

January 14, 2015, 4:42 PM ET

# The Rise of Automated Analytics

By **Thomas H. Davenport**

For more than a decade I have talked about only three types of analytics: descriptive, predictive, and prescriptive. This trinity of analytics variations has worked well for me, and many others use it too.

*Descriptive* analytics describe what happened, of course, and they normally do so with simple descriptive tools: frequency distributions, charts and graphs, and “measures of central tendency,” such as means and medians. They are only oriented to the past. We used to call this type of analytics “reporting,” and it constituted about 95% of historical analytical activity.

*Predictive* analytics, rather obviously, predict the future. They use models describing past data (unfortunately, the only type we have) to extrapolate into the future. They are useful, as [Eric Siegel’s book Predictive Analytics](#) states in the subtitle, to “predict who will click, buy, lie, or die.”

Some analysts, like those at [Gartner](#) Inc., have posited an additional type of analytics between descriptive and predictive—they call it diagnostic—to describe the creation of models on past data ([see this blog post for a good summary](#) of the Gartner thinking). They are right that this sort of work is a prerequisite of predictive analytics, but one could also argue that it is simply descriptive analytics using statistical models. I also hesitated to use it in my own work because it doesn’t end in “-tive.”

*Prescriptive analytics*, [which I have written about here a couple of years ago](#), are analytics that tell you what to do. They make recommendations—often to front-line workers—about the best way to handle a given situation. What price to charge for a product, what version of a webpage to use, what turn to make next in a driving route—all of these are prescriptive analytics.

Now it’s time to add a fourth category—*automated analytics*. Unfortunately neither the word “automated,” nor any synonyms for it that I can find, end in -tive. Perhaps the neologism “automative” would be appropriate. But analytics are increasingly becoming automated. Instead of presenting a recommendation to a human, as in prescriptive analytics, automated analytics take action on the results of their analysis. They change an online price automatically, display the best landing page automatically, determine what email to send a customer automatically, and steer the car automatically.

Some of this, of course, has been happening for years. You don’t think that airline companies have had humans reviewing price changes for airline seats, do you? To do so would require all of their employees, and more. You don’t think that a banker actually reviews your application for a

credit card or personal loan, do you? That's all automated, as are bankers' deliberations about whether a charge or debit you intend to make is fraudulent. If they weren't automated, by the time a human got around to looking at your possibly fraudulent transaction, the fraudster would have committed several more and flown to Venezuela.

But automated analytics are increasingly necessary in a world in which customers want real-time responses, in which every marketing promotion should be tailored and personalized, and in which data is everywhere and needs to be analyzed to be useful. We simply don't have enough people to analyze all the data and make all the decisions and take all the necessary actions. And even if we did, they would take way too long to do these things.

Automated analytics, as I have defined them, are based on how analytics are used. The term shouldn't be confused with the automated—or at least semi-automated—creation of analytics through tools like machine learning. That is happening much more often as well, and it's happening in part for the same reasons—too much data to analyze, and not enough analysts to do it.

Automated analytics, in order to function effectively, typically need to be embedded in other systems that bring forth data to the analysis, and then take action after the analytical result is achieved. Gartner's list of strategic technologies for 2015 [includes “advanced, pervasive, and invisible analytics.”](#) and many of those analytics will be automated. The systems into which automated analytics are embedded might be of the “complex event processing” family, which were designed to take action in real time. Or organizations are increasingly doing automated analytics inside of data warehouses and of course Hadoop clusters. This integration means that automated analytics need to be closely connected to IT organizations and CIOs; this type of analytics is no longer a separate, ad hoc activity.

It's often a natural progression through the different types of analytics. Say, for example, that you are a trucking company and you'd like to minimize your consumption of fuel. Step one might be to do some descriptive analytics on how much fuel your trucks use on different routes, whether the amount is increasing or decreasing over time, and even whether some drivers use more fuel per mile than others. Step two would be to create a predictive model of which attributes are associated with greater fuel consumption—probably using some form of regression analysis. Step three would be to start telling drivers where and when to stop for fuel—exactly what some companies, like Schneider National, are doing now. And Step four would involve bypassing the drivers and telling the trucks themselves when to pull over to fuel up. Obviously this last step involves more vehicle autonomy than we have today, but I am told by several leading trucking companies that it is not far off from a technical standpoint—regulatory approval might take longer.

Of course, automated analytics raise even more issues for humans than prescriptive analytics do. You can imagine what truck drivers think when they are told what truck stops to visit for fuel. I am guessing they will like it even less when the analytics are making all the driving decisions.

Automated analytics are a brave new world, and we'll be assessing their implications for a long time. But the sooner we recognize them as a valid and important category of analytics, the more rapidly we can begin dealing with their consequences.

*Thomas H. Davenport is a Distinguished Professor at Babson College, a Research Fellow at the Center for Digital Business, Director of Research at the International Institute for Analytics, and a Senior Advisor to Deloitte Analytics.*