

# Transforming Data with Predictive Analytics



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## Executive Summary

You've been hearing the term 'big data' for years now, and your company has plenty of it. It's well-known that it portends a whole new level of untapped value and potential in your enterprise data assets. And alongside big data is the equally ominous term predictive analytics. How, exactly, do big data and predictive analytics work together to unlock that value?

It's not just a timely question – it's a mission-critical one. Organizations of all kinds have begun leveraging big data and predictive analytics, not just to become more efficient, but for strategic advantage in the marketplace. It's no exaggeration to say that companies making the most of predictive analytics tend to lead the field, while those that haven't gotten on board are falling behind.

The concept is a simple one: within the historical data of most organizations, patterns and trends may be hidden that hold the key to significant improvement in efficiency, resource management, customer relations, service quality and workforce effectiveness.

The goal is to surface those patterns and trends so that they can be studied and applied. Think of big data as your company's cumulative experience, and predictive analytics as your tool for exploring it and learning from it.

And to say that organizations everywhere have gotten on board with this concept and are reaping significant rewards is no exaggeration. According to a survey cited by IBM, 90% of business respondents say they attained positive ROI from their predictive analytics deployments, with a median ROI of 145%, with 66% rating it "very high" or "high" in business value. The survey also noted consistent year-over-year improvements in operating profit margins and customer retention among companies using predictive analytics.

Think of predictive analytics as actionable intelligence – secrets in your data brought to light that can provide critical insights into the best ways operations can be improved, with benefits accruing across the board throughout the enterprise.

## Analytical Stepping Stones

In this context, predictive analytics seem to be a holy grail of sorts, and understandably so – but they're part of a greater whole. It's important to note where they fit in the analytical process.

First, there's descriptive analytics. This is a style of analysis and reporting that tells you what has happened in the past. That's why big data is so important from the outset. Most organizations already make use of descriptive analytics, even if they don't call it that.

Next comes diagnostic analytics. This style of analysis tells you why the thing you learned about from the descriptive analytics happened. Diagnostic analytics are less commonly used.

And then comes predictive analytics – analysis that predicts what happens next. That's the sweet spot, where real change can happen in the operations of the enterprise. If you know what happens next, you can be ready for it, spend less money

getting there, and make the most of it when it comes to pass.

There's a fourth stage – prescriptive analytics – that can be used to extract recommended actions to use in parallel with predictive analytics to fine-tune outcomes. This is certainly very useful, but the truth is that most companies aren't there yet.

## A Broad Range of Applications

A broad range of companies use predictive analytics in a variety of ways. Here's just a sample:

**Banking and Insurance.** These two industries have had tremendous success using predictive analytics for fraud detection. By analyzing historical incidents of fraud and mapping the traits and behaviors of perpetrators, models have been built that help these organizations know what to look for.

**Healthcare.** It's widely known that prevention is more cost-effective than treat-



ment, when it comes to personal health – and predictive analytics has been a boon to the healthcare industry, surfacing patterns of behavior that help bolster good health, as well as identifying early warning signs of potential health issues so that doctors and other care providers can intervene as early as possible.

**Customer Retention.** Organizations of all kinds have used predictive analytics to study customer attrition to understand why their buyers go elsewhere, so that they can make improvements in customer relations that bolster their retention. (Those same techniques can be adapted and applied to retaining employees.)

**Transportation.** How can predictive analytics help with fleet management? By anticipating traffic issues before they happen, allowing dispatchers to reroute vehicles to avoid delays.

**Utilities.** Power and water utility companies are having great success optimizing their operations by analyzing consumer consumption patterns and adapting

their resource management accordingly.

**Manufacturing.** The uses of predictive analytics in manufacturing are myriad, including unexpected applications such as machine fault prediction on factory floors and enhanced quality assurance practices.

**Finance.** Just as predictive analytics has greatly enhanced risk management in healthcare, it's doing the same in the financial sector. It's also used for investment analysis, to predict the most effective strategies.

**Pricing Optimization.** In organizations of all sorts, predictive analytics is being used to arrive at the perfect price point in sales operations, enabling precisely focused pricing based on rapidly changing conditions.

**Food Service.** Predictive analytics can greatly enhance the accuracy in demand prediction in food service, making highly optimized supply chain management possible.

This is just a small sample of predictive analytics applications. And those above



make use of conventional data; it's also possible to apply predictive analytics to unstructured data – data that isn't stored in conventional records or formats, such as speech or text – and mine that data for insights and actionable intelligence.

For instance, you can monitor social media for mentions of your company's brand, gathering customer discussion of your products or services, to get a more accurate sense of just how well the brand

is holding up against the competition. This can become an essential step in brand management.

It's worth mentioning that if you can listen in on your own customers, you can also listen in on your competition's customers, to see what's good and bad about their products or services from a consumer point of view – and that's just one of many ways you can use predictive analytics to study the competition.



## Predictive Analytics, Under the Hood

There are several moving parts to consider, when thinking about how predictive analytics can be applied to any particular problem to be solved in the enterprise.

We've already mentioned big data – large amounts of historical data, detailing past enterprise operations and events. The usefulness of that data is that it can

be used to build a model – a kind of simulation of whatever event is being analyzed. The model is based on patterns of events seen in the past, and includes target variables, also more simply called factors.

In a healthcare model built to predict heart issues, for instance, the factors would be those attributes of a patient associated with heart trouble – abnormal blood pressure, for instance. Analyzing

historical data on previous heart patients allow a weight to be assigned to that factor: i.e., how important is blood pressure in predicting a heart problem?

When the most predictive factors have been identified and have been assigned accurate weights, you have a strongly predictive model, one that can be relied upon to perform well and give the company the heads-up it needs to operate more effectively. And – bonus! – predictive models improve over time, as more real-world data flows through them and as more outcomes can be examined to fine-tune them.

## Where Should Predictive Analytics Be Used?

Not all the problems or questions facing the enterprise can be solved with predictive analytics. It's important to note that it's a question of using the right tool for the right job – so what does that job look like?

You should apply predictive analytics to a problem when the following conditions exist:

- There is a great deal of historical data

available for study that is relevant to the problem (e.g., past storm damage outcomes in the database of an insurance company)

- There are lots of cases or incidents or people (customers, etc.) to be scored (in the insurance company example, adjusters need accurate rubrics during storm season because there are many incidents to be evaluated)

- The outcomes matter a great deal (many families will be affected by spring storms, and accurate forecasting of required reserves is essential to maintain good service to claimants during that period)

- The process is easily automated (predictive analytics are hard to develop and difficult to use manually; a model should be automated, if possible, so that time-consuming human effort is not required in day-to-day application – embedded in the company claims system, for instance)

If these criteria are met, then predictive analytics are a good bet. If any of them are not, then predictive analytics are likely overkill, or too costly a choice.

## The Strong ROI of Predictive Analytics

We've already noted that predictive analytics have strong ROI. Where can this be seen?

In customer relationship management, it shows up in marketing, by significantly lowering costs. The technique of market segmentation – analyzing a customer population and establishing the groups that vary in their likelihood to respond to marketing efforts. Using this technique means you don't waste money on customers that are unlikely to respond to a particular marketing campaign, and that you don't spend money trying to market to those customers who are very likely to buy regardless of the campaign.

Similarly, in marketing to bolster customer retention, it's silly to spend money trying to ensure the loyalty of customers who show no signs of leaving – predictive analytics makes clear who those customers are.

And, of course, gains in efficiency –

which is the primary result of using predictive analytics – allows the enterprise to be more price-competitive, while lowering operating costs.

## Transforming Data, Transforming the Enterprise

This is just a brief survey of the way that predictive analytics is transforming organizations everywhere by adding value to the data that's already sitting there. There are many more.

Search engines like Google and Bing use predictive analytics to improve the results they surface; customer browsing behaviors on the company website can be used to personalize their online experience; retail stores can use data from customer loyalty cards to send customers targeting coupons they are likely to make use of.

The point is very simple: the applications of predictive analytics are limitless. There are thousands of use cases out there already, certainly, but there are many more waiting to be explored and applied.





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# Predictive or Preventive?

Equipment maintenance takes priority in high-demand environment

By: Sean Riley, Vice President, Industry Solutions, Software AG

Maintenance has always been a conundrum for asset-intensive industries like manufacturing. While uptime is critical to providing a high return on assets, obtaining high levels of uptime is difficult due to operating conditions. These conditions put machines under stress, and the high preventive and reactive maintenance expenditures needed to keep them healthy can be a drain on profitability.

There are two ways to deal with this:

**Preventative maintenance:** Preventative means preplanning a maintenance schedule to ensure high uptime and optimized use of technicians. But it is expensive and still runs the risk of machine failure, often urgent corrective actions and unplanned downtime. There is typically a backlog of maintenance needs and

maintenance costs are still high. From the manufacturers' perspective, this carries the threat of potential product quality issues, yield losses and increased operating costs.

It's still considerably more effective than a break-fix method and the outcomes of a preventative program are usually accepted without significant scrutiny (because that is the way it has always been). For companies that continue this practice, they should expect to see vast quantities of spare parts/component stocks, which consumes valuable working capital. Maintenance scheduling will continue to have backlogs and equipment will still fail or cause production defects.

**Predictive maintenance.** To move away from the above paradigm is not without its challenges. Having engineers monitoring



assets consumes their valuable time, is expensive and is not completely foolproof. Analyzing the data can take time. Plus, don't most technicians understand how their machines operate anyway? They have been working on them for years, so it seems counterintuitive not to rely on their knowledge.

The right set of predictive maintenance capabilities, on the other hand, can address these concerns by ensuring that maintenance activities are only conducted when maintenance is really needed — and that replacement parts/components are ordered only when needed. This ensures unparalleled levels of uptime and product quality at a reduced cost.

To realize the value of this, you need some very specific capabilities:

**Sensor and device connectivity and management:** Connect to devices quickly and without coding.

**Self-service tooling:** Empower your technicians and maintenance experts to use their knowledge to configure the plat-



form without an intermediary.

**Self-service applications:** A drag and drop, no code environment to define advanced rules to monitor and act on events, to create sophisticated dashboards and to integrate to other applications like a CMMS.

**Streaming analytics, predictive analytics and machine learning:** Support

massive amounts of data with predictive model execution and machine learning to adjust models as conditions change.

Today's manufacturers are being held to increasingly high standards when it comes to product availability and quality, thanks partly to recent events. With predictive maintenance, your repairs and replace-

ments are only conducted when maintenance is really needed — and your replacement parts/components are ordered only when needed. This ensures unparalleled levels of uptime and product quality at a reduced cost.

To learn more, visit: [www.softwareag.com/iot](http://www.softwareag.com/iot).