



How any size organization can supersize results with data visualization

Discover trends and communicate results with data visualization

From midsize companies and government organizations to global banks and professional sports teams, all types of organizations are using data visualization to help make sense of their data and to comprehend

information quickly. Keep reading to learn how six organizations of all types and sizes are using data visualization to improve customer relationships, fight fraud and more.

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Get the full
picture when
disaster strikes

SAS® Visual Analytics dashboard gives
Aviva Canada executives up-to-the-minute
information about claims

In June 2013, days of torrential rain inundated the city of Calgary, Alberta, and surrounding areas. The Bow and Elbow Rivers overflowed their banks, causing the evacuation of 26 neighborhoods and 100,000 people. Four died, and a state of emergency was declared in 32 communities. The Insurance Bureau of Canada called it the costliest natural disaster in Canadian history, with insurable damages of more than US\$1.7 billion.

Data from that disaster led Charles Dugas, Assistant Vice President of R&D at Aviva Canada, to model a catastrophe dashboard in SAS Visual Analytics. "During the flood, executives could easily monitor the amounts of claims coming in, and by geocoding them, we could map them out and see which customers and brokers were most affected."

Throughout the company, Dugas says, use cases for [SAS Visual Analytics](#) fall into two categories: reporting, like the dashboard above, and exploration.

"The exploration side is really for analysts who want to better understand their data and check for relationships, one-to-one relationships and one-to-many relationships," he says. For example, certain loss causes shouldn't be associated with certain types of coverage; analysts can perform a "sanity check" on the data, he says.

"SAS Visual Analytics is so fast, you move from asking a few questions of a data set to entering into a 'chat' with a data set," Dugas says. "You ask a question, the answer comes back immediately. That generates another question, and the loop goes on. You can gain intelligence about your data much faster that way."

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Charles Dugas
Assistant Vice President of R&D at Aviva Canada

On the reporting side, Dugas hopes to use SAS Visual Analytics to automate what can be a very manual process.

"We have a lot of people working on reporting, spending a lot of time in an assortment of different tools," Dugas says. "With SAS Visual Analytics we want to not only streamline a lot of these processes, we want to enhance those static reports and make them dynamic. So an executive can look at an aggregated, high-level view of the business and start drilling down through different segments, different policies – even down to an individual customer."

Dugas says there are clear benefits to the business, though they haven't been synthesized into a single return on investment number: customer retention, fraud detection, better intelligence for agents and brokers, and even the ability to become more competitive by adjusting pricing in months rather than the normal two-year cycle.

And there's more to come. [High-performance analytics in a Hadoop structure](#) and [neural networks in a visual analytics environment](#) are on Dugas' road map. "In a couple of years, what I'm hoping for is to have a much cleaner, clearer path from data sources all the way to the scores, modeling those scores, and monitoring those models," Dugas says. "That's what I'm hoping for."



The magic behind the Magic

Instant access to information helps the Orlando Magic up their game and the fan's experience

From ticket sales to starting lineups, the Orlando Magic have come a long way since their inaugural season in 1989. There weren't many wins in those early years, but the franchise has weathered the ups and downs to compete at the highest levels of the NBA.

Professional sports teams in smaller markets often struggle to build a big enough revenue base to compete against their larger market rivals. By using **SAS® Analytics** and **SAS® Data Management**, the Orlando Magic are among the top revenue earners in the NBA, despite being in the 20th-largest market.

The Magic accomplish this feat by studying the resale ticket market to price tickets better, to predict season ticket holders at risk of defection (and lure them back), and to analyze concession and product merchandise sales to make sure the organization has what the fans want every time they enter the arena.

The club has even used SAS to help coaches put together the best lineup.

"Our biggest challenge is to customize the fan experience, and SAS helps us manage all that in a robust way," says Alex Martins, CEO of the Orlando Magic. Having been with the Magic since the beginning (working his way up from PR Director to President to CEO), Martins has seen it all and knows the value that analytics adds. Under Martins' leadership, the season-ticket base

has grown as large as 14,200, and the corporate sales department has seen [tremendous growth](#).

The challenge: Filling every seat

But like all professional sports teams, the Magic are constantly looking for new strategies that will keep the seats filled at each of the 41 yearly home games. "Generating new revenue streams in this day of escalating player salaries and escalating expenses is important," says Anthony Perez, Vice President of Business Strategy. But with the advent of a robust online secondary market for tickets, reaching the industry benchmark of 90 percent renewal of season tickets has become more difficult.

Perez's group takes a holistic approach by combining data from all revenue streams (concession, merchandise and ticket sales) with outside data (secondary ticket market) to develop models that benefit the whole enterprise. "We're like an in-house consulting group," explains Perez.

In the case of season ticket-holders, the team uses historical purchasing data and renewal patterns to build decision tree models that place subscribers into three categories: most likely to renew, least likely to renew, and fence sitters. The fence sitters then get the customer service department's attention come renewal time.



SAS has helped us grow our business. It is probably one of the greatest investments that we've made as an organization over the last half-dozen years.

Alex Martins, CEO, Orlando Magic

"SAS has helped us grow our business," says Perez. "It is probably one of the greatest investments that we've made as an organization over the last half-dozen years because we can point to top-line revenue growth that SAS has helped us create through the specific messaging that we're able to direct to each one of our client groups."

Ease of use helps spread analytics message

Perez likes how easy it is to use SAS – it was a factor in opting to do the work in-house rather than outsourcing it. Perez's team has set up recurring processes and automated them. Data manipulation is minimal, "allowing us more time to interpret rather than just manually crunching the numbers." Business users throughout the organization, including executives, have instant access to information through [SAS Visual Analytics](#). "It's not just that we're using the tools daily; we are using them throughout the day to make decisions," Perez says.

Being data driven

"We adopted an analytics approach years ago, and we're seeing it transform our entire organization," says Martins. "Analytics helps us understand customers better, helps in business planning (ticket pricing, etc.), and provides game-to-game and year-to-year data on demand by game and even by seat.

"And analytics has helped transform the game. GMs and analytics teams look at every aspect of the game, including movements of players on the court,

to transform data to predict defense against certain teams. We can now ask ourselves, 'What are the most efficient lineups in a game? Which team can produce more points vs. another lineup? Which team is better defensively than another?'

"We used to produce a series of reports manually, but now we can do it with five clicks of a mouse (instead of five hours overnight in anticipation of tomorrow's game). We can have dozens of reports available to staff in minutes. Analytics has made us smarter," says Martins.

What's next?

"Getting real-time data is the next step for us in our analytical growth process," says Martins. "On a game day, getting real-time data to track what tickets are available and how to maximize yield of those tickets is critical. Additionally, you're going to see major technological changes and acceptance of the technology on the bench to see how the games are played moving forward. Maybe as soon as next season you'll see our assistant coaches with iPad® tablets getting real-time data, learning what the opponent is doing and what plays are working. It'll be necessary in the future.

"We're setting ourselves up to be successful moving forward. And in the very near future, we'll be in a position again to compete for a conference championship and an NBA championship," says Martins. "All of the moves made this year and the ones to come in the future will be done in order to build [success on \[and off\] the court](#)."



In the first year, we saw ticket revenue increase around 50 percent. Over the last three years – for that period, we've seen it grow maybe 75 percent. It's had a huge impact.

Anthony Perez, Vice President of Business Strategy, Orlando Magic



Data discovery leads to happy customers

Oberweis Dairy gains customer insights,
improved satisfaction and retention with
SAS® Business Analytics

Oberweis Dairy is bringing state-of-the-art analytics to its decidedly old-fashioned business – home milk delivery and traditional ice cream shops. With SAS Business Analytics, the company mines its data to better understand which customers shop through its different channels for more effective cross-selling and up-selling. The marketing efforts are critical as the company hopes to expand in the coming years.

Oberweis Dairy at a glance

The company has 48 dairy stores in the Midwest, along with a six-state home delivery network. It also sells wholesale through local and national grocery chains. The dairy stores sell prepared ice cream treats along with milk, packaged ice cream and other fresh, perishable foods. Oberweis wanted to understand its customer base better so it could cross- and up-sell without cannibalizing from existing sales channels.

With SAS®, Oberweis:

- Can easily mine dairy store receipt data, match it against loyalty card information and select the best candidates for home delivery sales campaigns.
- Learned that running specials on milk sold through grocery store chains doesn't cannibalize from dairy store or home delivery sales. The sevenfold

increase in sales at grocery stores during a recent promotion helped introduce new customers to the Oberweis brand.

- Automated reports designed to calculate commissions for home delivery drivers. The process had previously taken a combined management effort of 20 hours a week using a system that relied heavily on Excel spreadsheets.
- Quickly identified and corrected manufacturing glitches by mining customer complaint data.
- Created a program to root out bottle return fraud at dairy stores.
- Gained valuable insights on what factors would improve customer satisfaction and retention.

Getting the big picture

Oberweis uses [SAS® Visual Data Discovery](#) to view data. "It's a much faster way to identify correlations and trends in data," says Bruce Bedford, Vice President of Marketing Analytics and Consumer Insight.

Why SAS®?

"I think implementing SAS is a great way for a small company to become a large company," Bedford says. "One of the most valuable assets of any company, large or small, is its data, but you have to analyze it. SAS is one of the best tools available to do that."



I think implementing SAS is a great way for a small company to become a large company.

Bruce Bedford, PhD, Vice President of Marketing Analytics and Consumer Insight at Oberweis



Valencia College uses data-driven approach to improve outcomes in higher education

SAS® Visual Analytics empowers the college to help students succeed

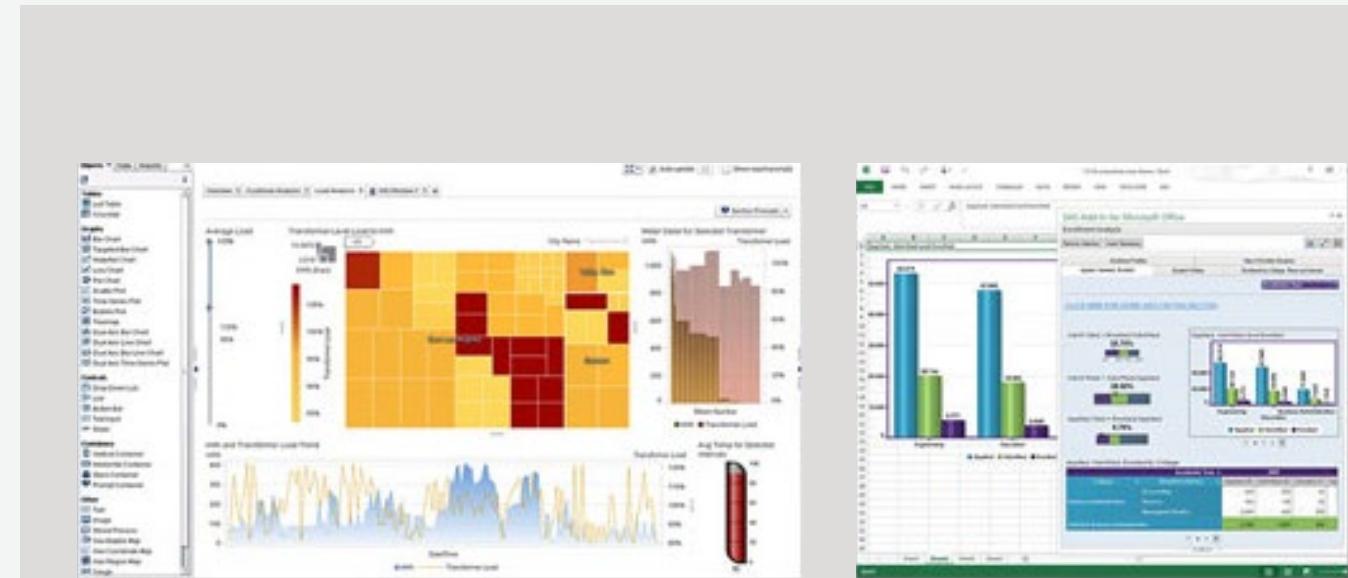
Making sure the right number of courses are offered at fast-growing Valencia College is just one of the many jobs Daryl Davis' team is responsible for. To make it easier for administrators to make these decisions, Davis has automated the process with SAS Visual Analytics. Administrators can see what they want when they need it, and the Institutional Research team Davis leads can devote time to more detailed analysis.

Because Valencia College has more than 59,000 students spread over five campuses, enrollment periods are hectic for administrators who must rapidly determine whether to open more sections of certain classes, or close others. By using [SAS Visual Analytics](#), administrators can view the information themselves anytime, anywhere, giving what one campus president described as "the ability to see what is going on from my mobile device while I'm sitting in the drive-thru at McDonald's."

Data-driven decision making has been transformed with users exploring their data through interactive analytic visualizations anywhere the need arises. "We don't have to create 100 different versions of the same report. Users can get access to any data and answer any questions they might have by just drilling in, checking or unchecking a box, or using a drop-down menu," says Alex Larzabal, who directs enterprise application services for the college. The result: Requests for ad hoc reports have dropped more than 60 percent.

Managing enrollment and student progression

The earliest successes of SAS Visual Analytics were evident in the weeks leading up to a new semester. As students enroll, deans and campus presidents are constantly analyzing their information: Is demand for introductory English classes outstripping supply at the Osceola campus? Is there weak demand



With SAS Visual Analytics, my mind is always turning. What can we study? What data can we give our administrators? It has led to a culture shift.

Daryl Davis, Director of Institutional Research at Valencia College

spread across multiple sections of math at another campus? The school wants to make sure students can get the classes they need, but it doesn't want several classes with low enrollment. The data is refreshed every day so campus deans can see where the college is at as far as availability and sections being filled and what percent of each class is filled to better understand whether to open new sections on campuses where demand is high or close sections where demand is low. "This helps with space and resource utilization," Davis explains.

Davis' team has automated multiple reports that used to be done manually, including one that shows how long it takes new students to complete 15

college-level credits. "Given that many of our students need to take developmental courses, our administration believes that getting in 15 college-credit courses within two years is a good measure to see how successful students will be toward graduation," he explains. Now, using SAS Visual Analytics, this report - as well as other factors - are built into the dashboard. Measures include graduation rates by race, ethnicity, first-generation college students and students who participate in a special college transition program.

Since Valencia is a member of the Achieving the Dream consortium of colleges, this data-driven approach to improving outcomes is expected. Administrators can answer complex questions: Why are students successful in certain demographics? Are we meeting certain college key thresholds that we have set? Are students who have experienced certain initiatives within the college more successful?

"Our leadership needs data to make informed decisions on whether current initiatives to help first-generation or low-income students are working," Davis explains.

What happens when administrators have instant access to data

Now administrators can quickly make adjustments - and even find mistakes, such as the campus president who was looking at a report and found too many sections of a class were opened too soon. She was easily able to annotate that on her tablet and email it to her dean and ask, "Why are we offering this?" Had the mistake not been found, the college would have needed to collapse several sections, possibly causing some students to have a difficult time working that class into their schedules.

These newfound abilities have led to a culture shift. Instead of using static PowerPoint slides for meetings, university administrators now easily access and share up-to-date reports in SAS Visual Analytics on their laptops, mobile phones or tablets. If a question arises, attendees can interact with

the data and reports. They can slice and dice the information however they want, and use filters and drill-through capabilities to better understand what is going on. As Davis explains, "I think a part of the culture shift is not only our discussions of data, but it also shifts the discussions on how data is visualized and how it's presented to the audience."

And there is more to come

The Institutional Research team is exploring more ways to use SAS Visual Analytics. Valencia College is partnering with nearby University of Central Florida (UCF) to understand student success rates and persistence and other measures for students who graduated from Valencia College's two-year program and eventually transferred to UCF.

The college is also working on visualization for Human Resources so it can better understand budgeting and staffing. "They're interested in having conversations like, 'Do we need to create more positions? If we do, how many more positions can we afford? Do they need to be full time versus part time? What campus or what department needs that the most?'" Larzabal elaborates.





Improving patient
care and reducing
costs with visual
analytics

Gelderse Vallei Hospital brings data
analysis directly to medical staff

What if you could use weather forecasts to determine demand for doctors' visits? At Gelderse Vallei Hospital in the Netherlands, a visual analytics approach is reducing wait times, improving care and even predicting when the weather will cause a spike in doctors' visits.

"We provide the medical staff with data they can view on the web or via mobile phones, and they can respond immediately," explains Rik Eding, Data Specialist and Information Analyst for the hospital. "You click on the data you want to analyze and the form in which you want it presented." According to Eding, "It's highly addictive to be able to delve deeper and establish new correlations."

The ability for anyone, not just IT, to view data helps find outliers having a negative impact. Hospitals in the Netherlands are judged by wait times, and Gelderse Vallei's wait time for hernia surgery had jumped. "When we looked closer, it was because two patients postponed their operations due to holidays," Eding explains. "If we left these two cases out of consideration, our waiting period had actually decreased."

Users conduct analysis without relying on IT

Before using [SAS Visual Analytics](#), the hospital staff was dependent on Eding and his colleagues to provide reports and analysis. "As soon as we compiled the report, we immediately received 10 follow-up questions," he says.



We provide the medical staff with data they can view on the web or via mobile phones, and they can respond immediately ... It's highly addictive to be able to delve deeper and establish new correlations.

Rik Eding, Data Specialist and Information Analyst at Gelderse Vallei Hospital

When SAS Visual Analytics was rolled out, colleagues reacted enthusiastically. "I saw care managers and physicians start exchanging ideas mutually," Eding says. "They started asking questions about what they could do themselves. That is exactly what we had hoped for. We are capable of providing reports, but the hospital units know best what information they require."

The hospital has also been able to break out of siloed reporting and incorporate outside data sources, such as weather data or information from the country's Social and Cultural Planning Office about the income and education level of patients. "Our physicians had noticed that people with lower levels of education and income had a higher mortality risk," Eding says. "One of the physicians wanted to link the patients' clinical features to their social status to better identify the mortality risk. In this way, we as the hospital can respond even better to a patient's individual situation."

Eding elaborated that the ease of use encourages creative thinking. "I included weather information in our data warehouse at the request of pulmonologists. Now they can predict which patients are going to develop symptoms by using the weather forecasts. They are then able to arrange treatment accordingly. That, of course, is awesome."

And for the first time the finance department, which had used data to reduce costs, can work in unison with the medical staff. "We can improve the quality of care and reduce costs," Eding says. "That's what makes SAS Visual Analytics so exceptional."



Making debt collection less painful

Data visualization and analytics help DirectPay improve client relationships, better manage risk and maximize repayment potential

Practically everyone has some level of debt. When consumers get too far behind and are unable to make payments on time, a debt management company is there to work through the process and help resolve the issue.

Because debt can be a complex and diverse issue, it is tough to read trends and customer behavior, especially if your main tool is a spreadsheet. Colin Nugteren, the Chief Analytics Officer for DirectPay, used to have a lot of spreadsheets. It's his job to help DirectPay decide what debt to buy and then how best to collect on it.

"We needed software to visualize current information, explore relationships, provide predictions and display it all on a mobile device for when we are visiting with clients," Nugteren says. By using visual data discovery tools, the Netherlands-based company gets user-friendly, intuitive explorations and dashboards that help DirectPay's staff work with data and fuel the company's growth.

Fast action on both fronts

DirectPay buys portfolios of delinquent invoices or loans from companies like telcos, utilities and online stores. Each portfolio could include millions of delinquent invoices or loans. To set a reasonable bid price, DirectPay needs to know the likelihood that it can collect the money owed by individual customers or debtors. Powerful predictive analytics are prototyped

using [SAS Visual Statistics](#), then put into production using [SAS® Enterprise Miner](#).™ In the past, this process might have taken a few weeks or months. Now, Nugteren can do it in days.

After DirectPay makes contact with customers, the company also tries to find the best ways to encourage them to pay. Once again, these types of predictive analytics help. The company studies what types of programs help prevent payment problems and what offers - made soon after a payment is missed - can get the debtor back on track.

Additionally, DirectPay recently launched a new independent company called DebtScan to find cars that are subject to repossession. (A car can only be repossessed in cases in which a court grants a verdict to enforce debt collection.) DebtScan drivers use cars equipped with cameras that capture license plate data. Using SAS Analytics, the data is matched against cars owned by people behind on their payments, and the nearest law enforcement office is notified of a car's location. Analytics software processes the information used to match the license plates against the repossession lists. These results can be visualized to understand where there is a predominance of identified cars. This leads to much more efficient use of the limited amount of repossession resources and a faster recovery of these cars, ultimately leading to a faster capital return to DirectPay.

In search of a better process

Before adopting predictive analytics and SAS Visual Analytics, DirectPay had a vast amount of data about payment behavior that it couldn't use



SAS Visual Analytics allows employees to just pull out an iPad and show the clients all the data, face to face, and answer any questions they might have. That exchange of knowledge on a personal basis is crucial.

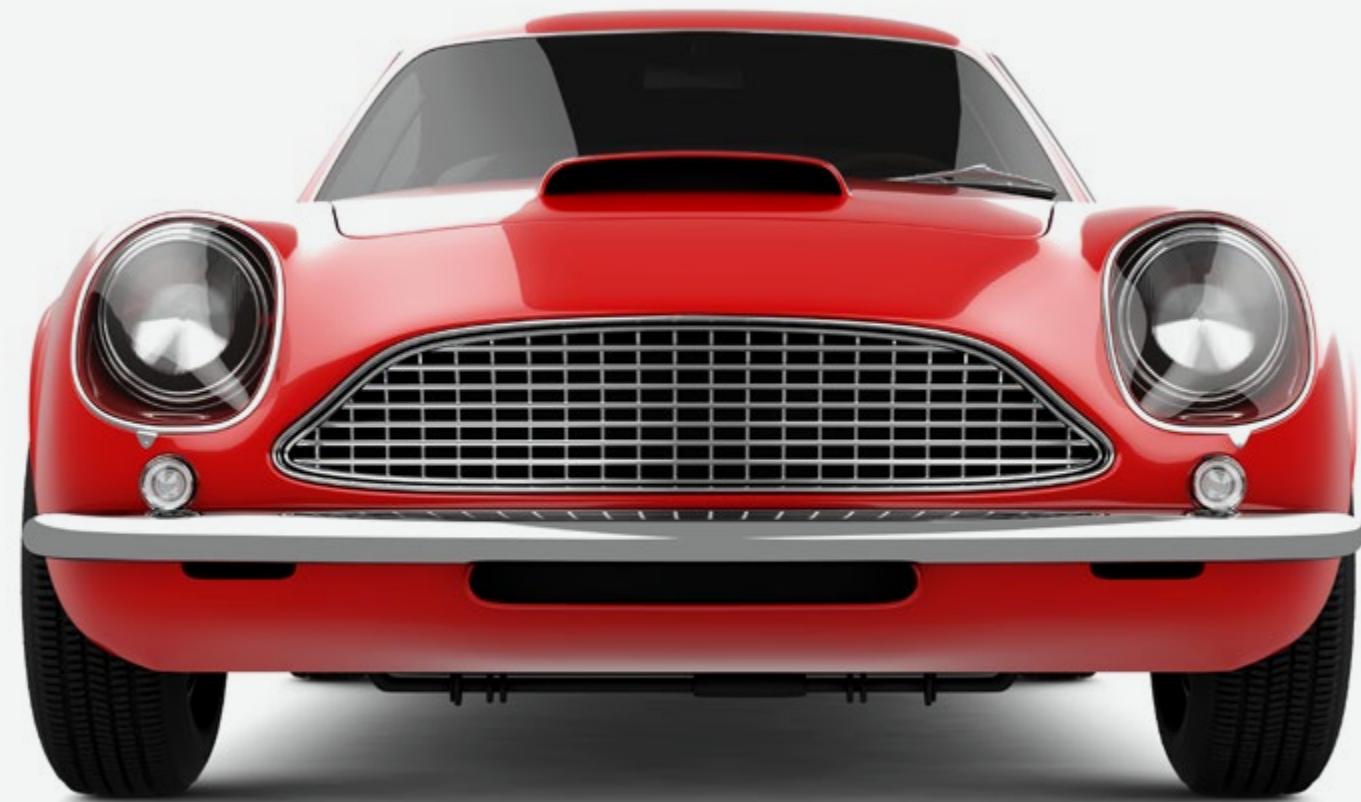
Colin Nugteren, Chief Analytics Officer, DirectPay

effectively. The IT department alone had access to the data warehouse system, so all information requests had to go through it. "We were always behind," Nugteren says. "Now we have relevant data available every day, every hour, every minute."

When visiting with potential and current clients, employees can interact with information on their tablets or mobile phones and answer questions easily. They can track their metrics and follow how well their collection efforts are working. "SAS Visual Analytics allows employees to just pull out an iPad and show the clients all the data, face to face, and answer any questions they might have," Nugteren says. "That exchange of knowledge on a personal basis is crucial."

Geomapping helps the company quickly see areas of high delinquency, which aids in deploying the DebtScan cars in the right geographic locations. "I wake up, and I look at so much information that is really interesting," he says. "It's a real difference, and it makes you feel much more connected. That is something I never expected software to achieve."

It even helps the company maintain a better relationship with debtors. Agents know how often they've contacted an individual, who is responding and who isn't. "When we treat them in a friendly manner, they share more information," explains Nugteren. "They proceed with payments sooner, which in turn leads to more revenue for DirectPay."



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Why you need data visualization

Whether you're a business user, an analyst, a statistician or data scientist, you have a need to visualize data and share results with others.

With data visualization you can make sense of complex data and visually explore all relevant data – smartly, quickly and easily. Interactive data discovery lets you look at every option to find out why something happened and identify critical drivers. The software automatically highlights key relationships, outliers, clusters, trends and more, guiding you to critical insights that inspire action.

Quickly create dazzling interactive reports and dashboards. Then easily share them via the web, mobile devices and Microsoft applications. Recipients can slice and dice to arrive at relevant information using filters and drill-through capabilities.

Predictive analytics combined with easy-to-use features means everyone can assess possible outcomes and make smarter, data-driven decisions – without coding. And data scientists can use our interactive predictive modeling environment, which boosts analytical productivity.

No matter where you are in your analytics journey, we have a visualization tool to scale to your needs. And you can run our software on commodity hardware, database appliances or in a private, public or [SAS Cloud](#). The choice is yours.

What is data visualization?



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