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Big Data for the Next Big Idea in Financial Services
Understanding Customers, Global Economies and Human Welfare with Analytics

Insights from a panel discussion at the
SAS Financial Services Executive Summit

Featuring:

Aditya Bhasin, Consumer Marketing and Online/Mobile Banking Executive, Bank of America

Robert Kirkpatrick, Director, Global Pulse, United Nations

A. Charles Thomas, Market Research and Analytics Executive, USAA

Moderator: **Jim Davis**, Senior Vice President and Chief Marketing Officer, SAS

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Introduction

Fifty-seven million customers, 29 million of them using online banking. Ten-million mobile banking users, growing at a rate of about 30,000 to 40,000 registered users a week. Billions of customer interactions each week.

That's the world of Bank of America. "For us, big data is a way of life," said Aditya Bhasin, who manages marketing for the bank's consumer lines of business, as well as marketing and operations for online and mobile platforms. "We have somewhere on the order of 65 petabytes of data about our customers and the interactions that we have with them.

"We use maybe **1 percent** of it for analytics – and even then, there's too much of the looking back and not enough of the looking forward."

How can financial services organizations get more value from the data they already have? What new data sources should they be capturing, and how can they transform that data into forward-looking insights?

Those were the questions of the day at the May 2012 SAS Financial Services Executive Summit. In a one-hour panel discussion at the event, leaders from banking, insurance and public policy organizations shared their ideas about big data – what their organizations are doing with it, how to deal with it and what they wish they could do.

- **Aditya Bhasin** from Bank of America explained how financial services companies can make better use of the data already being collected to differentiate the customer experience.
- **Robert Kirkpatrick**, who leads an information initiative of the UN secretary-general, discussed how data can be used to better understand changes in global economies and human well-being.
- **A. Charles Thomas**, a market research and analytics executive at the insurance and investment company USAA, described how his company is navigating the shift to more real-time and predictive analysis.

What Exactly Is Big Data?

Big data is a relative term describing a situation where the volume, velocity and variety of data exceed an organization's storage or compute capacity for accurate and timely decision making.

"The definition of big data is all relative," said Jim Davis of SAS, who moderated the panel discussion. "It is not so much about the volume of data but about reaching the point where, for whatever reason, the organization has difficulty getting to it and truly harnessing it. We wouldn't be talking about big data if it didn't represent some sort of obstacle to the organization."

It's an obstacle when data grows beyond the limits and processing capabilities of relational database management systems. It's an obstacle when the data is used primarily to look at the past but not to predict or optimize the future. It's an obstacle when it takes hours or days to get the answers to time-sensitive questions. It's an obstacle when the window of opportunity – such as the chance to get customer insight right to the point of contact – has passed.

Beyond Big Data Warehouses

Our thinking about data has fundamentally changed in just a few years, said Davis. "If we were having this conversation five, six or seven years ago, we would be talking about the importance of consolidating information from all the product silos in our financial institutions, building an enterprise data warehouse, and then making sure the data is clean and made available for people to apply certain analytics to it so that we can make fact-based decisions that we hope are predictive in nature. That sounds really good, but we're past that point today. Now we really need to be looking forward to what we can do faster and how we can handle big data without having to bring it all together into an enterprise data warehouse."

Bhasin agreed: "Historically, the first thing you worried about was, 'Let's put everything into one data mart or one big warehouse, and then we'll start working on it.' As more and more tools and platforms get developed that allow you to use highly distributed, highly disparate and highly unstructured data sources, we're able to tie and drive insight from those sources. That's where we are excited about big data."

Big data refers to enormity in five dimensions:

Volume – From terabytes to petabytes and up.

Variety – An expanding universe of data types and sources.

Complexity – Need to correlate and share data across entities.

Velocity – Accelerated data flow in all directions.

Variability – Inconsistent data flows with periodic peaks.

Extracting Business Value from Big Data

The true value of big data lies not just in having it, but in being able to use it for fast, fact-based decisions that lead to real business value. To that end, the role of data in the organization has been fundamentally redefined, said Davis. "Traditionally, data was used in support of business intelligence, OLAP, query reporting, for creating presentations – those kinds of things. Today, the demands on data are incredibly complex. We're relying on data to run our businesses, and we're using analytics in a predictive way to enable us to be more proactive in our decision making and less reactive. And the questions we're asking are much more complex," dealing with critical issues of risk, fraud, compliance and customer insights.

For example, what would it mean to your organization if you could understand customers not just as segments but as individuals? For example, USAA recently expanded its traditional focus on military officers to include members of the military at any level of honorable service. With more diversity than ever among its 9 million members, it's no longer enough to segment by demographics, said Thomas. "Just imagine, we have a 65-year-old general and we also have a 65-year-old private who served in Vietnam. They have some things in common and other things not in common. We also have a 19-year-old private. So, traditional ways of looking at our membership are really having to change." New data management and analysis techniques enable a more granular and real-time view.

Big Data on the World Stage

The benefit of big data goes beyond doing what we've always done, better and faster. It is more than doing a better job at the proverbial "right product to the right customer at the right time." Big data has a powerful role to play in public trust and industry stability. For example, there is speculation that disasters such as the financial meltdown and mortgage crisis could possibly have been prevented with risk computation on historical data at a massive scale.

"We live in a highly connected world," said Kirkpatrick. "Our economies, our societies, our markets are connected in ways so complicated we no longer understand them. … An economic shock in one part of the world can reverberate around the world very, very quickly. In a matter of months, economic shocks, political unrest and social upheaval can begin to reverse decades of work that we've done to fight hunger, poverty and disease.

"The landscape is so dynamic that you could have emerging vulnerabilities that you don't even know about until two years later. That's a serious problem, because then we're finding out today what started happening two or three years ago, because of the time it takes for statistics to come out. We recognized that we had that challenge, while ironically, we are swimming in an ocean of digital data."

The optimistic vision for big data is that organizations will be able to harvest and harness every byte of relevant data and use it to make supremely informed decisions.

Big data technologies now support the ability to collect large amounts of data, but more importantly, there's a shift from simply collecting it to being able to understand it and take advantage of its full value – very quickly.

The ability to rapidly process massive amounts of data is redefining the possible on a grand scale, said Kirkpatrick. "We see big data as an astonishing opportunity, a really unprecedented opportunity, to understand what's happening while it's still happening, so we can be more agile developing responses and getting feedback as to whether those responses are having the desired outcome."

Ten Best Practices for Getting the Most From Big Data

1. Find Ways to Extract More Value from What You Already Have

"There's this notion of data intoxication," said Bhasin. "You can get very drunk on the fact that there is the other 99 percent of data that's available, but we're focusing right now on making better use of the 1 percent that we do use."

For example, the bank has transaction records, so it knows where customers shop. With customers' permission, could Bank of America use that data to deepen its relationships with customers? In January 2012, Bank of America started testing a new service, BankAmeriDeals, that allows customers to get savings from retailers based on their previous spending patterns.

"Most deal services are inherently unintelligent about you," said Bhasin. "We have the advantage that we know where customers shop, and we can match their shopping behaviors to a deal that's relevant to them, which is populated into their online banking statements. … The next time you walk into a store, you swipe any Bank of America or Merrill Lynch debit or credit product, and the deals automatically apply. You get the cash back the same day."

The BankAmeriDeals service benefits customers, because everybody loves getting a deal. It benefits merchants, who can tailor the deals and recipients to influence consumer behavior. And it benefits the bank, because it makes the credit or debit card more valuable – and more frequently used.

"What we're seeing in the early pilots is that customers who get to know the program activate their cards more and use their cards more," said Bhasin. "If there's some sort of financial outcomes that occur because of the deals themselves, that's interesting, but the real benefit is that our card becomes 'top of wallet,' and that's the holy grail."

For the United Nations, the holy grail is improving program effectiveness. "We collect performance metrics across all of the different services and programs that the UN runs worldwide, and we use this data to understand how well the program worked," said Kirkpatrick. "What we're beginning to realize is that how people participate in programs changes over time – they use programs differently when their needs change – so there's a vast trove of data tracking what people did and how they interacted with our systems that can tell us more about what was happening in their lives outside of that interaction. We hadn't even looked at that before. We suddenly realized this is a dual-purpose data source, and we hadn't even begun to touch that."

By finding a new use for transactional data the company already had, Bank of America created a new program that benefits customers, merchants and the company. Data that was formerly just a byproduct of the operational environment becomes an asset for potential top-line benefit.

2. Bridge Gaps Between Organizational Data Silos

When different business functions and flavors of analysis are integrated, the organization gains essential big-picture perspective, said Thomas. "Under my organization, we have market researchers and we have what are considered traditional analysts. One describes the 'what' and the other describes the 'why' – but together they can say 'what happens next?'

"We want to examine customer behavior but also to understand the motivation, so we can either repeat it or stop it, and be able to communicate in a way that resonates. So bringing those pieces together has been very powerful, because it tells complete stories. You have full understanding as to why things are happening, so that you can effect change."

It is also important to bridge the gaps over time, to connect the dots, said Bhasin. "For example, a researcher will go out and ask a customer a question, and the customer will answer the question in the way customers do in focus groups and quantitative surveys. But as we all know, what they say and what they do are very different things. So you have to close the loop and see how they actually did behave – and feed that information back into the next time you ask the question."

3. Move from Hindsight to Insight and Foresight

"Everybody has analytics today," said Davis, "but the question is, what sort of analytics do you have? Do you have analytics that is showing you things that happened in the past, or do you have analytics that is predictive in nature – such as predictive modeling, forecasting, operations research techniques for optimization and statistical analysis to do regression?"

USAA recognized the need to make that shift to a more forward-looking perspective, said Thomas. "Understanding what happened yesterday really, really well is not going to be enough for us to operate in real time tomorrow. So starting last year, we're pivoting, moving away from what we call hindsight and insight and moving toward foresight."

Thomas described it as moving from "I know what I don't know" to "I don't know what I don't know," to "what if."

4. Be Creative Finding New Data Sources

Moving up that analytics value chain from rear-view analysis to predictive insight requires that you use data sources differently or tap into new ones. If you're just answering specific questions, the traditional enterprise data warehouse probably suffices, said Thomas. You can even move into the second realm – finding patterns that were previously unknown – by delving deeper into the various data sources the organization already has. But to evolve to the third area – predictive insight – you have to bring in far more data from external sources.

The UN has to be creative to get access to the behavioral data it needs, said Kirkpatrick. "The best data sources about what's happening to people are in the hands of the private sector, and ultimately … that creates fragility for economic and social shocks. If there were a way for us to create a commons for sharing some of this data in ways that protect privacy and competitiveness in the process but still let us make better decisions globally, we could change the world.

"We're now in discussions with private sector companies across different industries about this idea we call data philanthropy. How could you share – not the raw data, but aggregated data and analysis that powers your business – to reveal patterns, here and around the world?"

With a constellation of data sources, could we identify when people are in trouble, losing their jobs, getting sick, unable to afford their medicine? Could mobile financial transaction data show where people are finding employment, where they are in trouble, or when they are starting to default on their mobile phone-based microloan payments?

"With these kinds of data sources, we're not talking about probabilistic models that something might be happening," said Kirkpatrick. "This is hard, quantitative evidence of human behavior in time and space. You have to investigate and triangulate to determine causality, but being able to actually see collective behavior change using anonymized data sources is very powerful."

5. Capitalize on the Insights in Social Media

"Social media analytics is a profoundly useful tool for what we're trying to do, because you can see intention in a way that we've never been able to do," said Kirkpatrick. Social media is prevalent even in the world's developing countries, representing a largely untapped new data source.

"From the Internet revolution to the mobile revolution to the social network revolution, populations in places like East Africa have tremendous mobile phone coverage. Senegal is adding 100,000 Facebook users a month, and there's a 600 percent increase in mobile phone coverage in that country. Indonesia is the second-largest user of Twitter in the world now. There are new opportunities to listen to these signals to help us fill information gaps in understanding what is happening. If we can figure out ways to get access to the data, create the right incentive models, do the right analytics and fully protect privacy in the process, we could have a profound effect."

Kirkpatrick described a project where social media analysis enabled the UN to predict unemployment spikes in the US and Ireland four or five months ahead. "We worked on one project with SAS where we found if you simply analyzed the chatter on social networks about work in the months before people lose their jobs, they know something's wrong and it changes the emotional tone of how they talk about work." Imagine the power of being able to drill into particular parts of the country, identify impending job losses, and then have that advance notice to work with employers and establish job training programs where they can do the most good.

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> **Robert Kirkpatrick**
> *Director, Global Pulse, United Nations*

6. Give Customers Value for the Data Value They Offer

There is unquestionable value in being able to analyze and correlate data from a wealth of new data sources, but at what point does it become intrusive, at least from an individual perspective? Our panelists agreed on the need to be sensitive to "the creepy factor" but felt it could be overcome with simple consent. Get customers' permission to use the data by offering them some value in return.

"There has been some really interesting research in this area that shows that the perception of whether or not this is a violation of my privacy is relative to my perception of the good, whether it's a public good or a personal good," said Kirkpatrick. "Google 'flu trends,' for example. People search for their symptoms on Google; it predicts flu outbreaks by two weeks ahead of CDC, and nobody's worried about the fact that it's aggregated data from search queries. Amazon tells me that people who like this particular book also like that book. Thank you. That's a gift; you made my life better today. We struggle with this all day, because our mission is to help people, but we've got to make sure that the public good dimension of it, or the personal value, is really clear."

7. Develop a Customer-Centric View

"We're very focused on data that can create differentiation in the customer's experience," said Bhasin. "What do we know about either your behavior or your potential that can cause us to create a meaningfully different environment when you come and visit us in any one of our channels?" That insight is gained with two primary approaches:

- **Model targeting**. "When you come onto BankofAmerica.com, we know who you are; we know what you have with us. We also know what you don't have with us and what you could have with us," said Bhasin.
- **Behavioral targeting**. "Based on where you have been on our site, or based on the product holdings in which you've shown interest in a prior interaction, BankofAmerica.com changes the products that are shown to you in real time.

"These are things we couldn't do two years ago," said Bhasin.

8. Build Bridges Between the Business and IT

Our panelists agreed that the need for collaboration is greater than ever. Whatever the organizational structure, the business people need to understand IT, and IT needs to understand the business.

"Our best technologists are the ones who sit at our tables, work alongside with us, and are actively involved," said Thomas. "It is very important that they're working with us right at the beginning, because otherwise there's too much of, 'What if we could do this,' and then you end up with the business requirements document to fill out, and then you are by design in an antagonistic environment."

"In the coming years, we'll be looking more at social data, more location data, but there are a lot of privacy and permission questions that, as an industry, we all need to be careful about before we dig too deep."

Aditya Bhasin
Consumer Marketing and Online/Mobile Banking Executive, Bank of America

By the same token, the business users need to be technology-aware. "They're not going to understand the nuts and bolts of the IT architecture, but they should understand which systems connect to which systems and how they work, because then they're less likely to ask for herculean things that can't happen."

The talent model at USAA encourages this business/IT cross-pollination, said Thomas. "We like to see technologists coming into the business and doing business operating rules for a while, and going back to technology, and vice versa. We think that's very important, because you've got to have a core understanding of the business."

USAA went so far as to create a new career path – basically the equivalent of an analytics fellow, a role that can go from executive director level to vice president without managing people. "There will be only a handful of them across the enterprise, but ultimately we're trying to create a career path for the best and brightest to not be forced into managing people." This represents a big cultural change from the tradition that equates power with headcount. "Now power is in the ability to make good decisions," said Thomas. "We believe that this title, job class and hierarchy are really representative of what we're talking about as we move toward being a fact-based enterprise."

SAS is doing its part by founding a master's degree program in advanced analytics at North Carolina State University. "The program has been extremely successful," said Davis. "These aren't people who come from a mathematics or analytics background; they're business people who appreciate the need to use what's available to help solve a problem. Graduates are getting two and three job offers, and in the last year, the average salary for a graduate out of this program has been higher than the average salary for an MBA out of the university, so it shows you how much they are being valued."

9. Establish an Analytics Center of Excellence

Since analytics expertise is still in short supply, organizations should take this concept very seriously, said Davis. "We have help desks in our organizations where if your word processor is not working or your email is not working or your PC crashed, you have a single number you can call, and there's a repository of information and expertise out there to help. It amazes me that a lot of organizations view data as a strategic asset yet have no equivalent of the help desk for that environment."

"At Bank of America we started to have a slightly different problem," said Bhasin. "We started to have multiple centers of excellence. Each center of excellence thought it was individually excellent, and it was, but the problem was that the connections weren't being made. The research center of excellence would churn out great research; the analytics center of excellence was churning out great analytics, and the modeling center of excellence – and there were two of them, a customer modeling and credit modeling center of excellence – were each doing great work. Where we were falling short was that nobody was connecting these pieces."

The company recently consolidated the reporting units, analytics units and modeling units into a single consumer marketing function, with a chief data officer. "It's very early still, but we are starting to see people working together in different ways to come up with common sets of solutions to common sets of problems," said Bhasin.

10. Prove the Value and Build Incrementally

IT budgets have certainly not expanded at the same pace as the big data wave. So the onus is still there to show the ROI for every IT investment, but it can be a challenge to show the payback when you're breaking new ground, said Thomas. "It might not pay back anything, but it might pay back tenfold. You never know."

Thomas said USAA is taking an "inch-by-inch" approach. "Rather than go get heaps and heaps of more data, you have to show the incremental benefit of adding that. If you go get data on customer profitability, they say, 'Okay, I understand, you're going to drive more profitability.' If you go get customer data on cross-channel behavior, they say, 'Great.' You can use it for deflection techniques, and you can put a dollar value on that. But what's the value of social media today? We don't know, but we can test our way into that.

"So it's not only the analytical process around how you can wring as much value out of what you have, but it is also a culture and process change. You have to give the CFO a reason to believe along the way, show incremental value and partner with IT to drive that change. But you also have to loosen the criteria for success around IT investments; otherwise you won't make any bets in this space at all."

Closing Thoughts

Big data is not just about helping an organization be more successful – to market more effectively or improve business operations. It reaches to far more socially significant issues as well. For example, could we have foreseen the mortgage meltdown, the financial crises and the recession if only we had gotten our arms around more data and done more to correlate it? Could we trim millions of dollars in fraud from government programs and financial markets?

The possibilities are wide open. At SAS, we are optimistic about the potential for deriving new levels of value from big data with big data analytics. That's why we reinvented our architecture and software to satisfy the demands of big data, larger problems and more complex scenarios, and to take advantage of new technology advancements.

SAS® High-Performance Analytics was designed to support big data initiatives, with support for in-memory, in-database and grid computing. SAS OnDemand delivers any SAS solution on an infrastructure hosted by SAS or private cloud. The SAS High-Performance Analytics solution on Teradata and EMC Greenplum appliances provides yet another option for applying high-end analytics to big data.

> "If you're trying to use the 'I don't know what I don't know' or 'what if' mentality, but you're using methods from the era of 'I know what I don't know,' then you're really going to be in a position where you never make any investments in this space at all."

A. Charles Thomas
Market Research and Analytics Executive, USAA

With SAS High-Performance Analytics, the time to decisions can be compressed from hours and days to minutes and seconds, transforming large volumes of data into relevant business value. For example:

- A large financial services firm with millions of customers reduced the run time for predictive modeling for marketing offers from five hours to less than three minutes.

- A large investment banking firm cut the time to recalculate the risk exposure of large portfolios of complex financial instruments from 18 hours to 12 minutes.

- A major US bank slashed its loan default calculation time for a mortgage book of more than 10 million loans from 96 hours to just four.

With that kind of speed, more predictive models can be analyzed, resulting in better offer acceptance. Companies can quickly determine exposure and fine-tune their responses to market changes. High-risk accounts can be identified early. Customer communications can be framed in the latest knowledge about customer needs or preferences.

"The high-performance analytics environment is a real game-changer," said Davis. "It can break down the barriers to big data, and it can help us do things in minutes rather than hours. Then the obstacle goes away and financial services organizations can focus on how to capitalize on this power to change the way they do business."

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