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TRANSCRIPT

Title of Meeting:	Bank of America 2021 Global Liquidity Speaker Series *A new era in cash forecasting - Leveraging machine learning to make better decisions*
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Speakers:	Karen Ly, Head of Global Liquidity Solution Specialist GTS, Bank of America Paul Smithwood, Head of Data & AI Product Development GTS, Bank of America

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Coordinator:	Welcome, everyone, to the Bank of America 2021 Global Liquidity Speaker Series: A New Era in Cash Forecasting, Leveraging Machine Learning to Make Better Decisions. Your conference is hosted by Karen Lee. My name is Stephane, and I'm your event manager. During the presentation, your lines will remain on listen-only. I would like to advise all parties that this call is being recorded for replay and transcription purposes. Now, I'd like to hand your conference over to Karen.
Karen	Thank you for that. Good morning and good afternoon, everyone. Thank you for joining today's Liquidity Speaker Series Call on Cash Forecasting. My name is Karen Lee, and I'm the Head of Global Liquidity Specialists here at Bank of America. On today's call, I will be speaking to Paul Smithwood, Head of Data and AI Product Development in Global Transaction Solutions. Together, we will discuss the challenges of traditional cash forecasting, as well as recent technology development in this space. Now, cash forecasting is not a new liquidity priority for many clients, but when COVID hit last year, many companies were exposed to the fact that they did not have comprehensive or accurate cash forecasting processes. For those that did, the new challenge of working from home made it difficult for businesses to ensure that they had enough cash on hand to meet vendor, staffing, and funding obligations. At Bank of America, we saw this translate to many companies sitting on higher than normal cash balances by treasury change for most of 2020, and while absolutely necessary, it probably wasn't considered by many as the optimal use of working capital. Paul, maybe we can start with understanding some of the traditional challenges that clients face when it comes to cash forecasting.
Paul	Sure. Thanks, Karen, and thanks for having me. To quickly elaborate on my role here before we dive into these questions, my name is Paul Smithwood. I am the Director of Product Development within the Data and Artificial Intelligence Group here in Global Transaction Services. Prior to that role, I was a client of the bank and was a Treasury Manager for a global private equity company. Cash forecasting really was my day-to-day then and continues to be so now. In answer to your question, Karen, about the challenges that corporates are facing, there are many. We could spend the whole time talking about them, but if I really had to hone in on some of the ones that I see and hear most often when talking with treasury teams, there are three main ones, the first being the amount of manual effort. Many clients are spending a significant amount of time not analyzing their forecast but simply updating and maintaining it, so pulling data from different systems consolidating it typically in a spreadsheet. It's a lot of manual effort before you can actually get to the analysis and decisions based on it. That's one; two, I would say, is poor visibility. What I mean by that is obviously, this probably isn't news to most, but before you can create a good forecast, you have to have access to the requisite data, right? You

need to be able to have a global view of your balances, of your pending transactions, of your booked invoices. Many teams have partial views and are missing significant cash flows for a variety of reasons and then have an incomplete forecast due to poor visibility.

Then, lastly, I would say in addition to poor visibility is poor analytics, right? Given the fact that many teams are forced to consolidate data in a spreadsheet or some other homegrown process, I oftentimes see clients that are creating forecasts either simply by rolling forward prior balances; maybe they are looking up pending payment runs or booked invoices and plugging them directly in the forecast. For a variety of reasons, a lot of times they don't have the time or technology to apply better analytics to start analyzing historical data to do scenario analysis and ultimately produce a better forecast. I'd say those are the three main ones, manual effort, poor visibility, and poor analytics.

Karen   Thanks, Paul. I know definitely from talking to a lot of clients that visibility challenge isn't just technology. A number of clients have multiple banking relationships, so you then also have to layer on top of that different data dumps that different banks are also potentially giving you as well. I know that also adds into some of the complexity around visibility, and probably manual effort as well, from a client's perspective.

Today, there are many options for clients to leverage when it comes to cash forecasting solutions. Technology companies do specialize in applications for this. I know that many ERP systems also have their own module. There's also banks that have their own solutions, and then many companies may also consider building something in-house.

Paul, as companies think about evaluating some of the various options to them, what are some of the considerations that you could recommend they take into account?

Paul   Sure. You're right, Karen. There's so many forecasting providers out there now. Really, more than ever in the last couple of years, and especially the recent pandemic, most ERPs, treasury management systems are beginning to build forecasting modules. There is dozens and dozens of typically FinTechs and other specific forecasting-based providers. There's a lot out there, and it's difficult to evaluate them side by side.

I would say there are several things that you should consider when looking to adopt a new forecasting technology. First and foremost, I would say capabilities. Before you even go and start looking across the market, you want to be able to know what capabilities are critical based on your forecasting needs versus nice to have.

We all know many nice to have capabilities, and I would say don't over-complicate or make a list too long. For example, if you need to forecast at the company level versus at a subsidiary or account level, if you have a need to be able to forecast by a cash pool or a currency, or to be able to break out and forecast your cash flows by individual cash flow types, things like AP, AR, depending on what your forecasting needs are, there's going to be some supporting capabilities behind how you need to forecast. Make sure you know those, and the forecasting provider is able to do that.

Two, this hits on the first question, analytics, right? Every good forecasting tool should have good, embedded analytics. Some of them are now adopting more advanced forecasting technologies like machine learning. Even at a basic sense, can they do embedded scenario analysis, allow you to plug in assumptions such as growth rates, quickly take trailing averages? Making the analytics piece is automated and advanced as possible is another key piece to it, and every forecasting technology should do a good job of that.

Third, I would say data integration is a big one. In order to achieve your forecasting needs, you should certainly know what data you need to support that, and where the best source of that data is within your organization. When you go out and look at a forecasting technology, if you need bank data, for example, to pull in historical transactional activity to update your balances; if you need ERP data to be able to pull in book invoices; other working capital data from a variety of payroll systems, invoice management systems, whatever it is that you need to create your forecast, make sure you know what that data is, where it's located, who owns it and ask those forecasting providers how easily can they integrate to each.

A lot of forecasting providers, if it is something like an ERP or a treasury management system they should be able to automatically integrate with data within that ERP or within that TMS. For any technology that's pulling that data outside of it, make sure you ask what that process looks like and how difficult it is.

Then, that would lead into probably the fourth thing, is time to implementation. Depending on what your data integration needs are and what your given setup requirements need to be, make sure that you get a good estimation of what the implementation timeline looks like. I've seen many forecasting providers say that they can integrate with any system out there, and theoretically that could be very true, sure, they can.

When you get under the hood and say how difficult is it; is it something that's as seamless as an API connection versus a file-based connection? You can really figure out whether or not it is an easy implementation or not. I've talked to many treasury teams that have engaged a technology provider, signed a contract, and then found out after the fact that it's a six-month implementation. Make sure that you ask those questions and know what that time to implementation is.

Then, lastly, I would say ease of use. Every good forecasting technology should also be simple to use and not require a 100-page user manual. I've talked to many treasury teams that have been sold on very good forecasting technology with lots of capabilities.

Ultimately, we all know there's treasury teams who wear lots of hats. They have to spend a lot of time doing things other than forecasting, so when it takes you several weeks in webinars to learn a new forecasting technology, then I've seen many situations where treasury teams stop halfway through, and then they revert back to their manual process because they know it and it's easy. Make sure it's easy to use as well.

Again, to recap those capabilities, know what capabilities you need and make sure the forecasting provider can meet them. Analytics, make sure the forecasting provider provides good, embedded analytics that are easy to use within the application and that they are able to provide some sort of measurement on how good those analytics are. Data integration, how easy is it to integrate the data sources that you need in your forecast? Time to implementation, how long is it going to take you to implement this forecasting technology. Ease of use, make sure you see a demo, make sure it's intuitive, make sure anyone in your treasury team can quickly pick up and start using it.

| Karen | Thanks, Paul. I think that's really great advice, especially around making sure that you are able to see a demo. And, to add to that, make sure it's the end-users that are involved in that demonstration. I think a lot of times when we get third-parties coming to pitch applications, it's really done at a senior level. Not to obviously discredit their opinion, but having the end-user as part of that demo and part of the feedback process, I think, is very important [indiscernible - 55:00] that ease of usability. |

One other one that you didn't mention, which I think is a real factor for every company, is going to be cost as well. Depending on the size of the party that you're going with for the solution or how comprehensive the application is, I think the cost can very much vary [indiscernible –n 55:24] across all of the different options available.

Obviously you need to also take into consideration of not just the initial purchase but what is the ongoing maintenance going to cost the business as well, because I think that really becomes a factor in any company trying to make a decision on what solution to go with.

| Paul | Yes. Karen, that's a really good point. Just before your next question—I know this is getting long—I'm glad you brought that up. I would say cost and overall ROI. |

It's essential that you can make sure that the benefits of the new forecasting technology justify the cost. Just because a solution is capable of integrating with every potential data point and has all the bells and whistles, that can have the highest potential return, but oftentimes, treasury teams find out that the costs outweigh those benefits. It takes six months to implement; they need a team of consultants, there's ongoing maintenance.

Ultimately, many treasury teams are simply looking for if forecasting technology that improves or streamlines their existing process or just looking for a good tool to help them start forecasting, then just make sure you don't get oversold.

| Karen | Maybe I'll add to that. I know this is a very complex question, but it's something else in terms of getting |

oversold. I would say though, you should take into account any growth plans that your business already has.

If you already know that you have certain growth plans that have been forecasted for the next 12, 18 months, those requirements should also be taken into consideration when you make these decisions because you don't want to need to reinvest or find that the application or solution you have decided on maybe is not going to be comprehensive or grow with the business if you have growth plans as well.

Paul, depending on the size of the business, and the footprint of the company, and potentially the complexity of the legal structure, I know that establishing a forecasting strategy and implementing and maintaining a solution can be very time-consuming. I know that Bank of America through your team is working on something exciting to assist clients that potentially may help alleviate some of the time aspects that a company needs to invest.

Can you provide some details on Bank of America's Cash Forecasting IQ solution? Given the title of our topic today, maybe explain how it leverages machine learning to help improve forecast accuracy.

Paul   Absolutely. This has been a multiple-year journey. It's one that we've spent a lot of time working with our clients with. As part of a pilot and a proof of concept, we've engaged a FinTech company that specializes in machine learning and cash forecasting.

Ultimately, when we set on this journey two, three years ago to create a forecasting application for CashPro, our online banking portal, we wanted to solve this pain point that we talked about in the very beginning. We wanted it to be as seamless as possible with minimal manual effort, automated wherever possible. We wanted to improve visibility, and we wanted to ultimately, from a machine learning point, provide robust analytics.

Talking about that last piece first, what we did is basically created a machine learning component to this application whereby all of the historical data that is housed within CashPro, within Bank of America, it's automatically brought into the application and analyzed through several different algorithms. Ultimately, it's looking at several years of historical cash flows and balance activity, and it's picking up variables that you would never identify within something like an Excel spreadsheet.

It's able to identify patterns in if your cash flows or balances increase on the first of every month, if you're making payroll on the 15th of every month, it picks up a lot of those insights and is able to identify the most accurate model out of about a dozen or so that fits each of your accounts. It's only going to use it when an accurate forecast is possible because, again, I'll say machine learning cannot solve everything. You could have opened an account yesterday, or you could have an account that makes two transactions a year; machine learning will do a very bad job of predicting that.

Wherever it can provide a high level of accuracy, it's going to analyze all of the historical cash flows, pick the most accurate model for every account based on historical performance, and use that to forecast going forward.

In addition to that, we know that not everybody is either comfortable with machine learning or wants [indiscernible - 60:30] to set and forget their forecast. We've also looked at and have included the ability to do a variety of different scenario analyses. A lot of times, it's used to compare against the machine learning, and then ultimately take the best way to do your forecast.

We've created different ways to derive your forecast based on taking things like trailing averages, assigning growth rates, pegging your forecast to a prior period, for example, and ultimately enabling a user to quickly and without much complexity at all, create a forecast based on the assumptions that they want to make. Ultimately, the machine learning may very well prove to be the most accurate option.

So we're very excited about it. It is scheduled to have a soft launch later next month. We're opening it to about 200 companies. Then, later this year, it's scheduled to be available for all CashPro companies within CashPro.

Karen   Paul, just to make sure my understanding is correct when you say through CashPro, this means that any

	clients that are existing users of CashPro, according to the timeline, will have this solution available to them?
Paul	That's right, and that also brings up another good point. It is within CashPro, and as such, any user who uses CashPro and has access to information reporting—which is basically where all of your historical information lives, almost all of our clients use it—they will have the ability to use Forecasting IQ.

Being part of CashPro, there's no implementation. It automatically knows which accounts each user can see because that's already entitled when you're set up to CashPro. It already has direct integration with the data because it's integrated in the CashPro, so there's no setup; there's no IT requirement. Everything is sourced directly from CashPro, which also has the ability to receive multi-bank files, so you can get multi-bank information sent to CashPro and included in the tool. Again, it's automating a lot of that manual forecasting update-type of work that many treasury teams are doing today. |
| Karen | Okay. Thank you for clarifying that. I just want to maybe ask a clarifying question on a point that you made around AI or machine learning not being accurate when it comes to some new information. Am I correct in the understanding that as time goes on, the accuracy will improve for new information that comes in? Is that how machine learning works? |
| Paul | Yes. In a nutshell, yes, that is very accurate. Ultimately, the more data machine learning or a given machine learning model sees, the more it learns, the more accurate it ultimately becomes. When it comes to forecasting, the more transactions that flow through an account, the longer of history that an account has, ultimately the more accurate a forecast it will result in.

It does more heavily weight more recent cash activity because obviously, trends change. The recent year is a perfect example of that where machine learning cannot anticipate something like a pandemic, right. But, as soon as something like a pandemic happens and clients are stockpiling cash balances in their accounts, machine learning picks up on those trends and will begin more heavily weighting that sort of activity that it began seeing. It's continuously learning and continuously changing, but obviously always retroactively as those trends begin to occur. |
| Karen | Okay. Thanks for the additional information. It all sounds like the machine learning will lead to a great time saver. It should, over time, reduce the number of errors and also help eliminate manual effort throughout the companies.

I'm wondering, to what extent can forecasting be measurably improved by new technology? Do you see a danger that it becomes more complex than traditional manual methods such as spreadsheets? |
| Paul | There's certainly the danger. I would say, for one, good forecasting technology helps you to actually measure the performance of your forecast. I would say that the majority of treasury teams of our clients do not have an effective way to even measure forecast performance in their current process.

If it's something like Excel or if it's a manual process, it's tough to gauge how good your forecast is. Good forecasting technology should help you measure what your forecast variance is, where your forecast is going off the rails, and help give insight into how you can begin to improve your forecast.

Certainly, as technologies like machine learning and artificial intelligence get introduced, there is a lot of potential for improvement, but there's also a lot of potential for analysis paralysis, as I like to say. Again, good forecasting technology should use these sort of technologies to provide a better, more accurate forecast, but it shouldn't do it in an overly-complicated way because, at the end of the day, the machine learning is doing the work of the analysis anyway. That part is simple.

As long as the technology can give you some insight and explainability into how it's working and how the machine learning is weighting the different variables in providing the forecast to give you the comfort that you need as a user to be able to explain this to different stakeholders, and not just say the model came up with this number, but be able to validate that based on past performance and what it is weighting as far as the variables in your forecast, then it should not be that different.

But again, not all forecasting technologies are making it that seamless. |

Karen	Okay. I know we only have a couple of minutes left, but I'm going to sneak in another question. It really segues from the question that you just answered with so much about this new technology and what it can deliver, many of our clients vary in terms of sophistication, in terms of size of operation.
	Are there any prerequisites that we should be mindful of in terms of adopting new technology, or is it really available to your business regardless of size and complexity?
Paul	With everything in forecasting, it depends a little bit. I would say something that's pretty universally true is that before you adopt new forecasting technology, you have to have good data quality. We talked about this a little bit before, but if you have no idea where your cash flow information lives, and how its formatted, and how to get access to it, and who owns those systems, make sure that you figure that out before you talk to a forecast provider.
	I would say the biggest things, yes, make sure you know where the data is, make sure that the quality of that data is good. Obviously, there's always the garbage in/garbage out factor. Technology can't fix that. If you're getting incorrect feeds into your TMS or it errors out, and you're not getting daily cash flows, that's something that needs to be fixed first. Technology only can work off of the data that you're feeding it. Make sure the data is good quality, and make sure you know how to access it.
	Then, ultimately when you do talk to forecasting providers, make sure you have an understanding of what your budget is, what IT resources you have available, if they're needed. Ultimately most forecasting technologies have some sort of implementation, so make sure you have the right stakeholders involved. I think, Karen, you made a very good point earlier; make sure the end-users are sitting at the table when you are seeing the demos, when you're talking to the providers, and are part of that evaluation process.
Karen	It sounds like it isn't really about the size of your business, but really understanding what you're looking to achieve and understanding your source of data are really going to be the key drivers for any client looking to leverage new technology to do cash forecasting. Thank you, Paul, for the insight. It definitely was great for me to understand this as well.
	That's all the time that we have for today. If anybody does have any questions about today's topic, please reach out to your Bank of America representative to organize a follow-up discussion. I know that cash forecasting is very much front of mind since the pandemic, so it is a win with Bank of America's solution coming out over the next month or so. It's perfect timing for us to be talking about this topic.
	Thank you, Paul, again for your time. Thank you, everyone, for joining. We look forward to your participation on our next Liquidity Speaker Series Call. Thank you.
Coordinator	Thank you. That concludes your conference call for today. You may now disconnect. Thank you for joining, and enjoy the rest of your day.

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