy organizations, need to figure out a path forward, and that path forward is not dealing with Fintech as an external entity but taking the themes and the topics that Fintech has been driving around continuous innovation and really making it of their own, right?

So, how do we innovate responsibly? How do we drive our products and solutions to our market better, faster, more efficiently? How do we serve the needs of our customers better? How do we know them better? How do we operate ourselves more efficiently?

And ultimately, the common denominator of all of this is technology-driven innovation.

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MR. WYATT: Rick?

MR. FLEMING: Well, I think one of the reasons that we struggle to define what Fintech is is because it's changing all the time.

You know, as some of the earlier panelists from this morning talked about, you know, think about the ATM. That was Fintech 10-15 years ago. And so, what's considered Fintech is not the same from year to year.

I, like my fellow panelists up here, tend to define it pretty broadly.

Obviously it includes things like payment processing and blockchain and all the things that we've had panels on today, but I would also include things like data aggregators and some of the innovative tech companies that are mining the data within 10-Ks and other disclosure documents and doing a lot of interesting things and providing that data to investors in a way that's useful to them and helping them make their investment and voting decisions.

So, there's a lot of interesting aspects of Fintech that sort of go beyond what we would sort of typically think about.

As far as the benefits, again I think it's instructive to think back about the ATMs. I mean, that was a pretty disruptive innovation. A lot of people lost

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their jobs. We went from a system where we were having human contact at the bank to where we were dealing with machines.

And I think, you know, as we look back at that, I don't think any of us would really want to go back to those days. You know, would you really want to give up the convenience of the ATM machine?

And I think, 10 years from now, we'll be looking back and thinking about 2016 as the day of, you know, how we did things like dinosaurs. I just think there's a lot of interesting potential for developments that are going to be really beneficial to consumers and to investors.

MR. WYATT: Thanks.

So, in the responses, obviously we hear words like "disruptive," "innovation," and "change."

So, given it's evolving and we can argue what inning we think we're in, what's the most pressing risk or the most pressing issue for investors as a result of all this change?

Let me start with John.

MR. WALSH: Well, I would think the most pressing issue today is the same one it always is, which is trust, and I think the reason trust is critical for both the financial community and financial regulators --

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it is at the core of investment capital.

You can go back to Max Weber and people like that, and they will talk about how, if you don't have trust, you're not going to invest; you'll consume or you'll hoard or you'll do something else.

So, the whole point of what is being done in regulation is to help create a structure of trust where people are willing to invest, to put their hard-earned assets to productive use.

And we have also seen -- I'm sure everyone up here -- just within the last few years -- some fairly signal events where trust evaporated, sometimes almost overnight, and had catastrophic consequences either for individual firms or for fairly large market sectors that worked very well until, all of a sudden one day, the product didn't work anymore.

So, I think, actually, if we're looking at an investor protection issue, we need to say, okay, we have all these financial developments in the electronic space, in the technological space. Are they trustworthy? And it's not just does it work or is the disclosure right, but what is it about it that will make it trustworthy, and I think, actually, one of the consequences, Marc, of thinking along these lines is you almost start to think more like a bank regulator.

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You start to think more like -- and I don't know -- prudential regulation is not a popular term, at least not here at the SEC, but the more you think -- well, you've got a platform, and it's not just what's the investor experience on the platform; you're saying, well, what's the safety and soundness and viability of that platform?

Because if the platform comes down, it's more than a business problem, it's a structural problem. So, you need to worry about things like that.

And I think, actually, that kind of institutional concern, as we move forward, is probably going to be part of the future. It has to be part of the answer.

And so, I would say, as a pressing issue, how can regulators help generate trust? Not in any

particular player but trust in the system. I think that's what I would put down as the most pressing issue.

MR. WYATT: Thanks, John.

Nikhil, would you care to respond to that?

MR. LELE: Yeah. Just to play on John's term of trust, which is the single most important thing, you know, underpinning any financial institution's right to operate, when you break that down and you start to intersect what that means with what the trends and

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innovation are driving, you have things like privacy, transparency, security, control, efficacy, and these things are, you know, on the one hand, large and onerous concepts for most large firms to deal with, and so, they've built, you know, tons and tons of very expensive human scaffolding to deal with these issues. They invested in systems over -- well over a decade to deal with these issues. And the threat of new risks entering the environment are even more ever-present than they've ever been.

And so, when you look at what this new wave of technology-driven innovation -- and I'll purposely not say the word "Fintech" from this point forward, just because we've shown up here that we're not believers in the term itself but believers in the underlying concept of it.

What this new technology-driven innovation is bringing are capabilities to allow firms to improve these underpinnings of trust in a way that they haven't been able to do so before, with better automation, better capability to manage data, better ability to communicate amongst stakeholders, better ability to manage the quality and effectiveness of the data that they're managing to create, really, information people can actually rely on and trust, and an ability to protect the

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environment in a way that, you know -- I hate to say this, but no environment is ever truly secure, and the reality is that if a nation-state actor wants to penetrate an institution, they will, and so, the whole game now is how do you leverage the best capabilities that you have access to, plus partnerships with the regulatory community, the legislative community, and other communities, law enforcement communities to be able to properly protect and support this notion of trust, which everyone in this town, even with all of the divisions that are going on, can fundamentally believe in, right?

Trust, if that erodes, it's effectively taking away the efficacy of the financial system, and so, everyone is incented on every side of this equation -- the innovators, the institutions, the regulators -- to work together to make sure that that underpinning never erodes.

MR. WYATT: Rick?
MR. FLEMING: Well, I like John's answer, trust, fundamental trust, is critically important, and I do think that probably the biggest danger to that fundamental level of trust that investors have comes in the area of cyber-security.
Data security just has to be number one as far

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as the biggest risks to investors, and along with that sort of their asset protection, you know. That's one of the things that I worry a lot about, is what's going to happen someday if there's a disruption of some major market system and what impact that will have on investor trust, and sort of related to that, what will happen if investors wake up someday and their assets are gone? Those are big issues that we have to do everything that we can to protect against.
I guess I'd also admit to some fear of the unknown. Warren Buffett has famously said that it's only when the tide goes out that you learn who's been swimming naked, and I think Fintech's performance and namely the performance of robos has yet to be tested under sort of severe -- a severe downturn.
So, you wonder how investors will react and how Fintech will respond when that inevitable bear market hits. For example, will redemptions proceed smoothly? Will investors be able to access their funds when they want them? Some questions like that I think we have yet to see the answers to.
MR. WYATT: Travis, anything to add?
MR. SCHWAB: I'll add a few more things. I think just a couple things, one around trust. It is interesting to think of you have -- we're talking about

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Fintech, but let's talk about Facebook, right?
You have a billion-plus -- well more than a billion people using Facebook to inform how they're doing things, making payments.
There's a lot of fin happening in Facebook, and then you lay on top of -- you know, there's been a lot of articles about this election and how Facebook has shaped opinions, and so, do you have trust in even your Facebook feed when the AI is telling you to do something or giving you certain responses to read that might not be that trustworthy, for instance, or there's other actors.
So, I think it's such a broad universe that we're talking about that the expansion of the tech into every part of our lives -- you know, the fin is moving into the social platforms or whatever platforms to where the regulators have to think far out.
And then the whole -- you know, kind of just as a pragmatic matter, you know, the firms in this space exist to question the rules, and so, a lot of -- you know, there's new tech, but then, really, a lot of the

innovation is happening on the business model side, and the business model side is normally asking or really questioning the rules that exist, and we all know there are a lot of rules that Marc's group likes to enforce --

MR. WYATT: We inspect for. We don't enforce.

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MR. SCHWAB: Sorry, sorry, sorry. There's a lot of rules, regardless, right?

So, there is a challenge in the fact that you have a very regulated market where rules are being questioned, and a lot of times they're going to break the rules first and ask for forgiveness.

If you take an Uber example, they'll go into a market whether they're allowed to or not and then try to work back and make sure that they can get it done.

If you looked at a firm like Zenefits, for instance, they sold a whole hell of a lot of benefits without having a license to sell benefits.

So, there are -- the whole notion of Fintech is to disrupt, and to disrupt is to break the rules a lot of times, which there are a lot of, and so, I think there is a real challenge to work within the structure or change the structure to allow for innovation, allow for safe innovation, as Nikhil was saying, responsible innovation, so that you can allow for, you know, new and interesting business models, new and interesting adoption of technology, but still allow and make sure we're protecting the rules that are important for the end investor.

So, I think that's critical.

MR. LELE: You know, Travis, you make a really,

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really good point, and you know, this is one that most people on each side of this equation don't appreciate about the other all the time, and I spend half my time working with startups, half my time working with large financial institutions, and effectively, they're all dealing with this concept of coming to the center in their own different starting points.

And so, for the large financial institutions, it's how do we innovate, how do we get faster, how do we serve our clients better, how do we become more efficient but do so in a way that's still extremely consistent with this, you know, fortified moat that we've built around our business, called trust, in which, you know, all of the regulatory, compliance, legal, and other infrastructure that you've put in place serves as a significant competitive barrier to entry.

Whereas on the flip side of the equation, in the startups, you know, their problem is not necessarily trust. It's scale.

And their issue is how do we take a business model that -- to Travis' point -- we've spent so much time challenging the status quo, the assumptions made

around the financial services business, we've created something new and unique and something we think could be actually ingenious and innovative if it were to be

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adopted more widely.

How we don't have the ability to establish that level of trust, because we're not able to achieve any real level of scale, and those two things go together, right? You can't have trust without scale and scale without trust for the startup community, and so, what do you see them doing?

They're hiring very, very senior talent from the financial industry. Some of their top-level positions are now becoming senior legal, compliance, and regulatory-related positions.

They are fortifying their top brass in the board levels, as well as the C suites of the startups to demonstrate that they're taking this notion of trust and all of its underpinnings extremely, extremely seriously.

And so, there is a misnomer on either side of this equation that the other side doesn't get what we do, whereas what I really see happening is both sides are starting to come to this center point to say how do we just figure out how to partner or work together to leverage the best of what these new folks have built but do so in a way that plays to our strength, which is knowing how to manage the environment of establishing and continuing to enforce trust?

MR. WALSH: Marc, can I jump in with a quick

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thought? I think both Rick and Travis made a real good point, and that is -- I would describe it slightly differently, but I agree with both of you.

Ultimately, technology, I think, is most powerful in this space when it becomes not a technological issue but a people issue, and I think both of you reflected this, I think, in your comments. For example, how will people view an algorithm in a really bad market?

We're used to face to face human interaction, and we have confidence in our ability to deal with other people, and that's why I think, even though Fintech is booming and growing, personal advice has a big future ahead of it, and personal advice armed with tools like you're talking about, I think, will be even better personal advice, but I think that really is not going away anytime soon.

On the other hand, you used the example of Facebook, and I think that's a great example, because we look at this incredible technological platform, but yet, when it finally comes down to it, what is the decisive factor? It's the subjective decision of an individual. All this other stuff is trash, but you know, this person who posted that -- I choose to believe them. I'm

trusting you.

And so, I really think Fintech -- it's really important -- this goes back, I think, to this whole idea -- it's all cumulative, and the technology is cumulative on itself, but you know, it's also cumulative on the individual human subject of elements, as well, and until we get all that right, until we can actually understand how all that fits together, as you're saying, as I understand you to be saying, we're always going to be sort of poking around, but we're really not going to have an answer to the problem.

MR. FLEMING: You know, that brings up another sort of related concern that I have.

You know, there's a lot of benefit that comes from the human touch and having somebody there that's going to sort of calm the waters and, when the markets are going down, making sure that investors aren't making really bad decisions at the worst possible time.

And so, I think it, again, is one of those things that sort of remains to be seen, is how well technology can sort of replicate that and put those protections into place.

MR. WYATT: Well, we have -- it's an interesting panel in that we do have a former regulator, obviously, the investor advocate, people providing advice on this. So, we as a regulator -- what can we do better?

I appreciate Travis saying politely that people are questioning the rules, and so, from our perspective, I heard dialogue, as Nikhil mentioned, in terms of trying to have dialogue.

I heard -- John, you mentioned potentially safety of the platform.

So, to me, that just feels like testing, and it requires expertise, which we're bringing into the Commission, and I have to say we have brought more and more people with technology experience into the Commission to help inform policy, as well as in examinations, etcetera, and then I also heard protection of data being very important.

So, in a room where we're trying to get better as a regulator every day, what can regulators do better to try and be helpful in the space?

John, as a former regulator yourself, do you want to take that one first?

MR. WALSH: Sure. I was really pleased when Chair White this morning said that you're taking a hard look at your regulations to bring them up to date. I think this is really critical, because frankly, I think your rulebook right now is part of the problem.

The rulebook -- and Travis, perhaps, actually, it was what you were saying -- actually, everybody is

saying it, now that I think about it, except you, Marc -- you haven't said it -- that the SEC's current rulebook, unfortunately, I think, gets in the way.

And I'll give you an example, and it's not to pick on this particular issue, but it's had enforcement activity, press releases, a sweep, and things like that, and I think it really shows the difficulty, and that is investment advisors' third-party performance.

Now, if you take out the advertising rule under the Investment Advisors Act, it's pretty clear and it's pretty straightforward. You can't be misleading in your advertising.

Now, the difficulty is, of course, that that rule was adopted in 1961, 55 years ago, and I think it's plainly contemplated that you have a single point of regulation. You have an investment advisor who prepares performance and advertises it on paper, probably in a newsletter or something like that.

Well, fast forward 55 years and because of technology, we now have a multi-point system in which you not only have people who are generating performance, but that performance is being propagated across networks that include commercial vendors, professional firms, registered firms, unregistered firms, private communications, you name it, and so, now we go back to

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the rule and we say, well, how does this single point rule create and publish work in a multi-point environment?

And frankly, it doesn't. It's really hard to figure it out.

Some members of the SEC staff have said, well, you must verify before you propagate, essentially, before you use third party, and that leads to the question, well, what does that mean?

Does that mean recalculate? Does that mean have a GIPS verification? Does that mean obtain a certificate of authenticity and correctness? And it doesn't address the question, well, who can rely downstream? Does everybody downstream have to keep re-verifying over again, or does there come a point in time where downstream people can rely on what was done upstream from them?

And I use this as an example, because the rule was a great rule, I'm sure, in 1961, but in this new networked environment, raises a lot more questions than it solves, and so, when I heard Chair White say that you're taking out the rulebook, I'm hoping she meant not just the rulebook as it applied to the other panels earlier today but across the board and really thinking about how they work in this new environment, because

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there's a lot to do the.

MR. WYATT: Anyone else want to add how we can

be more effective from a regulatory framework?
MR. LELE: So, I'd hate to use the word "improve," because I think the SEC does a wonderful job, and we are SEC-regulated ourselves, so all good on all fronts there.
What I would say is, in this notion of rules, is rules are great when you have an extremely well-defined game that's fairly static. The game of baseball hasn't change fundamentally since it's been incepted except for maybe replay reviews at this point, right?
But the fundamentals of that game have not really shifted since its beginning, whereas we are now in an environment, to John's point, where this network effect is creating a game that's constantly changing, and that constant pace of change driven through all this innovation is what makes the inspection, enforcement, and definition of even new rules extremely difficult, right?
And that lies at the crux of where a lot of the larger firms that I work with, especially in the investment advice space, wind up needing some more input and clarity sometimes before they enact some of these major changes in their platforms and their products sometimes that they've envisioned.

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And it's because you take a very simple example, you know, in the investment advice space, all of the attention and energy of the movement is driven towards robo-advice, but the robo-advice is actually just the tip of the iceberg as it relates to the investment advise industry in terms of what innovation is bringing the capabilities that it actually helps these firms to implement.
And when you look at the role that data and analytics is playing in terms of informing the types of conversations that advisors are even having with clients and you look at the complexity involved in the rules that effectively go into determining the recommendations that get made in the industry, it's called next best action or next best option or next best offer or whatever nomenclature it is you subscribe to.
But while it's extremely scientific, the data shows that you should have this conversation, then you get into the gray zone of, well, is that conversation for the betterment of the firm, is it for better profit, is it for the betterment of the client, is there something the client is going to improve on if they take this recommendation?
And the transparency around that rulemaking process from the technology side as well as from the

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regulatory side is one that I think the industry and the regulatory, you know, kind of ecosystem has to come to terms with, because while the rules are pretty well laid out, what we observe is there's still a lot more

conversation that has to happen before the larger firms are comfortable moving forward with some of these fairly transformative initiatives that they're planning to undertake, simply because they don't want to have to sink tens of millions of dollars into something that ultimately the regulatory agencies will say, no, that's not the right thing.

MR. FLEMING: Well, I do think we need to take a look at the rulebook on a regular basis to make sure that it takes into account sort of normal business practices. I think I'd give you an example of one place where that has happened in a positive way.

FINRA has recently adopted a rule that requires the people that are responsible for the design or the development of trading algorithms to pass an exam to make sure they're aware of the regulatory environment that they're operating within and also to register as securities traders. So, that's at least one example of where a regulator has sort of reacted to changes within the business in a positive way, I think, and I think we need to be on the lookout for other places where maybe we

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may need to make adjustments in different ways.

I think probably the biggest way that regulators need to ensure that investor protection is fulsome in this changing world that we're in is just to stay on top of the technology that's being used out there.

You know, Marc, I think, you know, if you're sending people in to do an exam of a robo-advisor, if they don't have some technological savvy, that's going to be a problem, because how are they ever going to make any kind of determination of whether the business is operating appropriately, whether it's meeting its fiduciary duty, if the folks that are conducting the exam are not technologically savvy.

So, I think that's probably true of every area of the Commission. It's just going to be more and more important for the folks here to be on top of the technological changes that are happening.

MR. SCHWAB: Maybe I can just add a few more lower-level type items. Outside of the rules, obviously, I think, you know -- and John talked about, you know, a -- more of a framework approach, potentially, to represent or to give the flexibility for the innovation to happen. I think that's critical.

You know, selfishly, I want, you know, better

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access to data, APIs. I mean, the world is moving, you know, to APIs, right?

There is no reason why the SEC cannot extend out tools that are helpful to investment advisors, tools helpful to broker/dealers that -- technology is, you know, pervasive, right?

So, I think there is an opportunity to extend out technology, either through an API, either through data that you make available to the industry as a utility -- I think that's critical, and then just, you know, very clear standards -- again, this goes back to the rules, but -- and approaches for what it means to be in certain segments of the market.

And the brighter lines -- and we talked about this in the back. It's hard to achieve that balance between having, you know, just tell me what to do, as compared to give me a framework so you don't constrict me, and I think there is -- it's a challenge. It's a big challenge, but -- and you want to probably err on the more conservative side, because we are talking about people's livelihoods and retirements and everything else.

But there is an opportunity to provide and extend some of the tech out to spur innovation, to lower the cost. I know, for us, it's really expensive to get market data, right? Just to get real-time market data in

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this space, and the SEC is potentially looking into it, but it's a small little piece of a huge puzzle that just providing good sources of industry data out to people that are trying to innovate would go a long way.

So, I think there's lots of different opportunities to help spur and -- spur on while protecting the individual investor.

MR. WYATT: So we talked about protecting investors. You all gave some great suggestions about how regulators can try to help improve in this space. But let's get down to what is really the front lines in compliance. That's compliance officers.

And Nikhil, you talked about that center coming together, if you will, of the technology people, as well as hiring, which warms our hearts, about hiring legal and compliance people to try and make sure that they're in compliance with the rules, whether they are as prescribed as Travis would like or principles-based, because it's a dynamic marketplace, so striking that right balance.

How do we better -- how are they using technology? How are they trying to, out on the coalface, use technology to make sure that they are effective compliance officers?

MR. LELE: So, I'll provide a response, and it will be kind of a lay-up for Travis to spike down from a

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reg tech perspective, but -- so, what we see happening is, take Fintech innovation, disruption, categorize it much more broadly as just digital transformation that's going on with the financial services environment, and to date, most of this digital transformation has focused more on the front office, the product teams, technology, in some cases even operations, and folks in risk, legal, and compliance have been kind of the next order of

conversation in a lot of these programs.

Now what we're starting to see is, really, most firms taking a fundamental look at their whole lines of defense approach, right? Whether it be compliance, in cyber, or internal audit, even -- you know, we're fielding more calls from internal audit professionals at this point than we are even, in some cases, compliance professionals.

It's because everyone is starting to realize that at the pace that the industry is moving, at the pace that the business now wants to start moving, and at the pace that most technology organizations are equipping themselves to move, the lines of defense of the organization can't be the only roadblock to speed and getting to market with new ideas and products and solutions. They play an extremely important role, and that role has to be preserved.

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But now what we're seeing is, how do those lines of defense actually be brought up in the entire process of innovation, right?

So, compliance is not a toll gate and a checkpoint that you go through in month three or five or seven of your program.

Compliance is inherently in the middle of all of your initial design sprints that you're doing with your business, so that as and went new product ideas or new innovations in technology are being conceived of, you have your risk, your legal, your compliance professionals there to help inform those decisions up front so that the business can move at the speed in which it wants to move.

And then, lastly, what we're also seeing is the formation of an entirely kind of new and evolving space of reg tech that Travis here represents, and reg tech is just like Fintech, except all the innovations for helping manage legal, risk, compliance, regulatory matters more efficiently through use of technology and data innovations, and now we're seeing the combination of risk and compliance professionals being brought up front in the process, with new technologies that are actually enabling them to perform their functions more efficiently.

And this is now starting to help move the

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industry into a place where they're actually starting to feel a lot more confident about being able to innovate at speed and being able to keep track of and pace with what's going on in the external environment for the startup community.

And I think it's had a generally positive effect on a lot of the clients that we work with. Still a long way to go, but finally risk compliance is in the conversation of innovation, whereas just a year ago, they generally were not.

MR. SCHWAB: Yes. I'm not going to disagree with Nikhil. In fact -- but I'd like to add a little finer point.

One of the challenges or one of the things that we're seeing within the governance organizations at the firms that we talk to is still a fear of moving, and you know, to the point where the business side -- and you said it perfectly -- is the speed of business.

Well, the business side is building up their own governance organization and their own tools, which, you know, we're not unhappy about, but I don't know if that's directionally the way it should move, right?

You know, there's a real challenge in the fact that I think the governance organization is so concerned about the WSPs and the SEPs and sticking to procedure,

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and it's hard to move that big ship, as compared to the business that can move faster.

And so, we're finding much easier adoption, much quicker adoption -- I use that term very loosely as far as quicker, but easier adoption on the business side, with reg tech type tools, as compared to the governance side, which is what we designed the system for.

I think that's a challenge, and I think, again, that goes back to our earlier point, is I think there is a fear that they get it wrong, right?

They're testing different algos for spoofing or the different, you know, ways to mark orders, and then the regulator comes in and said, hey, you didn't do your testing right or whatever, and that is a concern for them.

And then on top of it is you have some fairly strong guidance from the regulatory bodies about your vendor risk assessment, right?

So, not to say that you shouldn't have good, sound controls about how you manage your vendors, but it starts to preclude working from smaller, more innovative companies, or at least the banks interpret it to where you can't work with those type of entities, to where it makes it very difficult to work through the supply chain management process at a lot of these entities.

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And I think it's scarring that, you know, you have to keep working through, which I think is starting to happen, exactly to your point, but there is a long way to go until I think you have real comfort working with the more innovative side on the -- on whatever type of tech, star.tech that you want to mention.

So, I think, again, I would say, you know, we're not even up to the plate yet on our baseball analogy as far as that's concerned.

MR. WALSH: Marc, if I could just quickly jump in, I think one of the things that has struck me over the last few years, the last several years, is how many times

we've gotten ourselves in a situation where people say, oh my gosh, this is totally different, this can never work for us.

Believe it or not, I remember a time when people said that about emails. You cannot possibly ever provide compliance for emails. Too many, too much data, too difficult.

And I think one of the really impressive things repeatedly has been the innovation of people stepping forward and saying, well, you know, as a matter of fact, you can, and it's been a race throughout.

Can the technological innovations -- can we figure out how to deliver compliance for them, and a lot

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of times it's both a technological solution and it's both a people solution, and from time to time, one pulls ahead of the other, but more often than not, they catch up.

Travis, I think that deploying technological tools to help regulatory compliance is a great idea, and I think it's an example of this race that we're constantly running.

I would add that the regulatory approach of these bright line command and control standards that can never be violated no matter what the circumstance, I think is building in a lot of fragility, as opposed to resilience.

And again, since you've invited us to come up here and give you our advice, I actually think one of the ways to deal with these highly complex environments where there's a lot of change and a lot of innovation is to think about less bright line, you cannot possibly cross this, to, well, what can institutions do to be resilient, to respond to problems, to look for latent failures, to look for things that connect in a way they didn't expect, hold them to fix it, and ask questions like how did you find it, how did you fix it, were people made whole, but then view that kind of resilience as a positive thing, as a good thing, and not simply the prelude to further action.

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And what I hear Travis saying -- and I'm not trying to put words in your mouth, but I kind of feel the same way, that there should be a zone where people can respond innovatively to innovation.

And as long as, ultimately, they're doing the right thing, hopefully it won't trigger the kinds of consequences that make everybody freeze in place, because that's not a good thing for you either.

MR. WYATT: Rick?

MR. FLEMING: I'm just sitting here thinking that technology has been a tool for compliance folks for a long time.

You know, you think of a broker/dealer, and you know, for a long time, they've mined their own data to

generate exception reports, and I don't think the SEC has really sort of put parameters around how that has to work, what has to be within the exception reports.

My understanding is that the firms have been given a fair amount of flexibility in terms of how they design those systems, and the basic idea is that we want them to be able to spot red flags of potential unethical practices or abuse of customers and that type of thing.

So, this isn't a new idea, and I think, as business becomes more and more online and process are more and more automated, that type of thing ought to

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actually become easier to be able to put a compliance structure over top of that that finds those red flags, and it doesn't necessarily have to be sort of dictated how that should work in any given firm.

MR. WYATT: Travis, can I just go back and pick up something you mentioned?

The fear of the firms not trying to implement policies and procedures for either an examination or some other regulator coming and saying you ran afoul of your own policies and procedures -- John and Nikhil, are you finding your client base not wanting to put things in place for fear that they won't be adequate given it's a moveable feast and everything is changing on a regular basis, or are they just trying to say here's what I think for the foreseeable future, here is the policy and procedure, I will amend it and keep looking at it on a regular basis, and again, I didn't want to put words in your mouth.

MR. LELE: So, I think what we're finding is the fact that the policies that are in place are effective policies, right? They're all espousing the right things in terms of protection and control and transparency.

Where most of our clients are starting to hit this kind of wall of uncertainty is when you start trying

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to take action relative to these policies without a clear understanding of the ramifications if something were to go not according to plan, right?

And this is where we come back to this notion of responsible innovation, meaning that there ought to be a zone -- and the word, obviously, "safe harbor" is off-limits for most conversations that we have, but there ought to be a zone where a bank or a regulated financial entity can experiment in a way that allows it to try new things, new approaches in a controlled environment that if something were to fail, even though "fail" is an awful word to use, in any general context, this notion of failure is one that most of our clients want to embrace, right?

And it's this cognitive dissonance of we have policies that basically say you can't fail, and when you

do, there has to be clear justification as to why, and you have this now ever-pressing need to be able to fail quickly in things so you can figure out what works and move forward the right way.

And the two haven't figured out the right middle point yet. And I think we're trending in that direction.

I mean, we're working with several of the different agencies on matters like this, and all the

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conversation sounds something similar like this, which is how do we bring these two sides closer together so that we allow the financial institutions the flexibility, in some cases, that they seek to be able to try new approaches to things, but then, once implemented, abide by the things that we all expect them to abide by, which is, you know, high degrees of control, transparency, trust, security, and everything else.

MR. WALSH: Marc, I would add that I think one of the problems that everyone is wrestling with today is the difference between complexity and complication, and we tend to use the two words as if they were synonyms. They're not.

Something that's complicated has a lot of pieces in it, and it's hard to understand. Something that's complex is something where it's really difficult to predict what it's going to do, and in almost every financial firm today, you have enough complexity in its electronic environment or its Fintech, as we're calling it here today, where you actually have a fair amount of complexity, where you actually don't necessarily know all of the different ramifications of what you're doing.

Back in the day, Marc, when I was in OCIE, I had an opportunity to interview the CIO of a major New York broker/dealer, and he said I'm a Luddite. Those, as

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you'll recall, were the people that wanted no innovation. And he said people think I'm a technologist, so of course I'm always interested in the latest and greatest innovation, and he said not at all.

He said every time I change anything, I have no idea what all of the potential ramifications are. Some of them may show up years later in some bizarre, obscure scenario that no one could ever possibly think about in advance.

So, he said a perfect world for me would be you get everything in place and you never change anything, and he's not going to get his perfect world, I'm sure, anytime soon.

But going back to what Nikhil is saying, I agree there should be -- and I -- you know, we're not to talk about safe harbors and things like that, should not be there, but I do think regulators need to have a certainly degree of flexibility in saying, well, this is

a complex system, registered firm, what are you doing to deal with that complexity?

And if they're in good faith dealing with it -- and I totally agree, including making customers whole if there's any harm -- I think they should be a little more flexible about letting that resilience take place and letting that resilience go forward.

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I think I'm agreeing with you.

MR. WYATT: Rick, if I could turn to you, obviously protecting investors -- also part of that is information and providing information to them. So, can we just discuss a little bit about how Fintech can improve disclosures in delivery of information so those investors we're trying to protect can make better and more informed decisions?

MR. FLEMING: Sure. I just gave a speech -- a 30-minute speech on this a week or so ago. So, how much time we got?

MR. WYATT: We'll take three minutes.

MR. FLEMING: Okay. No, I think sort of the -- my basic thought is that technology really gives the Commission a unique opportunity to provide disclosures to investors in a more effective way, and at the same time, reduce the burdens to the companies, the issuers that have to provide that disclosure, and in particular, you know, I'm thinking about structured data and how that can be utilized.

There are a lot of interesting things going on where data aggregators are sort of pulling the XBRL data and helping investors slice and dice that information to do analytics on potential investments, a lot of interesting things going on there, and I think a lot more

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can be done in that space, particularly if we continue sort of the march that the Commission has been on to require more filings to be in a structured format, and I would include even tagging the unstructured text portions of filings.

I think that will make it easier for investors or for these intermediaries, the aggregators, to be able to pull that information out and do all the analytical whiz-bang things that they do with it.

MR. WYATT: One of the things that we continue to hear about was, obviously with that data -- I think it was said earlier -- there comes a great deal of responsibility in protecting that data, and cyber-security being a key risk, specifically in this space.

Maybe, Nikhil, you could talk about what role protecting the data provides -- you've heard about trying to get the bad actors to look elsewhere, but you know, they're going to go where the money is. So, how are we supposed to look at cyber-security specifically in the compliance realm?

MR. LELE: So, as we look at where clients are putting all their time and focus and energy in this space, and especially with the introduction of these sometimes new very small startups that they want to bring into their ecosystems, you know, it usually buckets

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across three different types of investments, right?

There is the identifying investment, right, which is being able to monitor for cyber-intrusions, as and when they may be happening, and as real-time as you possibly can.

There is the prevention-related investments, which is hardening off your perimeter and then all the way down to your data entity level to be able to control and secure access so that you prevent any unwarranted intrusion.

And the space that's gotten the least amount of attention, which is now starting to change, is in the response, and so, when you look at even just the well-publicized example of the Target breach a couple of years back, the problem was not in the identification and not in the protection. It was actually a well-known and already identified intrusion.

The problem there was in the response, and because the response dealt with so many people who are staring at tons and tons of flashing lights on a console, they didn't have the ability to sift through what they were looking at to be able to inform the judgments needed to alert and escalate in a timely enough fashion, and then, hence, what occurred.

And so, where we see a lot of the innovation

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occurring is in the response part of this equation in the sense that, you know, it's not good enough just to know what you have in front of you and to know what controls you've put in place to prevent something from happening.

You have to be able to take all of that information in as real time as possible and then formulate responses in as automated a way as possible so that you're not relying just purely on human judgment, and as it relates to all of the new innovation and the new technologies that are available to companies, most of which are not the large technology vendors, and those are still ever present in all of our client sites, but more and more so, you have a lot of these new and agile startups that are, you know, bringing new cool technologies to the table that do some of this stuff.

We have some simple advice for all of our clients as it relates to cyber, specifically.

Number one, as part of you, you know, vendor on-boarding -- and sometimes a lengthy process -- you should at least have a stance on every single company you seek to do business with as it relates to the hardening of their cyber-security infrastructure, right?

So, all of these solutions, or most of them, nowadays, are built in the Cloud.

There is a degree of hardening that's

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associated with the Cloud, and it's proving out more and more so as time passes, but being able to understand the security not just of the physical perimeter of any particular product or vendor that you're looking at but all the way down to how they protect data at the data entity level within their product or solution, having that due diligence done up front is a very critical step for especially large, established financial players to be able to undertake to be confident enough that they're not introducing yet another risk in already a very complicated environment.

You know, number two, we are advising most of our clients to establish the capability of doing due diligence on a very rapid and iterative and ongoing basis, all right.

So, if you look at due diligence, it's usually a one-time static exercise. It takes an army to complete. It takes a village, whatever it is, what euphemism we want to use, but the point being that with the space being what it is and the speed of new technology entry in the environment, and the way the business wants to use technology to advance their own business goals, technology, risk, the cyber-teams, or however they're formulated in any client have to have the capability for spinning up due diligence extremely

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quickly, whether it's in their labs, whether it's in external labs, being able to have the environments they need to bring vendors in quickly, assess them, evaluate them, generate a score on terms of risk that they're going to be able to accept by working with such vendors, and that can't take six months every time you do it, right?

That has to be done in a matter of days or a couple of weeks, right? And that speed and that operating model to be able to operate in that kind of intensity is something that many of our clients are starting to look into now, but that's the next evolution of where we're really seeing things heading.

MR. WYATT: So, Travis, we heard there, obviously, cyber-security and compliance, the role of compliance.

So, what are now the obstacles for technology, specifically in the innovation for compliance and the combination of compliance and risk management? How are they all coming together in your world?

MR. SCHWAB: I think we've talked a little bit about, you know, again, a slight reluctance to change a lot of preexisting policies and procedures. You know, those documents, those systems have been put into place

over the course of many years. To abruptly shift that is
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hard, and you know, it's a big ship to turn.
I think a huge part of the challenge that doesn't get talked about very much is data, is every single department at, let's say, a large bank, and even within the departments, every single group, there are different data sources, and most of the time these data sources do not talk to each other, and you know, people have been up here talking about kind of the golden source of data.
That just does not exist at this moment, and there are huge problems, you know, replaying the same data, storing the same data, or giving the data to examiners when there's an exam, and replicating that day in, day out, storing it all for six years, seven years, whatever your retention policies are.
So, the challenge of getting a complete picture of what just even the front office is doing, just even within an asset class, is pretty huge, and I think that is one of the areas that is really a challenge for people in this space.
A lot of people have -- you know, in the Fintech space, there's tons of vendors for visualization, for instance, or you know, different types of looking at data, but as far as putting the data into, you know, the really kind of core aspects of how to manipulate the data
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into kind of a universal system is still very much a huge challenge for these banks and really hinders development, because a lot of big banks have not moved to the Cloud, because they're worried about customer data, right?
And so, you have -- when you go into an organization talking about, hey, I want to give you a system that gives you a complete view of your data, the IT guys sprint from the room, right?
I mean, there's just -- it is to add another project on top of what is already a huge backlog, and then you throw it into a compliance group that is constantly playing defense a lot of times, because they are responding to multiple regulatory inquiries across jurisdictions.
It is a challenge, and I think that is a -- you know, it's an opportunity for people who can figure out the right business model so it's as easy as possible for these folks to adopt technology, but the reality of it is they are overwhelmed almost all the time. Their budgets are constrained. Their resources are constrained. And they can't necessarily utilize the tech that's out there now.
So, you know, we have our work cut out for us ourselves, but it really is, you know, a continuing problem that, you know, I think will start to lessen as
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more and more of these technologies are adopted, but it's still a big issue.

MR. WALSH: Marc, if I could throw in two cents here, as well, I think this is exactly the problem that everybody is facing right now, that everyone is trying to catch up, and you mentioned compliance is on defense and the technologists are -- they don't want another project, and Nikhil mentioned that cycles are shortening, so the time you have to do critical things are getting shorter and shorter, and I think, looking specifically at compliance, the challenges they face in this environment today are pretty extraordinary.

In the old days, a good compliance professional needed to know two things -- their firm and the rules -- and if they had that down, they could do their job.

Well, now they need to be data literate. They need to be able to work with data visualization. They need to understand networks. They need to keep up with communication developments. They need to understand the nuances of different types of communications that are being used in the firm. They need to be very quick with their wits, because the cycle is so quick, when something happens, they're going to be making decisions in short order.

And so this new Fintech world we're entering is

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-- maybe it's creating solutions, and I think it is -- it's helping, but it's also making old types of risks like, are you responding quickly enough, even riskier, and it's upping the ante, I think, with people a lot, and I think, Travis, you summed it up pretty well there with the notion of people running screaming from a room, saying, oh, no, not another project, even when you say, hey, this is a project that will eventually help. It's a real stressed environment.

MR. WYATT: When you say "eventually help," all of that is daunting, but as you say, if you embrace it, it can actually help you be a more -- give you a more thorough view of the firm, and to Travis' point, pushing it all the way to the front office to say here are the risks, here are the rules, here's what we're seeing, have the data talk to one another, so none of that is siloed.

So, I guess, Travis, one of the things you mentioned -- is it going to take someone just to -- forgive the expression, but just to bite the bullet and make that innovation change, to be the thought leader, and then you'll have others follow, or is this always just going to be incremental?

MR. SCHWAB: That's a good question. You know, we like to think that, right? If we get, you know, that one more big entity to sign up that says, okay, the rest

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-- you know, Wall Street generally kind of follows a fairly following mentality, but you know, it's pretty

one-off, because certain firms get it and they've adopted certain technologies. Other firms are shocking in their lack of adoption, and so, I think -- I don't know what that catalyst is going to be to where everyone is going to be like, you know what -- just the Cloud, right?

I mean, the CIA is using the Cloud. FINRA is using the Cloud. You know, there is a -- there is a lot of good evidence to support that this is a good direction to go. That would be a huge win for the street to feel comfortable putting their data in the Cloud, to where they feel comfortable that they're not going to get hammered if you have a breach at AWS, right? I mean, that's -- that would be catastrophic for lots of firms, not just the financial firms.

So, I think that one piece of adoption in this space would probably go a long way. That could start the ball rolling in the direction that we want. But it is a daunting -- you know, if I put myself in their shoes -- a daunting aspect to try to change -- because you know it's going to make things better, but you have to look out a year, 18 months, and these projects, you know, just -- it's too long to think about.

MR. VanGRACK: Marc, I think we've got time

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just for one more question.

MR. WALSH: Marc, I think that, obviously, you don't want to be in the business of picking winners or picking technologies.

On the other hand, I think, as a regulator, because you can step back and look at the space between firms, because you can look at the network effects, because you can think about the complications across the industry and the complexities across the industry, I think you are really in an excellent position, more, perhaps, than any individual firm, to guide this process going forward and to say this new financial technology -- here's the direction we would like to see it go in, when, as Nikhil has been saying, people don't worry they're going to get sued if an innovation doesn't work out if you can communicate that to people so long as certain things are done that get it heading in the right direction. It's a real opportunity for the agency.

MR. WYATT: I appreciate that.

Let me, first of all, thank my panel. I think it was a great exchange of information, ideas, concerns, and food for thought.

So, please join me in thanking the panel for their time.

(Applause.)

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MR. VanGRACK: A round of applause again, please, for these panelists and, really, for all of our moderators and panelists for contributing to the conversation.

(Applause.)

MR. VanGRACK: This concludes the SEC's Fintech Forum. We covered a lot of ground, from robo-advisors and distributed ledger technology to crowd funding, online marketplace lending, and of course, investor protection.

You heard about a wide array of ground-breaking technologies that could make virtually every aspect of our industry more effective and efficient, with lower costs and greater market access.

But to fully maximize the potential benefits of these technologies, it is incumbent on innovators and other market participants to engage with regulators.

It is said that innovation doesn't happen in a vacuum, but in that same vein, neither does effective market oversight and regulation, and so, as the Commission undertakes Chair White's call for specific Fintech recommendations, we need to continue to hear from all stakeholders, because wherever this effort ultimately leads, the end result will only improve with further communication and input from those working on and

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impacted by these technologies.

So, thank you again for coming and those of you online for watching. Have a good night and a safe trip home.

(Whereupon, at 4:28 p.m., the meeting was concluded.)

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PROOFREADER'S CERTIFICATE

In the Matter of: FINTECH FORUM
File Number: OS-1114
Date: Monday, November 14, 2016
Location: Washington, D.C.

This is to certify that I, Christine Boyce, (the undersigned), do hereby swear and affirm that the attached proceedings were held according to the record and that this is the original, complete, true and accurate transcript, which has been compared to the reporting or recording accomplished at the hearing.

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