



DECISION  
MANAGEMENT  
SOLUTIONS

# Putting Predictive Analytics to Work in Operations

Using Decision  
Management to  
maximize the value of  
predictive analytics

Predictive analytics applied to operational decision making is the next major source of competitive advantage. The most successful companies are using Decision Management to put predictive analytics to work powering the day-to-day decisions that impact performance most.

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More information at:

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# Maximizing analytic value in operational decisions

Insights from  
predictive analytics

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# Insights to actions

## improving operational decisions

*“Most discussions of decision making assume that only senior executives make decisions or that only senior executives’ decisions matter. This is a dangerous mistake.”*

**Peter Drucker**

*“The essence of strategy is choosing to perform activities differently than rivals do.”*

**Michael Porter**

Companies that systematically apply predictive analytics to operational decisions, especially those pertaining to customers, outperform their competitors.

Many organizations think of predictive analytics as being valuable primarily for strategic purposes. They look to it as a source of market insights to help guide executives and managers making decisions about where to focus and allocate resources. Conventional wisdom is that these high-value decisions are worth investing in. But they’re not the only types of decisions that are.

In fact, the most impressive examples of analytics-driven performance—including most of the winners showcased in the groundbreaking book *Competing on Analytics*—are using analytics to make everyday operational decisions. At Decision Management Solutions, we like to point out that it’s not analytic insights that create value, but the *actions* taken as a result—and operations is where most of the action is.

We chose the well-known quote from Harvard Business School professor and author Michael Porter because it highlights choices - decisions- and points to the fact that actions are where the rubber meets the road and performance gains are actually made. While analytic insights are extremely valuable in shaping executive-level business strategies, this value isn’t realized until strategy is implemented at the operational level.

## Insights to actions

Companies that systematically apply predictive analytics to operational decisions, especially those pertaining to customers, outperform their competitors. The best practitioners create advantage within multiple core functions such as originations, marketing, account management, customer retention and collections by applying predictive analytics in operations.

To understand why there's so much advantage in applying analytics to operations, consider two types of decisions a company might make about continuing or ending a business relationship. One of these is the strategic decision to renew the contract of a major channel partner; the other is the operational decision to retain a customer account.

The channel renewal decision will be made once every year or two, and because it impacts sales, margins and market share, most companies will invest a lot of time and money trying to ensure the best result. Putting the organization's data to work by using analytics to predict the likely value, costs and tradeoffs of the contract will not only improve the strategic thinking that goes into the decision about whether or not to renew, but also sharpen the company's ability to envision and negotiate for the most favorable terms.

A retention decision for a specific customer will also be made once every year or two. Rather than being a unique decision, it's one of thousands, maybe hundreds of thousands, of similar decisions made within that timeframe. These operational decisions determine the actions the company takes in regard to one of its most valuable business assets—a portfolio of customers worth millions in customer lifetime value.

The cumulative bottom-line impact of such high-volume, action-initiating decisions can be substantial indeed, easily exceeding that of the channel renewal. The value of each decision is multiplied by the number of

customers in the portfolio. Accuracy is therefore as desirable for an operational decision as it is for a strategic decision—yet it's not feasible to lavish the same amount of time and money on getting each decision right. How do you achieve decision accuracy economically and at scale?

Answer: Apply predictive analytics not just to customer retention in general, but to *every individual customer retention decision*. The goal is to generate smarter, more precise decisions from a process that is managed, automated, repeatable and consistent. Decision Management scales to accommodate the highest volume and speed requirements, and highly leverages the value of predictive analytics.

### Operational decisions are important

- They're high-volume because they impact lots of customers, but typically one at a time
- They're often made in real time, and must change in response to market conditions
- They're highly variable because many factors (customer, business, market, etc.) affect them
- They expand risk exposure, accruing risk transaction by transaction
- They must often run unattended on web sites, ATMs and other self-serve systems

In the next section we discuss why the way customers perceive your decisions has so much impact on your business and what you can do to turn perception into personalized, profitable reality.



# Customers

they think your decisions  
are deliberate

*“Customers treat the decisions you make about them as personal and deliberate.”*

**James Taylor, Decision Management Solutions**

*“Know me or lose me.”*

**Mobius Management Systems report on customer service**

A loyal customer of a high-end department store receives a glossy and expensive catalog for the spring collection. Settling down with a coffee to enjoy it she is disappointed when little of interest catches her eye. In fact the catalog seems aimed at someone completely different—she doesn’t buy the kinds of clothes being promoted, she doesn’t look like the models. As she always shops with the store’s own credit card, they know this and she wonders why they don’t seem to care. How can they misjudge her so badly? An opportunity to engage is lost and a once loyal customer is looking for new places to shop.

This real scenario was the unintended consequence of one-size-fits-all decision making by the store. Every customer, no matter what they had purchased, got the same catalog. The customer, however, responded to this generic decision in a very personal way: Why don’t they know me she wondered?

Operational decisions are the actions you take in transactions and in interactions (inbound and outbound) with customers. Customers respond as though these actions are deliberate, that they reflect the value they personally have to your company.

But most companies’ interactions with their customers are generic, one-size-fits all transactions. Most operational decisions are “thoughtless” and unfocused. They create a gap between customer expectation and operational reality that undermines results.

## Customers think your decisions are deliberate

As in our earlier example of a marketing campaign, poorly targeted messages and offers will generate a dismal response, probably no better than the traditionally low rate of 1%. You will also have expended budget to have a *negative* impact on many of the other 99% of customers. The campaign leaves them wondering if your company really knows anything about them and thus whether it really is in the best position to meet their needs. Even customers who know your decisions weren't deliberate and are savvy about mass marketing techniques are likely to react negatively. They wonder why you keep wasting your resources and their time sending them this rubbish and why your organization doesn't have the smarts to interact with its customers in a more focused, personalized way.

By applying predictive analytics to operational decisions, you can stop treating customers as if they were all the same, and start treating them differently in ways that are positive for the customer and your bottom line.

To understand the potent difference analytics can make in operational decision-making, consider the experience of a major warehouse club retailer:

This company wanted to motivate members who bought only within a single product category, such as food, to expand their buying across multiple categories. The campaign mailings were designed in the traditional way: find a segment, figure out a message and a compelling cross-sell, send a letter. The response rate was pretty typical: just under 1%.

In parallel the company conducted a separate campaign that made focused operational decisions about what to send to each targeted customer. Analytic techniques were used to create micro-segments based on purchasing behavior and then to identify the product in a different category that would be most appealing to customers in each micro-segment. Within each micro-segment, prices, locations and other aspects of the cross-sell offer were further tailored for individual customers.

The results of this personalized campaign: a **2000%** improvement in response rates. Moreover, since responding customers not only purchased a wider range of products than they had previously, but also filled their shopping baskets with more products overall, the campaign also had a considerable impact on revenue.

### Use predictive analytics to make them deliberate *and right*

As the above example illustrates, top performing companies are no longer making customer decisions based on policies, expertise and objectives alone. They add to this mix the critical competitive element of predictive analytics.

Analytics provide a scientific means of making decisions based on:

- What you know about customers and their past behavior
- What that tells you about how they are likely to behave under specific future circumstances

When predictive analytics are applied properly to operations, all interactions with customers are informed by these insights. Outcomes are better for both parties, and customers leave the experience with the impression that your company knows who they are, has thought about what they want and values their business.

In the next section we look at the challenges of implementing analytically empowered decision making at the operational level.



# Challenge

## getting analytics into operations

*“Decision making and the techniques and technologies to support and automate it will be the next competitive battleground for organizations. Those who are using business rules, data mining, analytics and optimization today are the shock troops of this next wave of business innovation.”*

**Tom Davenport, author of *Competing on Analytics***

There’s been a lot of interest over the past decade in pulling analytic insights from organizational data, and the tools and methods for doing this are now well developed and widely used. Where there has been less progress—and thus where there is more opportunity for seizing competitive advantage—is in the means of turning those insights into better customer decisions and implementing the decisions in operational systems, often in real-time.

The problem is that operations are all about taking action, and analytic insights have traditionally not been captured in an action-ready form. Usually the outcome of data mining and statistical analysis is a model, and this model is delivered by internal experts or consultants in the form of a report or presentation describing the model, a static graphic or an interactive dashboard visualization of the model.

For analytic insights aimed at making strategic decisions, these outputs are usually more than sufficient. The executives or knowledge worker needing the insight will generally review the information and make their decision.

But when analytic insights are at the operational level, such outputs stop far short of what is required to turn insights into decisions that can be implemented efficiently at high volumes. The challenge is to close this insight-to-action gap.

## Challenge—getting insights into operations

The insight-to-action gap is partly caused by the difficulty of applying analytic insights to: 1) the current potpourri of information systems, manual processes and policy manuals used by many organizations to make operational decisions; 2) the additional mix of systems and processes they may rely on to execute actions taken as a result of these decisions.

Currently, to make a decision-making process align with analytic insights, a company may need to change some manual processes, which generally means updating policy documents and procedures, and retraining employees.

Where automated or semi-automated systems play a role, changes may require multiple IT projects. Even when the analytic tool produces code, this code and associated data generally have to be reprogrammed for the operational systems where they will be deployed. In the process, the decision logic of the model will become embedded and entangled with the other code of the operational systems.

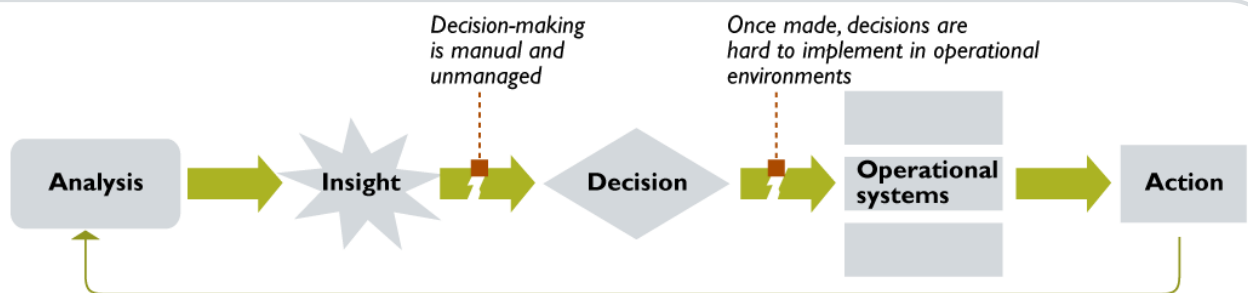
It's then time-consuming and costly to make subsequent changes as further analytic insights are generated. That's self-defeating, since in today's turbulent markets, a key reason to use analytic insights is that they help you respond with alacrity—and before your competitors—to changing market conditions.

Here's a real-life example of the insight-to-action gap:

An online travel site's IT team was asked by its business users to implement a response model. The model captured insights gained from analyzing past marketing campaign results. When the IT folks asked to see the model, they were shown a PowerPoint presentation. The model existed only as a description within this presentation. This meant that the IT department had to determine which processes and systems would be affected, figure out how to code the model and link it to the data actually available in the operational environment, then re-test and QA all the moving parts. Months later the model was in production. By then, however, the accuracy of the response model had declined because the world had changed. Diminished model performance and the high costs involved in implementation combined to reduce the ROI on this analytic investment.

There is a better approach. Today organizations can bring analytic insights into a wide range of operational decisions more easily and cost-effectively. Using Decision Management technologies and methods, you can implement new analytic insight in operational systems in weeks, not months, and in some cases even in days.

### The insight-to-action gap



In the next section we talk about leveraging insights from predictive analytics to make high volumes of customer decisions rapidly, reliably and economically.



# Solution

## Decision Management increases analytic value

*“Deliver the right information to the right person at the right time. Well yes but why? So that the right decision gets made – that’s the purpose of it all, that’s what adds value to the business.”*

**James Taylor, Decision Management Solutions**

Decision Management increases the value of analytic insights by making them far easier to implement across operations. With this approach, the models that capture analytic insights as well as other decision logic (e.g., policies, regulatory requirements) no longer have to be coded into operational systems, with all the costs and time delays that entails.

Instead, decision logic is managed separately by a Business Rules Management System (BRMS). It becomes a “Decision Service” that responds to operational systems by providing decisions when called (“Should this application be approved?” “Should this credit limit be raised?” “Should this account be targeted for a retention offer?”). This separation from other system code makes the decision logic easier to understand and change. It also makes operational systems more robust, since with the removal of decision logic—the code most subject to change—they require fewer updates.

A best-in-class BRMS will provide appropriate tools for both technical users and business users. Business users should be able to author and change rules, working in familiar ways (“if, then” syntax, decision tables, decision trees, etc.). They should also be able to add analytic models into rules-driven decisions—in the form of scorecards, for example, that bring together and differentially weight various factors—without having to ask IT to recode them for operational deployment.

## Solution—Decision Management increases analytic value

Companies adopting Decision Management use Decision Discovery to find the decisions that matter to their business and drive the results they seek. They replace embedded decisioning within operational systems with independent Decision Services built using a BRMS, then make them smarter by adding predictive analytics. They close the loop with Decision Analysis, ensuring that the way decisions are being made is monitored and the results constantly improved.

### Decision Discovery

Start by determining which operational decisions matter most to your organization. Which are most relevant to the business strategies your executive team has put at the top of its agenda? Which could have the strongest impact on the business drivers and measures being used to chart progress toward those goals? These are the decisions where Decision Management will deliver the biggest pay-off for your business. Identifying these decisions shows you where to focus your efforts and will be essential to showing a strong ROI that aligns with executive strategy.

The next step in Decision Discovery is to isolate these critical operational decisions from your business processes and IT systems. Describing and visualizing previously embedded decisions as separate, discrete decision processes helps business stakeholders understand and take ownership of how decisions are currently being made. It also enables decision-making to be explicitly linked to key performance indicators and other metrics.

With improved clarity around which decisions matter most, how they're being made and their impact on performance, you can now determine what changes to decision-making will be required to improve any given measure.

**EXAMPLE** Let's look at how Decision Discovery might work for improving performance in customer retention. We identify three critical decisions impacting our retention rate: 1) decision of which customers to target for retention programs; 2) decision about what retention offer to make; 3) decision about how and when to make it. These decisions are currently embedded in the several different account management processes and systems used by various channels. Depicting them as separate decision processes enables our customer management and customer marketing groups to see clearly that these retention decisions are currently being made using different criteria and data in different channels (and not in ways that can be justified by channel-specific characteristics). We also see that within a channel we are treating all customers targeted for renewal the same way. Linking decision data to revenue and profit metrics, it's clear that this "one size fits all" approach isn't helping us retain our most valuable customers.

The outcome of Decision Discovery is an understanding of the current differences in our retention decision-making processes and awareness that they are driven by channel rather than customer value. Our aim is to switch that situation so that we're making retention decisions based on customer value consistently across all channels.

### Decision Services

Having identified high-ROI operational decisions and determined what you need to do to improve them, your next step is to design and build an automated decisioning solution. The aim is to create independent Decision Services to replace the decision points currently embedded in business processes and operational systems. These services, which are built on a Business Rules Management System (BRMS) and

## Solution—Decision Management increases analytic value

generally deployed via a Service Oriented Architecture (SOA), deliver decisions on-demand to operational systems. Decision Services generally do not update information—they just answer questions—and thus have minimal runtime impact on operational systems.

The building blocks of Decision Services are the business rules you need to drive and support your new decisioning process. Business rules comprise expertise, policies, regulations and even what might be considered “tribal knowledge” about how your organization does business. There are many techniques for capturing this valuable know-how and making it explicit, including mining business rules from software code, reviewing regulations and policy manuals and interviewing experts. Analytics can also be used: rule induction techniques find rules that represent customer behavior patterns; classification and regression techniques can generate decision trees capturing the rules being used for population segmentation.

Business rules put decisioning elements that used to be buried in code into a language that everyone (analysts, IT, business users, regulators) can understand. They’re generally maintained in a common repository, accessible

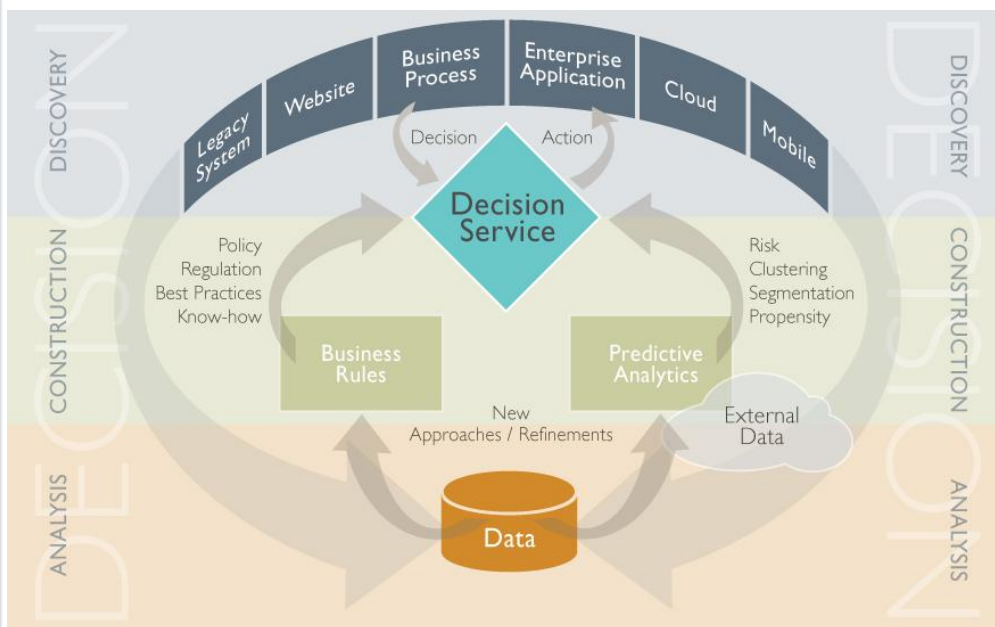
to and updated by both technical and business and technical users. The ability to share and repurpose these building blocks substantially reduces the time and cost involved in development and maintenance.

Organizations that are developing their first Decision Services often move on to testing, simulation and deployment at this point. A best-in-class BRMS will provide easy tools that enable business users to validate their rules, simulate the impact of new rules and changes by comparing multiple “What if?” scenarios and, when satisfied, deploy into virtually any operational environment with almost push-button ease.

At some point, however, most organizations want to enhance their Decision Service by incorporating predictive analytics into the decisioning process itself. Analytic models that predict customer behavior (response, revenue, profit, churn) increase precision in segmentation and targeting. The BRMS should be able to import models, including in standard formats such as PMML (Predictive Model Markup Language).

Even higher performance can be achieved by adding optimization as well. In general, optimization involves the use of analytic techniques to pinpoint the best decision—the one that will achieve a maximum or minimum outcome (e.g., the highest profit or lowest cost) within a defined set of constraints (e.g., time, expense, risk level, etc.). In customer decisioning, where the need is to get high volumes of individualized decisions precisely right, decision modeling may be used to capture the complexity and interrelationships of all the factors that go into a decision. Uncertainty can also be built in to this type of model. Keep in mind, though, that while the inputs and analytics employed are highly complex, the output—a

### Decision Services at the center



## Solution—Decision Management increases analytic value

decision—is simple and immediately actionable.

**EXAMPLE** If we pick up our customer retention example again, our task at this point is to design and build an automated Decision Service that will serve all channels by delivering decisions to the operational systems already existing in those channels. These will be decisions about which customers we want to retain and, for each customer identified, what retention offer to make and how and when to make it. To do this we need to author the business rules that will drive the automated decisioning process. The input for rule authoring includes content from policy manuals, decision logic extracted from our account management systems and knowledge amassed from interviews with our account management and channel experts.

Our IT folks do some of the initial authoring, and link up with runtime data sources. Business experts in our account management department do much of the refinement, however, and run simulations to see how tweaking rules this way or that might affect our retention levels. While a consistent decisioning process will be used by all channels, channel-specific rules will kick in when appropriate to make adjustments where necessary.

At this point decisioning is more consistent and under better control, but it can't really be said to be smarter. To make it smarter, we need to use predictive analytics to understand the differences between customers that we want to retain. We can do this at a basic level, analyzing usage and payment behavioral data as well as customer profiles and preferences to create segments that will receive different types of reminders of upcoming renewal dates. We can also go further, using multiple predictive models to separate customers based on revenue vs. risk, price sensitivity, lifetime value, receptivity to cross-sell offers for other products or services, etc. Advanced analytics today can even forecast a customer's likelihood to respond to different combinations of language, color and layout in communications. The more precisely we segment the

population, the more closely we can tailor a retention program to their needs and the more likely it is to work.

### Decision Analysis

Once the Decision Service has been deployed, use performance management techniques and technologies to monitor and measure it. This is the only way to understand how specific decisions create or destroy business value—and know what to do to improve them.

You need to set up a “closed-loop” system that captures data about decision processes, decisions and outcomes and makes them available for ongoing analysis.

At minimum, there are two levels of analysis you need to be doing regularly. The first is about decision performance. Decision outcomes need to be analyzed against the business drivers and metrics originally identified during the Decision Discovery process. Overall, has the new Decision Service “moved the needle” and by how much? Looking at each of your population segments, how has the business-rules-driven decisioning process affected results?

Companies that do this type of performance evaluation really well, driving continuous improvement from the analysis of operational decisioning results, generally use a process called “champion-challenger.” This is a systematic method of making changes to rules, predictive models or other elements of decisioning, then testing this “challenger” alternative on a randomly selected small percentage of the production population. You then compare the results to those of the existing “champion,” which has been applied to the bulk of your population. If the “challenger” results are better, you then promote it to become the new “champion” and roll it out across the rest of the population—except for another small percentage where you test another “challenger.” And on and on it goes, moving decisioning

## Solution—Decision Management increases analytic value

incrementally toward an optimal point. Using optimization techniques to design better challengers speeds progress toward optimal, and is especially advantageous when rapidly changing market conditions work against incremental improvement.

The second level of Decision Analysis you need to do is around fine tuning the Decision Service to operational conditions. This involves collecting data on throughput, response time, cost (e.g., for external data) and other basic statistics. In customer acquisition, for instance, how many decisions are being made to approve, reject or refer applications? Too many rejections will impact revenue. Too many approvals can raise risk to unacceptable levels. Too many referrals can overwhelm staff doing manual reviews. A good BRMS will enable business managers to quickly modify rules, scoring thresholds or other decisioning elements to adjust for variable staffing levels and other operational realities. Rules can also be added to restrict when external data is accessed, making the determination on an individualized basis e.g., will pulling this additional data improve decision clarity for this borderline customer?

**EXAMPLE** Finishing up with our customer retention example, decision monitoring and analysis tells us that our Decision Service is having an overall positive impact on two key metrics: Customer retention has improved by 5%, and annual revenue per retained customer has jumped by 2%. Looking at these metrics as well as response rates within each segment, we see that some of our targeted retention programs are proving more effective than others.

Results in one segment, in particular, are lagging. Using simulation tools, we try several “What if?” changes to our decisioning rules. For one of these scenarios, the simulation projects a very strong uptick in both response and retention rates. We implement a champion-challenger program to test this change on a small percentage of our production population. Six weeks later, we analyze the operational data and determine that the actual production results show

improvement very close to the simulation projection. To increase the scope and impact of the improvement, we roll the decisioning changes out to the entire segment. We then start testing another alternative in a small percentage of the segment population, and we initiate parallel champion-challenger testing processes in each of our other retention segments.

That’s an overview of this very powerful approach to business performance improvement. But how much improvement are we talking about?

When companies use Decision Management to put analytics to work, the results can be dramatic. For example, an insurance company that implemented a risk-based underwriting Decision Service for use across its channels had an 8-point reduction in combined ratio in its first year. This was the result of improved risk management (flexible business rules and inclusion of more predictive analytics supported more tiers and finer grained decisioning). Such a reduction is a big deal for an insurance company because it represents 8 percentage points of additional profitability.

Decision Management also reduced the insurer’s costs by increasing straight-through processing, minimizing manual review and putting underwriters and actuaries in charge of the rules behind the decision, eliminating or reducing many IT costs. It increased the efficiency of new business/underwriting systems for agents and enabled staff to focus less on helping agents to complete transactions and more on improving the book of business and channel productivity.

Even more important for this insurer’s present and future success, Decision Management extended true strategic control over underwriting decisions. A clear relationship now exists between the executive level, where analytic insights are guiding business strategy, and the operational level, where analytic insights are helping the company achieve its strategy every day, customer transaction by customer transaction.

This white paper can be found at [decisionmanagementsolutions.com](http://decisionmanagementsolutions.com) along with links to other articles and materials on the topic.

Other good sources of information, examples and guidance include:

Davenport, T., & Harris, J. (2007). *Competing on Analytics: The New Science of Winning*. Boston: Harvard Business School Press.

Taylor, J., & Raden, N. (2007). *Smart (Enough) Systems: How to Deliver Competitive Advantage by Automating Hidden Decisions*. New York: Prentice Hall.

## About Decision Management Solutions

Decision Management Solutions provides consulting and implementation services in all aspects of Decision Management, predictive analytics and business rules. Decision Management improves business performance by identifying the key decisions that drive value in your business and improving on those decisions by leveraging your company's assets: expertise, data and existing systems.

Our end-to-end, decisions-based approaches and methodologies address key business priorities—such as cost competitiveness, differentiation, customer retention and growth. We offer a range of consulting services for companies ranging from strategic advice about adopting Decision Management to tactical support for successful implementation projects.

Decision Management Solutions is led by James Taylor, one of the leading experts in decision management. James has over 20 years experience in developing software and is the foremost thinker and writer on decision management. In addition, Decision Management Solutions has an extensive network of industry and implementation partners. James has experience in all aspects of the design, development, marketing and use of advanced technology and has consistently developed approaches, tools and platforms that others can use to build more effective information systems.

More information is available at <http://www.decisionmanagementsolutions.com>. To engage us or request information, email us at [info@decisionmanagementsolutions.com](mailto:info@decisionmanagementsolutions.com).