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**Big data, machine learning,** data science – the data analytics revolution is evolving rapidly.

**BY MARTIN HELLER** 

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# Ten hot data analytics trends and five going cold

Big data, machine learning, data science – the data analytics revolution is evolving rapidly. **9** 

#### **BY MARTIN HELLER**



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# How to mine social media for business gold

A strong social intelligence strategy can transform social media data into actionable insights - and help shape your company's products, advertising and customer experience.

**BY SANDRA GITTLEN** 

In an age when most companies have a social media presence, it's somewhat surprising that many still haven't figured out how to turn data gathered from company-owned properties and social media listening tools into automated and actionable intelligence.

"Social intelligence is just making use of the analysis social analytics tools give you. It could be basic or it could be complex, but it needs to be applied to become intelligence.





emerging TECH

I thought we would be there by now but it's just not happening," says Jenny Sussin, research vice president at Gartner.

What's largely missing is being able to funnel social analytics automatically into traditional CRM, ERP and other back-end systems, enabling organizations to marry social findings with existing internal data.

#### The human touch

Bryan Long, senior manager of Nissan North America's social media customer strategy team, says technology will continue to assist Nissan's social media efforts but there is only so much automation that can be applied to social analytics. Parsing the brand's posts, tweets, and mentions, which total millions per year, into actionable intelligence requires human analysis.

"There will always be a need for people to read, interpret and understand what customer needs "Social intelligence is just making use of the analysis social analytics tools give you. It could be basic or it could be complex, but it needs to be applied to become intelligence.

-JENNY SUSSIN, RESEARCH VICE PRESIDENT AT GARTNER

are and how the brand should react," he says. Nissan North America has six to eight analysts that review data aggregated in queues by the social media management tool Sprinklr. The analysts, Long says, decide when to respond. "An individual instance of concern might not be enough to warrant a look, but when you get into a top 10 or top 20 ranked concern, you have to start paying attention," he says.

#### **Targeting pain points**

As the only employee 100 percent dedicated to social media at Zebra Technologies, Global Social Media Strategy Manager Sally-Anne Kaminski considers it her job to champion social intelligence throughout the company, a maker of mobile computers, scanners, RFID and barcode printers.

When the sales enablement team approaches her about prospective clients, Kaminski taps Oracle's Social Cloud, a social relationship management tool, to build a comprehensive dashboard to help the sales representative nail the sale. Kaminski loads Social Cloud's Boolean search with keywords, phrases and topics to discover in conversations across Facebook, Twitter and LinkedIn, as well as message boards and blogs.

"We find insights into [the prospective client's] products or solutions that might be causing pain points for their customers," she says, adding the tool's semantic filtering helps automatically keep results aligned with intent. Lengthy sales cycles keep her from learning if the presentations she delivers to the sales enablement team lead to closed deals, but the repeat asks for assistance indicate to her they have been effective.

## Integrating social intelligence

Gartner's Sussin finds herself frustrated that more hasn't come of social intelligence. She acknowledges that technology equipped to leverage social input wasn't available when businesses initially started listening to social plat-



forms but says it is primed to provide business value now, pointing to the ability to blend unstructured data from social platforms and structured data from traditional systems to extract intelligence.

Sussin says lack of integration often is a product of silos within an organization, where social media has either been buried in marketing or kept as a separate entity. "In the early days, companies set up social media as a feed for listening, figuring they would find something that would lead to a milliondollar idea and make it all worth it," she says, adding, "That's how they got in trouble."

For social intelligence to truly take hold, it must be incorporated with the organization's business analytics and intelligence infrastructure in IT. "Data leaders will say they have enough on their plate with bigger data management problems and don't see social intelligence as their issue, but it is," she says.

Social intelligence would do well

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"We need the social people and the data management people to talk to each other and understand that this information can and needs to be exchanged for better decision making."

-JENNY SUSSIN

with the governance applied to other data management efforts such as CRM and ERP systems, according to Sussin. "We need the social people and the data management people to talk to each other and understand that this information can and needs to be exchanged for better decision making," she says. ◆

Sandra Gittlen is a freelance writer and editor in the greater Boston area.



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# Connecting with customers on their terms

Food-service company HMSHost harnesses cross-channel data to optimize dining experiences for hungry travelers.

**BRENDAN MCGOWAN** 

here are, perhaps, no

more vocal or assertive customers than airline passengers between connecting flights. Sometimes these

hungry and harried travelers just need a hot coffee and croissant.

HMSHost, a leading firm in the food and beverage space for travelers, is focused







intently on that need. Sarah Naqvi, executive vice president and CIO at the company, describes an IT organization that has "been able to move mountains" on a digital level, accomplishing more in the past "six or seven months than we have been able to do in the past three years."

Specifically, Naqvi says several key factors have jointly accelerated HMSHost's agility and relevance to consumers, including a shift in digital governance strategy, key investments in technology infrastructure and a renewed focus on customer experience.

#### **Organizing for success**

Naqvi began her career at HMSHost as a programmer analyst in 2000. Her years of progressive experience at the organization provided her with a distinct perspective on IT's potential when she stepped into the CIO role in 2013.

"I started on the journey of innovation, trying to look at a strategy

#### "I started on the journey of innovation, trying to look at a strategy in which IT could play a different role than historically it was known to play – as a support center."

- SARAH NAQVI, EXECUTIVE VICE PRESIDENT AND CIO, HMSHOST

in which IT could play a different role than historically it was known to play — as a support center," she says. "I felt that technology was evolving and maturing at such a fast pace that the IT organization had to play a more significant role in enabling transformation and growth."

The most critical factor was forming a digital transformation group. The company hired a vice president overseeing digital transformation, reporting directly to Naqvi. Underneath this vice president are all of HMSHost's project managers, working on anything from the next version of the company's mobile app to a kiosk installation at one of the company's Burger King franchises.

Significantly, customer experience falls under the banner of digital transformation. The company's director of experience, Naqvi explains, resides in the digital transformation group and documents how customers spend, what frustrates or delights them, and even "customer flow" – the footprint, defined in minutes spent and footsteps, that every customer leaves behind.

With the digital transformation group in place, Naqvi and her colleagues strategized on how digital could directly impact customer loyalty. She believes customers are



very much in a transition phase in terms of how they transact, split between face-to-face interactions with employees and digital inputs.

As a result, allowing customers to interact with HMSHost on their own terms remains a strategic imperative. Customers can transact with the cashiers who work at the company's airport or travel plaza locations, and they can order food and beverages from self-service kiosks, tabletop devices and the company's mobile app.

The data that Naqvi and her team collect from each of these channels varies. The speedy kiosk experience, she explains, would be impeded if kiosks forced customers to provide even an email address, while the mobile app is tied to mobile user profiles and provides more detailed data.

This data on customer flow helps HMSHost adjust its multichannel strategy. The group found, for example, that when customers interacted with a kiosk to make

#### "The positioning of your digital assets and their design, the customer journey, and the flow of your information – these are all the factors that can mean the difference between a successful digital deployment and a failure. - SARAH NAQVI

food purchases, the average check was 30 to 40 percent more than it would be if they interacted with an employee. The most popular add-on items? Cheese and bacon. Nagvi and her team concluded that customers feel more comfortable ordering these add-on items from machines than from people.

Multichannel digital strategy is ineffective without simple, clear communication, Naqvi adds. To accentuate the point, she shares how she saw another 30-point revenue difference at kiosks in two separate company-run Burger King stores. The first Burger King had "Express Meal" as its kiosk

signage. The second store, comparable in terms of physical footprint and traffic. was far more successful with "Order Here."

"With all of these digital journeys, marketing is the key to success," Naqvi says. "The positioning of your digital assets and their design, the customer journey, and the flow of your information – these are all the factors that can mean the difference between a successful digital deployment and a failure." ♦

Brendan McGowan is global media bureau and client research manager at the CIO Executive Council.



**cover story** ANALYTICS

> Big data, machine learning, data science – the data analytics **revolution** is evolving rapidly.

BY MARTIN HELLER

data analytics trends

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ata analytics are fast becoming the lifeblood of IT. Big data, machine learn-

ing, data science — the range of technologies and techniques for analyzing vast volumes of data is expanding at a rapid pace. To gain deep insights into customer behavior, systems performance, and new revenue opportunities, your data analytics strategy will benefit greatly from being on top of the latest trends.

Here is a look at the data analytics technologies, techniques and strategies that are heating up and the once-hot trends that are beginning to cool. From business analysts to data scientists, everyone who works with data is being impacted by the analytics revolution. If your organization is looking to leverage data analytics for actionable intelligence, the following heat index should be your guide. >>

#### **HEATING UP: Self-service BI**

**cover storv** 

Who: BI/BA pros, managers

ith self-service BI tools, such as Tableau, Olik Sense, Power BI and Domo, managers can obtain current business information

in graphical form on demand. While a certain amount of setup by IT may be needed at the outset and when adding a data source, most of the work in cleaning data and creating analyses can be done by business analysts, and the analyses can update automatically from the latest data any time they are opened.

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Managers can then interact with the analyses graphically to identify issues that need to be addressed. In a BI-generated dashboard or "story" about sales numbers, that might mean drilling down to find underperforming stores,

salespeople and products, or discovering trends in year-over-year same-store comparisons. These discoveries might in turn guide decisions about future stocking levels, product sales and promo-



To gain deep insights into customer behavior, systems performance, and new revenue opportunities, your data analytics strategy will benefit greatly from being on top of the latest trends.

tions, and even the building of additional stores in under-served areas.

#### **HEATING UP: Mobile dashboards**

Who: BI/BA pros, managers, developers

n a world where managers are rarely at their desks, management tools need to present mobile-friendly dashboards to be useful and timely. Most self-service BI tools already have this feature, but not every key business metric goes through a BI tool. For example, a manufacturing plant is likely to have a dedicated QA system monitoring all production lines. All plant managers need to know whether any of the lines have drifted out of tolerance within minutes of the event; that's easily done with an app that queries the QA database every minute, updates and displays a Shewhart control chart, and optionally sounds an alarm when a line goes out of spec.

#### **COOLING DOWN:** Hadoop

Who: Data scientists

adoop once seemed like the answer to the question "How should I store and process really big data?" Now it seems more like the answer to the question "How many moving parts can you cram into a system before it becomes impossible to maintain?"

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# From business analysts to data scientists, everyone who works with data is being impacted by the data analytics revolution.

The Apache Hadoop project includes four modules: Hadoop Common (utilities), Hadoop Distributed File System (HDFS), Hadoop YARN (scheduler) and Hadoop MapReduce (parallel processing). On top of or instead of these, people often use one or more of the related projects: Ambari (cluster management), Avro (data serialization), Cassandra (multi-master database), Chukwa (data collection), HBase (distributed database), Hive (data warehouse), Mahout (ML and data mining), Pig (execution framework), Spark (compute engine), Tez (data-flow programming framework intended to replace MapReduce), and ZooKeeper (coordination service).

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**cover story** 

If that isn't complicated enough, factor in Apache Storm (stream processing) and Kafka (message transfer). Now consider the value added by vendors: Amazon (Elastic Map Reduce), Cloudera, Hortonworks, Microsoft (HDInsight), MapR and SAP Altiscale. Confused yet?

#### **HEATING UP: R** language

Who: Data scientists with strong statistics ata scientists have a number of options to analyze data using statistical methods. One of the most convenient and powerful methods is to use the free R programming language. R is one of the best ways to create reproducible, high-quality analysis, since unlike a spreadsheet, R scripts can be audited and re-run easily. The R language and its package repositories provide a wide range of statistical techniques, data manipulation and plotting, to the point that if a technique exists, it is probably implemented in an R package. R is almost as strong in its support for machine learning, although it may not be the first choice for deep neural networks, which require higher-performance computing than R currently delivers.

R is available as free open source, and is embedded into dozens of commercial products, including Microsoft Azure Machine Learning Studio and SQL Server 2016.

#### **HEATING UP: Deep neural networks**

Who: Data scientists

ome of the most powerful deep learning algorithms are deep neural networks (DNNs), which are neural networks constructed from many layers (hence the term "deep")

of alternating linear and nonlinear processing units, and are trained using large-scale algorithms and massive amounts of training data. A deep neural network might have 10 to 20 hidden layers, whereas a typical neural network may have only a few.

The more layers in the network, the more characteristics it can recognize. Unfortunately, the more layers in the network, the longer it will take to calculate, and the harder it will be to train. Packages for creating deep neural networks include Caffe, Microsoft Cognitive Toolkit, MXNet, Neon, TensorFlow, Theano, and Torch.

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**COOLING DOWN:** 

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Who: BI/BA pros, data scientists

he internet of things (IoT) may be the most-hyped set of technologies, ever. It may also be the worst thing that happened to internet security, ever.

IoT has been touted for smart homes, wearables, smart cities, smart grids, industrial internet, connected vehicles, connected health, smart retail, agriculture and a host of other scenarios. Many of these applications would make sense if the implementation were secure, but by and large that hasn't happened.

In fact, the manufacturers have often made fundamental design errors. In some cases, the smart devices only work if they are connected to the internet and can reach the manufacturers' servers. That becomes a significant point of failure when the manufacturer ends product support, as happened with the Sony Dash and the early Nest thermometer. Including a remote internet-connected server into a control loop also introduces a significant and variable lag into the control loop which can introduce instability.

Even worse, in their rush to connect their "things" to the internet, manufacturers have exposed vulnerabilities that have been exploited by hackers. Automobiles have been taken over remotely, home routers have been enlisted into a botnet for carrying out DDoS attacks, the public power grid has been brought down in some areas...

What will it take to make IoT devices secure? Why aren't the manufacturers paying attention? Until security is addressed, the data analytics promise of IoT will be more risk than reward.

#### **HEATING UP: TensorFlow**

Who: Data scientists

ensorFlow is Google's open source machine learning and neural network library, and it underpins most, if not all, of Google's applied machine learn-

ing services. The Translate, Maps, and Google apps all use TensorFlow-based neural networks running on our smartphones. Tensor-Flow models are behind the applied machine learning APIs for Google Cloud Natural Language, Speech, Translate and Vision. Data scientists can use TensorFlow, once they can get over the considerable barriers to learn-

ing the framework. TensorFlow boasts deep flexibility, true portability, the ability to connect research and production, auto-differentiation of variables, and the ability to maximize performance by prioritizing GPUs over CPUs.

#### **MXNet** Who: Data scientists

XNet (pronounced "mix-net") is a deep learning framework similar to TensorFlow. It lacks the visual debugging available for TensorFlow but offers an

imperative language for tensor calculations that TensorFlow lacks. The MXNet platform automatically parallelizes symbolic and imperative operations on the fly, and a graph optimization layer on top of its scheduler makes symbolic execution fast and memory efficient.

MXNet currently supports building and training models in Python, R, Scala, Julia, and C++; trained MXNet models can also be used for prediction in Matlab and JavaScript. No matter what language you use for building your model, MXNet calls an optimized C++ back-end engine.

## Batch analysis

Who: BI/BA pros, data scientists

unning batch jobs overnight to analyze data is what we did in the 1970s, when the data lived on 9-track tapes and "the mainframe" switched to batch mode for third shift. In 2017, there is no good reason to settle for day-old data.

In some cases, one or more legacy systems (which may date back to the 1960s in some cases) can only run analyses or back up their data at night when not otherwise in use. In other cases, there is no technical reason to run batch analysis, but "that's how we've always done it."

You're better than that, and your management deserves up-to-the-minute data analysis.

#### Microsoft Cognitive Toolkit 2.0

Who: Data scientists

he Microsoft Cognitive Toolkit, also known as CNTK 2.0, is a unified deep-learning toolkit that describes neural networks as a series of computational steps via a Running batch jobs overnight to analyze data is what we did in the 1970s, when the data lived on 9-track tapes and "the mainframe" switched to batch mode for third shift. In 2017, there is no good reason to settle for day-old data.

directed graph. It has many similarities to TensorFlow and MXNet, although Microsoft claims that CNTK is faster than TensorFlow especially for recurrent networks, has inference support that is easier to integrate in applications, and cover stor ANALYTICS

has efficient built-in data readers that also support distributed learning.

There are currently about 60 samples in the Model Gallery, including most of the contest-winning models of the last decade. The Cognitive Toolkit is the underlying technology for Microsoft Cortana, Skype live translation, Bing and some Xbox features.

#### **HEATING UP: Scikit-learn**

Who: Data scientists

cikits are Python-based scientific toolboxes built around SciPy, the Python library for scientific computing. Scikit-learn is an open source project focused on machine learning that is careful about avoiding scope creep and jumping on unproven algorithms. On the other hand, it has quite a nice selection of solid algorithms, and it uses Cython (the Python to C compiler) for functions that need to be fast, such as inner loops.

Among the areas Scikit-learn does not cover are deep learning, reinforcement learning, graphical models, and sequence prediction. It is defined as being in and for Python, so it doesn't

have APIs for other languages. Scikitlearn doesn't support PyPy, the fast just-in-time compiling Python implementation, nor does it support GPU acceleration, which aside from neural networks. Scikit-learn has little need for. Scikit-learn earns high marks for ease of development. The algorithms work as advertised and documented. the APIs are consistent and well-designed, and there are few "impedance mismatches" between data structures.

#### **COOLING DOWN:** Caffe

Who: Data scientists

he once-promising Caffe deep learning project, originally a strong framework for image classification, seems to be stalling. While the framework has strong convolutional networks for image recognition, good support for CUDA GPUs, and decent portability, its models often need excessively large amounts of GPU memory, the software has year-old bugs that haven't been fixed, and its documentation is problematic at best.

Caffe finally reached its 1.0 release mark in

April 2017 after more than a year of struggling through buggy release candidates. And yet, as of July 2017, it has over 500 open issues. An outsider might get the impression that the project stalled while the deep learning community moved on to TensorFlow, CNTK and MXNet.

#### **HEATING UP: Jupyter Notebooks**

Who: Data scientists

he Jupyter Notebook, originally called IPython Notebook, is an open-source web application that allows data scientists to create and share documents that contain live code, equations, visualizations and explanatory text. Uses include data cleaning and transformation, numerical simulation, statistical modeling, machine learning and much more.

Jupyter Notebooks have become the preferred development environment of many data scientists and ML researchers. They are standard components on Azure, Databricks and other online services that include machine learning and big data, and you can also run them locally. "Jupyter" is a loose acronym meaning Julia, Python, and R, three of the popular languages

Alas, businesses that want to be agile can't respond to environ-mental and market changes in months: the time between asking a question and getting an answer should be measured in seconds or minutes, not weeks or months.

for data analysis and the first targets for Notebook kernels, but these days there are Jupyter kernels for about 80 languages.

#### **HEATING UP:**

#### **Cloud storage and analysis**

Who: BI/BA pros, data scientists

ne of the mantras of efficient analvsis is "do the computing where the data resides." If you don't or can't follow this rule, your analysis is likely to have large delays if the data moves across the local network, and even larger delays if it moves over the internet. That's why, for example, Microsoft recently added R support to SQL Server.

As the amount of data generated by your company grows exponentially, the capacity of your

data centers may not suffice, and you will have to add cloud storage. Once your data is in the cloud, your analysis should be, too. Eventually most new projects will be implemented in the cloud, and existing projects will be migrated to the cloud, moving your company from the CapEx to the OpEx world.

#### **COOLING DOWN: Monthly BI reports**

Who: BI/BA pros, data scientists

efore self-service business intelligence became popular, BI was the province of IT. Managers described what they thought they wanted to see, business analysts turned

that into specifications, and BI specialists created reports to meet the specifications – eventually,

given their backlog. Once a report was defined, it was run on a monthly basis essentially forever, and printouts of all possible reports went into management's inboxes on the first of the month, to be glanced at, discussed at meetings, and ultimately either acted on or ignored.

Sometimes the action would be to define a new report to answer a question brought up by an existing report. The whole cycle would start over, and a month or two later the new report would be added to the monthly printout. Alas, businesses that want to be agile can't respond to environmental and market changes in months: the time between asking a question and getting an answer should be measured in seconds or minutes, not weeks or months.

Martin Heller is a regular contributor to CIO.com.

# The pros and cons of 4 CIO transition scenarios

While every CIO transition is unique, with no single formula for success, there are common patterns for navigating a change in leadership.

**BY KHALID KARK** 

Incoming CIOs are often energized by the prospect of putting their stamp on an IT organization. Each brings his or her unique vision for overhauling technical operations to provide a broader impact on businesses. But leadership transitions for new CIOs can be fraught with challenges.

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CIO transitions can be broken down into four typical scenarios: internal hire, hybrid insider, external hire, and mergers and acquisitions (M&A) or divestitures. Each presents unique opportunities, challenges and business contexts that dictate how the transition should be approached. Data and insights around the

key themes presented here are in the report "Taking charge: The essential guide to CIO transitions."

#### **Internal hire**

The most common transition scenario is the CIO who has been promoted from within IT. Hiring from within can provide continuity and minimize disruption. Such CIOs usually have a successful track record and have already built credibility throughout the company, having forged strong relationships with a number of key stakeholders and peers. Internal promotes tend to not want to be viewed as disruptive,



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and many are slow to make talent decisions. Some are first-time CIOs; they may find it difficult to delegate work and manage reports who were formerly colleagues. Many say they underestimated the importance of relationships in getting their work done.

Unless they fill their former roles quickly, internal hires may end up straddling both roles for months, impacting performance and focus.

Hybrid insider Sometimes, companies hire CIOs with little or no IT experience from within their enterprise leadership ranks. This hybrid insider is often hired when there is a need for greater business alignment or stakeholder trust. Since they typically don't have a strong technology background, hybrid insiders often focus on untangling alignment and relationship issues while relying on technologists and operational lieutenants to keep the lights on.

Hybrid insiders can bring instant credibility and existing relationships. They can be quick to identify opportunities for IT to contribute to business outcomes. They are unlikely to be limited by existing IT culture and can rapidly make significant cultural and talent shifts.

Coming into this role, the hybrid insider may need to learn about relevant technologies, and must work hard to gain the respect of IT staff who may be skeptical of the hybrid insider's authority. A common mistake can be to overcommit to business partners, focusing on short-term wins at the expense of long-term total cost of ownership or broader strategy. Many hybrid insiders report being surprised by the complexity of the IT environment.

**External hire** CIOs are typically brought in from outside the company when significant change is needed within IT. External hires

often impress with a successful track record in a particular domain. For example, CIOs from financial services or retail can be appealing to industries seeking expertise in building digital platforms.

External hires often find it easier to make key talent changes and are able to do so at a faster pace than many internally promoted CIOs. Because they often inherit IT teams with significant challenges, any achievement is celebrated.

But outside hires often are given a short timeline to end or redirect bad initiatives. They also typically must simultaneously gain understanding of a new industry, culture and company, and they may take longer to establish key stakeholder relationships than internal hires or hybrid insiders.

M&A or divestitures In general, M&A and divestitures can present CIOs with tight deadlines, strict

financial and talent targets, and the complex task of either integrating or separating multiple business-critical applications and platforms. Often, the CIO may be working with unfamiliar IT staff. When massive change needs to occur in a short timeframe, constant communication with stakeholders and IT staff is likely essential. CIOs must often maintain morale as their teams struggle with long workdays and frustrating migrations. Transitioning CIOs in M&A or divestitures typically do not have to develop a strategic plan; deadlines and road maps are usually driven by the business, typically with little input from IT. ♦

Khalid Kark is a managing director with

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# **Analytics success stories: An inside look CIOs are embracing data analytics to** fuel efficiency and growth, but not

every effort produces results. Here are some secrets of success.

**BY CLINT BOULTON** 

**CIOs are playing** with predictive analytics tools, crafting machine learning algorithms and battletesting other solutions in pursuit of business efficiencies and new ways to serve customers. And they are spending more than ever on technologies that support data science, with worldwide revenues for big data and business analytics expected to reach \$150.8 billion this year, according to IDC.

But there's a dark side to this delirious spending: Most data analytics projects fail to yield measurable value.

Here. IT leaders share data analytics success stories and hardwon advice for peers undertaking similar efforts.

#### **Providing contex**tual relevance

For years, Dr. Pepper Snapple Group's sales route staff grabbed a binder with customer data and notes on sales and promotions,

and hit the road to woo retail clients. Today, sales staff are armed with iPads that tell them what stores to visit, what offers to make, and other crucial metrics. "They were glorified order takers," said Tom Farrah, CIO of Dr. Pepper Snapple Group. "Now they are becoming intelligent sales people

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equipped with information to help achieve their goal."

The platform, MyDPS, is equipped with machine learning and other analytics tools that funnel recommendations and a daily operational scorecard to workers. Algorithms show staffers how they are executing against projections, along with insights as to how they can course correct. "If I am going to make someone successful I have to ensure what info they have is contextually relevant," Farrah said.

**Secrets of success:** To test the proof of concept, Farrah gave the software to four people in a branch and had the president of the business go visit them. They revealed that execution sell-in had improved by 50 percent since the previous month after using MyDPS, convincing him to greenlight the project.

#### **Perfecting planting plans**

Seed giant Monsanto uses mathematical and statistical models to

#### "There's a lot of data within your four walls – be innovative and look for challenging ways to use it." -SCOTT SULLIVAN, CIO OF PITT OHIO

plot out the best planting times and locations to maximize yield and reduce land utilization. Its machine learning algorithm churns through more than 90 billion data points in days, rather than weeks or months, said Adrian Cartier, director of global IT analytics at Monsanto. The business benefits? In 2016, Monsanto saved \$6 million and reduced its supply chain footprint by 4 percent. "In North America, a 4 percent land utilization reduction equates to a lot of land not being used and a lot money saved," Cartier said.

**Secrets of success:** The key for Monsanto was instilling a "cradle to grave" collaboration between IT and the supply chain business. "Their domain expertise from an agricultural and supply chain perspective, married with our domain expertise of mathematics and statistics created the value that we were able to deliver," Cartier said.

#### **Powerful predic**tive analytics

Pitt Ohio, a \$700 million freight company, had gotten used to picking up freight and delivering it to customers the next day. But thanks to Amazon, customers are increasingly expecting same-day delivery and more information about their packages.

"Customers now want to know not only when it will be picked up but how it will be delivered so they can plan their workload," said Scott Sullivan, CIO of Pitt Ohio. Using historical data, predictive analytics and algorithms that calculate a variety of freight weight, driving distance and other factors

in real time, Pitt Ohio can estimate the time the driver will arrive at a 99 percent accuracy rate. The company estimates that it has increased revenue through repeat orders (estimated at \$50,000 per year) and reduced the risk of lost customers (estimated at \$60,000 per year).

**Secrets of success:** Sullivan says it was a cross-departmental affair involving market research, sales operations and IT, all of whom checked and re-checked results to make sure they were accomplishing their objectives. "There's a lot of data within your four walls - be innovative and look for challenging ways to use it," Sullivan said. ♦

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