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Conference Debate Session VII

The Future of Banking Technology – into the 'digital first' world

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Gavin Scruby	CIO, SmartDebit

Bill Boyle

Hello, thank you. My name's Bill Boyle. I'm from IBSI (International Banking Systems Intelligence). We have been tracking banking technology for the last 20 years. What we do is a publication and the company specialises in is looking at who's buying what, so what companies, what banks are buying what technology, and this month, we publish an annual list of who does that in terms of it's a league, sales league, table of what banks have bought what technology.

We're going to talk today about particularly the digitisation, and I was at Stansted Airport, and I was looking for something to read on the way over here, and I saw a fascinating headline in the *Economist* which caught my eye, North Korea By Night. So as I was planning my holiday trip to North Korea, I noticed that the second headline was Tech's Raid on the Banks, and the *Economist* has got a whole special issue on the technical - on what's happening at the banks, how they're adapting to change and disruption.

Digital banking's the future of banking services, as institutions will tell you. Certainly they'll say that. They're thinking, rethinking nearly every aspect of their operations to take advantage of the opportunities digital engines can create. Consumers, and not just millennials, are demanding the enhanced levels of service, simplicity and personalization that only a truly digital bank can offer. So by digitizing and optimising the back office, banks can use advanced data analytics, so they say, to provide customers with tailored experiences and products across physical and digital channels.

However, bank leaders need to reassess which parts of their strategy and business should be analysed and adjusted for a digital-first model. There have been examples that certainly I've been told about, been claimed, that a digital bank can be spun up in 10 months or less. It can be done, it has been done, but they need five elements to make that actually happen. Have you got past that one?

First, building modular architecture, to continue meeting consumers ever-shifting demands, banks need to roll out products and services at a previously unthinkable pace. They need to do it at the sort of pace that Google has been constantly adding new features to its platforms while enhancing old ones.

Fintechs create more intuitive features stemming off a nimble platform that can quickly and continuously be enhanced. A truly agile platform undergoes short, frequent releases with a constant pipeline of improvements that are stacked on top of increasingly commoditized cloud infrastructure and will allow businesses to run uninterrupted on the front end. Again, that's a theory. This allows minor changes regularly rather than huge, infrequent ones that can cause major disruption, for example, to TSB implementation disasters, and draw out customer backlash, as has been the case with some traditional transformations.

Digitize and automate. Each year, banks spend untold millions with duplicating in the current siloed legacy systems and switching to digital platforms, again in theory, banks can shed that infrastructure and gain the ability to digitize and automate their core processes, while eliminating errors and duplication. Integrating these processes gives banks a single view of customers, again in theory, and allows them to provide a customised experience by defining their needs based on behaviour.

In terms of embracing APIs, one of the most interesting digital banks in operation in my opinion at the moment is N26, which is available in 24 countries with over 200 million customers as of November last year. Through APIs, they employ developers to build programmes and services around core functions to help, as it says, become an intelligent hub for customers' entire financial life.

So API-driven collaboration in business model is growing around a part of a larger business trend pioneered by today's technology titans. Those that embrace it, again, in theory will enjoy faster growth thanks to crowd source effects that creates previously unattainable momentum developing new service to meet customers' needs. That's something we'll be discussing, the panel will be discussing.

Creating smart products and services, any financial institution is handling large amounts of financial and non-financial data that can be used to create competitive and unique business products. Has that data been used properly by the banks up to now? Doubt it very much. Securely managing customers' data. As consumers' lives become increasingly digital, they need to be a good steward of the critical personal information that's part of that, and I think every session that we've had at this conference so far has made that point about security.

The good news for those that make the transition from legacy systems to cloud digital platforms where security improvements are constantly made is they can both create a peace of mind, and that has definitely been proven. Final comments I'd like to make before we start a discussion are some comments on the last year. As an organisation, we track trends in banking technology over the last year, and we've just finished a major study, which will be published over the course of the next month.

So while on the surface banking technology deal activity last year was relatively flat and fairly unremarkable, if you look at it more closely, there was a distinct change in the buying and selling patterns of banking technology systems. Conventional bank back-office systems are no longer the stars for the banking technology supplier, and that includes all of the major ones. However, they will continue to remain the primary cash cows for a while.

But the spotlight, as they say, has clearly shifted towards digital banking systems. While core banking continues to remain at the heart of the bank, the general focus and technology investments has clearly shifted towards specialised solutions that help the bank to rapidly enhance its market presence. So those are some of the trends. Total volume of global new named customer deals, and we're saying new name, that means new customers as opposed to old customers that you're just reselling to, stood at 327, down from 350 deals in 2017. A big contributor to that was in universal banking system sales. In fact, in those monumental, huge systems that do everything, as opposed to the smaller cloud systems I was talking about earlier on.

I'll leave the detail of that to the slide, and I think we want to come onto the discussion, and I'll actually introduce the panel, which is Moises Navarro, Principal Strategist from VMware. Thank you, Moises.

Moisés Navarro

Morning, hello.

Bill Boyle

Arash Aloosh, Assistant Professor of Finance Department, NEOMA.

Arash Aloosh

Hello.

Bill Boyle

And Gavin Scruby, CIO, SmartDebit.

Gavin Scruby

Good morning.

Bill Boyle

Right. Let's start with digitization. Now, I talk to banks all the time and they give me a continual story about how we're digitizing, how important digitization is, but then when you start to get into some of the detail, they're a little bit - they're not too clear. How far do you think the banks are going in real digitization.

Gavin Scruby

I'd like to say first that the challenge they face is where they are as an industry. Going back to what Michael said this morning, we've got electricity. You just plug in, everybody uses it the same way, electricity is electricity. Banks as an industry, core, central banks, are now in that same process, in that same position. They're a utility, so you can't have much innovation from one bank without disrupting what everybody needs to be able to use. So where they are right now is we need the regulation changes, which we've had with PSD2, we've had with open banking, to allow that push for them to innovate in that way. So the digitization is fundamentally limited already by that position that they're in.

Bill Boyle

Right. What do the rest of the panel think? Moises?

Gavin Scruby

I think that's why fintech is growing, so all those wrap-around services won't be from central banks.

Moisés Navarro

I think also part of the discussion should start in this defining what digital adoption means. I think that banks have been working in the digital world for many years if not ever, and they have done already several interesting things for us, the users and consumers. Now, there are still things to do, for sure, but again, what's the expectation coming from the market? Are we as users are demanding market in terms of retail services from banks the same as we are from other businesses? Maybe not that much, and maybe we can discuss about it, how much do they need to become digital?

On top of that, I would say that again, they have been doing their homework. Obviously, there is room for improvement and there are opportunities for doing many more things. In my opinion, one of the things that I haven't seen as a user is the proper use of analytics or you name it. I don't mind if it's artificial intelligence, machine learning. I don't mind.

But the smart use of the data they have for our expenses and the way we behave as a citizen, this is not properly liberated, in my opinion.

So there could be a very good opportunity for them to become much more digital and to leverage that power on our behalf and our benefit, so this is something pending to do in my opinion.

Arash Aloosh

Actually, I think that the industry is changing obviously, but there is a lot of cross-country differences, so it depends that what is the perspective that they look. For example, if I look at for example Asian banks, there is a lot of digitalization going in Asian banks, even in South American banks and so on. Not much digitalization yet in European banks, because if they think that digitalization is a kind of efficiency improvement in the banks, okay, so we had - it depends on our benchmark. We had so far the best performers, Western banks, as if we think about this benchmark, the other were not efficient, so they have been trying a lot to improve their efficiency and offer products and services through the digitalization.

But if we think that - if we want to think that even European banks and Western banks, American banks, and even financial markets are not efficient, which are not - for example, we can easily go on a platform and buy stocks and bonds and so on immediately, but to settle the transaction or trade, it's going to take three days. So this is massive. This is unbelievable. Think that when we had, for example, Internet, that they have a lot of computing power and so on, it's hard to believe that it's going to take up to three days. So it is a kind of inefficient, and we need digitalization to improve this market efficiency, and we believe - there is a lot of changes. We see a lot - as a business school, we see a lot of changes, so because of that, we have changed dramatically our for example strategy. Digital transformation, fintech, blockchain is top priority for our school, for example.

To study different parts of this, for example, industry, the rapidly changing industry, we have for example a connection and partnership with engineering schools, with law schools. This is not just our school. NYU, Duke University, they are actually doing the same strategy to understand for example what is blockchain and what is the impact of blockchain and so on, and the same for a banking industry. What is the changes in banking industry, fintech and so on?

Moisés Navarro

We fall into the fancy things of fintech and blockchain that we will for sure address. Let me get deeper into something real that is happening and you name it, efficiency. That's a boring word. Probably we can agree, but this is what the banks are mostly trying to achieve even today, and maybe this is happening only in the case of Europe, maybe because of the maturity or they feel they are incumbent or whatever, but efficiency is still a key word in banks today.

I think that they have power enough to deliver a lot of value to users, and now I think they need to reshape the way they are leveraging that power on our behalf and our benefit. Efficiency is one of the things they are addressing, because they have enough people, skills, technologies available, and they need to really extract much more value out of them. Let's think for example in the case of developers and application development. The big banks have more developers than usually software companies, but they don't think they are a software company, and they don't think they are producing the value out of those developers that the software company is delivering.

So maybe they can improve in that way of efficiency in terms of, okay, let's attract more value, and then again obviously leveraging the fancy things and the brand-new things that we are bringing from the industry, but efficiency is one of them. Also, I think that this is preventing somehow from them to innovate properly, and again, I would like to discuss this as long as the table is happy with it.

Gavin Scruby

I think efficiency is almost one of the only things they can do, because they can't innovate, and often they think the customer is going to drive innovation for them. They're going to tell them what they want to get out of their systems, and customers don't. Twenty years in product development has shown me that customers can't tell you what they want. They can only tell you what they don't want, and banks think it's all happy and it's all nice, and that's why the fintechs are growing around this and are now open to do the innovation that banks aren't doing, and banks are just concentrating on efficiency and speed of their data centres. They're not working that well at the moment.

Arash Aloosh

I just want to add, in addition to efficiency, I want to add complexity and culture, because to see changes in the industry, because this industry is very, very complex. It's not just a matter of mathematical, computational risk and so on, there's a lot of for example psychology has gone in the market, how traders' behaviour, what customers' and clients' demands, so there is a very, very complex industry that we cannot easily make policy. For example, policymakers, it is very difficult for Fed and central banks to decide what's going to be the best and optimal output, and also about the conservative.

For example, customers and clients, they are conservative. For example, I get used to do this type of experiment in my class. It's going to be interesting to know that if you know that there is some digital bank that you can for example deposit your main revenue, how many of you are willing to deposit your main source of revenue on a regular basis in a digital bank. If you think that, okay, that's great, you are basically having this background of IT and security, I would be very thankful if you raise your hand if you wish to deposit your main revenue in a bank, in a digital bank.

Gavin Scruby

I would.

Arash Aloosh

Okay, and how many of you - think about this. You are from IT industry, right? You are very knowledgeable about consequences of IT and so on. The majority of people, it's customers, clients, they don't know, and they - and also, it's again cultural difference. For example, if you think about Norway, my friends and for example my colleagues, they use a lot of digital finance and so on. But my students in France, they don't use. This is very…

Bill Boyle

What percentage actually say they would use a digital bank? Because the figures I've seen in Britain that around about 20%, 20% of 18 to 22 year olds do use neo-banks.

Arash Aloosh

I can't comment on a general population. I can just say in my class, it is less than 2% that use digital banks. Of course, they use Internet banking, but not much of even mobile payments and so on.

Gavin Scruby

I think people don't really - the public, I think in Britain particularly, don't care that much about security. I think they should care far more about it, the same as their health informatics we were talking about earlier. Until something very high profile happens, there's not going to be a big push from the industry to consolidate and get some security in place.

Credit card systems have PCI for credit card data. As open banking tanks off, when our account numbers and sort codes will be the transactional codes we use, as soon as that becomes a security issue, the industry will get around and do something. But until then, that's going to be quite open, because there's not a specific standard people are held to on it. Even in GDPR, it's bank account data is just the same as any other data. It's not even a special category.

Arash Aloosh

Of course, regulation, as you pointed out, it's very important for changes in industry, because profit of banks, and all financial intermediaries highly depends on the regulation. If the regulation changes a bit, maybe a part of industry will wiped out and go out of profit. But where should for example regulators becomes pro digitalization, that's a question of specific markets and what they see, but of course banks, they have been considering changes in industry and they do a lot of experiments. For example, if I want to say what I see is going on in Europe, because they are conservative and they want to have an open perspective on the changes, what they do is that they adopt - or somehow they open their own digital banking.

For example, Societe Generale, they have for example introduced Boursorama as a pure digital bank, which has been done in Singapore, for example, digibank in Singapore, actually owned by a High Street bank, so this is a very good way of hedging. Because they are efficient. At the same time, they want to not lose the game to the newcomers, so they actually understand and they do their study of this new market by introducing the, for example, the pure digital bank and to see what is the customers' and clients' behaviour and preferences toward those type of services.

Moisés Navarro

Let's take a look to the markets, like some sort of market landscape and competitive landscape in the banking sector. In Europe, at least, which is the market I know best, I think that banks are trying to grow, the main concern is to really increase their growth rate year over year, so they are competing against themselves, I would say, in terms of I really need to grow. I need to show growth to my stockholders.

They could be concerned about the new entrants and disruptors, sure. That's fair, and that's natural, so they take care of it. In my opinion, they are alert and they are taking care. We can discuss if they are doing the right thing or not or if they can be disrupted. We can do it, but again, they are not blind. Okay, so the first thing they are trying to do is to grow year over year, and this is an organic growth, and again, efficiency here plays some role, because they can improve results because of efficiency.

But now there are also these other banks, and usually they are big banks, trying to really change their scale. So it's not only a matter of organic growth or M&A, which is my opinion in Europe is something very, very common. They are also to really change their scale, and I've seen banks claiming publicly that they want to deal not with millions of customers but they want to deal with billions of users, and I remember very recently, a few weeks ago, a Santander Chairwoman publicly stated that they would be investing €20 billion in the next years only in technology for changing the scale.

They could be spending that money in many, many areas, many, many areas, but the main goal is to really change the scale. She was also explaining that they would like to become a platform for other businesses to exchange services. So this way, they are not the ones delivering a service or a good or a product to a final end user, but they could be the ones promoting, facilitating this kind of services change. Somehow, it reminds me of the processes we've seen with the famous disruptors, Airbnb, Uber, Netflix. We always name the same ones, so something is happening. Maybe we don't [disrupt] that often, but those disruptors, what they did was to build that platform. They were not the only ones producing something to be consumed. They were facilitating the producers and the consumers to interact, and I think that maybe this is a good opportunity also for banks, and in the case of Santander, they already disclosed that they are looking to that opportunity.

Bill Boyle

Right. We have a question to the audience…

Unidentified Male

Yeah, the *Economist* article you were talking about, it's a very good article. One of the posited questions that they didn't actually answer, which I'm interested to ask you, was that they were comparing the regulatory environment in different countries. So for example, if you compare Singapore, they've gone around and said, our banks need to become digitally native themselves, so that they're not threatened by these digital upstart technology companies. Whereas on the other hand, the UK regulatory body has taken the approach of giving out licences to help digital start-ups attack or coexist alongside the big banks, so that it's more competitive and forces them to change themselves.

From your perspectives, what you see, what you do day in, day out, do you have a preference for either approach? Do you think one's better than the other in terms of consumer outcomes and business outcomes? What are your thoughts there?

Gavin Scruby

I think it's just which market you're in. In the UK, I think the regulator has given up getting banks to innovate, and so it's created that, and they're dragging their heels on the open banking regulators now, so I think that it's the only way for the UK. Other markets that are more digitally native themselves and have perhaps a younger banking system, I think a different system will work better, particularly areas like Singapore.

Moisés Navarro

Yeah, anybody in incumbent markets, I think the role of the regulator, it's playing some sort of defence on behalf of the banks. I know it's a burden in terms of complying with regulation, because banks are meant to really spend a lot of money for that compliance, and they have to put in place money reservations for credit, et cetera, but on the other side, this is preventing those new entrants to really make a big impact. So in these incumbent markets, this is playing this defensive role.

Which one I would promote? Honestly, I don't know. I don't know. I prefer to the markets to be able to freely compete and develop services, but as a personal preference. I think nevertheless that, as you were saying, depending on the countries, banks are trying to behave properly and to adapt to that market, and I also think that because of the regulation in Europe, even though they are protected somehow from those new entrants, again, they are not blind. So they are trying to embrace them, to foster and promote them and obviously to extract all the value they can on their behalf. So Europe is playing that kind of role, and I don't think or I don't know if new entrants coming from the banking sector or from other geographies can really, really be a new entrant in an incumbent market. I don't know how easy that is.

Again, probably, the regulator could be the defensive on the local players.

Arash Aloosh

I would add that central bank roles is fairly difficult, as regulators. They do a lot of study to know what is going to be the best outcome of their policy, but [fairly] that is a very complex question, that okay, what is going to be the optimal regulation or what type of strategy they should promote, because that also depends of the reaction of the market psychology of, for example, clients. Just an example, we would like - we would love to manage our fund, and having our own control to see that where we're going to invest and so on, and one of the asset managers in New York, for example, Betterment, they use this strategy to get clients, more clients. They just give this device and a robot adviser, you just give this option that they can decide how much they move their assets and so on, which is not obvious that they're going to do a good strategy.

But at the same time, if we want to give a lot of control, for example, to the clients to decide what type of, for example, products they should have or where to invest and so on, because central banks should think about the overall impact on the economy. What's going to be the consequences if, for example, they're going to allocate some money somewhere that they shouldn't, or for example - for markets, that's going to be - this is a dilemma, that should they give a lot of autonomy and control to the clients or there should be some limits that where to invest, how to behave, what type of assets, what type of strategy and so on.

Gavin Scruby

I would say the UK market is more fun, speaking as someone who speaks with fintechs and works with fintechs all the time and start-ups. It's a much more dynamic environment, and that obviously just means more customers for you as well.

Bill Boyle

Does that answer your question? Do you want to ask any…

Unidentified Male

I guess the only follow up would be one of the points you made, Gavin, because again, going back to the article, the head of one of the Singapore banks - I can't remember which one it was - they were looking at it and they were going, well, how are we going to change this? Because most of our staff are in their 40s or 50s. How can they become cloud natives themselves, and then they saw what Ant Financial was doing, and they started saying, we need to do this ourselves or else we will get eaten, and then they basically started a mantra within the company where they always asked the question, what would Jeff Bezos do and tried to permeate that culture to do it themselves.

Do you think it's more on the cultural side of difficulties there, or that really banks don't want to risk their position by taking too much of a jump.

Bill Boyle

Can I just add to that, because when I talk to banks, they're continually talking about the number of fintechs they have, the number of fintech labs they've sprung up. If you talk to Deutsche Bank, they've got one on almost every corridor. So they're doing that, and if you look at the amount of money, the stat I've got here is that VCs invested 37 billion in fintechs last year. Now, that's a lot of money. Is that a strata above where the banks have invested? Are we seeing the banks actually completely out of step with what's happening at the higher level of VCs?

Gavin Scruby

I think there is a risk that when banks start creating their innovation and incubation hubs, and I've seen it with a couple of them, they get a bit affected by the central culture of the bank, because they're running it. Some of their core services come from the bank, so you end up with something that's not truly innovative, and what they're trying to do is copy a model where you can't guarantee engineered success, so a lot of these start-ups, only one or two are going to pop up and do something, and the bank's trying to create something where they're going to get an 80%, 90% success rate.

Bill Boyle

I was talking to Bank of America last week, and they were saying that they now, with the fintechs that they're dealing with, they give them 18 months maximum to deliver, but I looked at the actuality of it, and they've been working with some of the fintechs for four years, and they still haven't delivered, so is there - that seems to indicate a certain paralysis within the big banks in terms of how to deal with these things. You get them in, and then how do you get them out? Or if they're not delivering - some of them are, obviously.

Moisés Navarro

But that's the tricky part. I think for a few years, banks have been trying to break some chains, some dependencies on the past, and why not - collaboration with fintechs can be a good way to achieve that innovation and fresh air, but the dilemma in my opinion is that they have tried to innovate either by themselves or with the help of third parties. The tricky part was how to monetise that innovative.

On the other side, and luckily, they stopped investing in legacy, which was bringing the money to the company, and that was provoked probably some sort of…

[Over speaking]

Gavin Scruby

Is that across the board? Because I just know one instance.

Moisés Navarro

But I think that's the challenge I would say.

Gavin Scruby

Yeah, absolutely.

Moisés Navarro

So I think they need to [bridge] as soon as possible whatever they are doing for innovation and for bringing new value to the production and factory they already know very well for many, many years. Because if not, they are not going to monetise, so I understand the explosion of exploration and testing and experimentation, but I will try to link as soon as possible to that main stream and main production factory that they have. If not again, innovation can be awesome but not monetised, and that's not good for the business.

So I think, again, there is no magic rule. There is no recipe. In my opinion, it's hard, but that's the tricky part. That's where the magic might happens or might happen.

Arash Aloosh

I would say…

Bill Boyle

Any other questions from the audience? No? Because, Arash, you mentioned blockchain. Blockchain has obviously been a buzzword for a while, but again, the banks I'm talking to are beginning to take it very seriously. You mentioned it earlier on. Can you elaborate a bit on what you meant by exactly what you're seeing blockchain being - how it's developing.

Arash Aloosh

Yeah, actually, this technology, blockchain technology, although some of you may not agree, is a big innovation in finance - and particularly in finance and business. A lot of university, a lot of banks and many different industry consultants, they actually study the subject. There's big, big innovation in the - and change in the industry, because the way that we're going to communicate together. To know different aspects of blockchain, as I said, we are partnering with the engineering schools and lawyers, regulators and so on. We have actually in the meetings and conferences even geeks, developers, also attend the meeting to add knowledge to the society. So that's big changes, but it's not going to be that soon, so right now, the majority of development that we see is actually on the technology level, to know different process, for example, proof of work, proof of stake, for example.

There are studies showing that, for example, proof of stake is a kind of equilibrium of proof of work and so on. So there is a lot of learning going, but I believe that there's going to be a lot of changes in terms of application and also in the infrastructure as well. But it depends on the industry and the time that when we're going to see those changes.

Bill Boyle

So is there danger that the banks are going to take the same attitude and it's going to catch up behind them and bite them?

Arash Aloosh

That's difficult to say directly if it is dangerous or not, because that depends first on the knowledge of people, so how much the society and banks and traders, they are informed about this technology and consequences. But experiments are very important. For example, Societe Generale, just last year they issued 100 million of bonds on blockchain, to know that what is the traders' behaviour and so on. So there is a lot of learning and experiments going on in the market, and a lot of study and different perspectives.

Bill Boyle

Blockchain's got the whole world's marketing hype behind it at the moment, but I'm a little bit heretical with it. I think at the moment it's like quantum computing. It could do some great things, but we're a long way away from it being useful. There are so many engineering challenges with it that the advantages it gives have not meant much more than the losses you take from using it right now. Maybe it will change in the future, but I worry it's going to be something like 3D TV, that there's a huge amount of hype but then it doesn't really give that much that the consumer needs when they see it. So much work has to go into getting it into a position where people can actually use it and see it and then decide whether it's something that they want to sue and see or not.

Moisés Navarro

I think today it's a solution looking for a problem, so we are not there yet, and also I think that banks have reacted very smartly, which is okay, this is fancy and hot, so let's launch something using blockchain. So everybody has one service. International payments or transfers, loans, whatever. Now, we have the [stick] on blockchain. Let's go back to business. So I think it's a matter of maturity, normal life being as usual. I think the process of very, very strong and compelling benefit and the banks are trying to find the right place for that solution, and also, we need to improve as an industry in sense of efficiency and robustness of the model.

So just because it's cool, it's not enough, so banks are being smart and they are going step by step.

Arash Aloosh

Even I'd go beyond that. I would say that it has been going the wrong way. There is a lot of things that has been wrong about blockchain and applications and so on, and that is bad for the technology itself, because once you lose the face, it is very hard to get the trust of the people and traders and so on. For example, just be very concrete - for example, transparency is a very good side of this technology or security is a kind of good - for example, thinking about attacks and hacks on Bitcoin blockchain. Think about the computing power. It was fairly hard, but at the same time, there is - coming back to centralisation, for example, the idea of Satoshi's paper, whitepaper, was decentralisation and distributed is going to be very good.

But once we look at what's traders and miners, even they think or they view, they behave, it is definitely not centralisation. They have this pooling, the mining pools that they want to share their risks, so they add to different pools, which is actually moving from distribution to decentralisation, so that is not even according to what whitepaper suggests. Or we see for example more than 200 platforms. These are new types of not regulated financial intermediaries.

Bill Boyle

All right, thank you very much. You've had the last word. Thank you very much, panel. I hope you enjoyed it. Thank you for your time.

[end]