

# THE POWER OF WHAT-IF

---



Contents

Introduction . . . . . 3

Analytics and Decision Making . . . . . 4

Establishing a Decision Framework . . . . . 4

Taxonomy of a Decision Platform . . . . . 6

The Power of What-If . . . . . 8

How to Develop the Decision Ecosystem . . . . . 10

Conclusion . . . . . 11

# THE POWER OF WHAT-IF

## Introduction

The key to automating business decisions is having the ability to take into account the impact of all available information from the business ecosystem on the decision. Assessing this impact requires capturing the entire context of the decision and understanding all the resulting consequences. Ultimately business decision making is asking the question: “If X and Y meet certain criteria, can we do Z?”

In making a decision as confidently as possible, we combine decision making and analytics. Analytics is all about using information to make better decisions. A “better” choice is one that considers the entire ecosystem or context of the decision. The decision context/decision space is essential: making decisions in isolation without looking at the full context can have disastrous results.

If we have sufficient information about our business context and the analytics to understand that data, we can take decision making a step further and evaluate “What-If” scenarios: “What if X is higher and Y is lower? Can we still do Z?” The key to harnessing the power of What-If is creating a symbiotic relationship between decision making and analytics.

The power of What-If is the ability to answer questions like, “How would profitability be affected if I charged a lower rate for insurance policies on Corvettes?” or, “Which customer criteria are most likely to affect loan acceptance as interest rates rise or fall?”

These questions are examples of single decisions a business might encounter. In reality, businesses make thousands of similar decisions each day. The ability to capture the basis for these decisions is key to building a decision platform that automates making these decisions rapidly and consistently. A decision platform allows the consistent application of analytic results. Without a decision platform, much of the value of analytics is likely to be lost.

Decision platforms such as InRule® enable the synergy of analytics and decision-making. InRule not only allows for consistent application and automation of decisions, but also provides organizations with the ability to explore “What-If” by simulating a variety of possible futures and evaluating a range of judgments.

In this paper, we will look at several aspects of What-If decision making including:



**ANALYTICS AND  
DECISION MAKING**



**ESTABLISHING  
A DECISION  
FRAMEWORK**



**THE TAXONOMY  
OF A DECISION  
PLATFORM**



**INCORPORATING  
WHAT-IF CAPABILITY  
INTO DECISION  
PLATFORM**



**DEVELOPING  
A DECISION  
ECOSYSTEM**

# Analytics and Decision Making

Technopedia defines analytics as follows:



*“Analytics is the scientific process of discovering and communicating the meaningful patterns which can be found in data. It is concerned with turning raw data into insight for making better decisions.”*

For this paper, we are going to define analytics to include areas like predictive statistics, operations research, optimization, and machine learning (ML). All of these techniques use data to understand the ecosystem context in which decisions are made.

It's important to note that analytics gives us information about the data we've collected. It can provide summarized views of the data, so we examine the whole rather than the individual data points. It might suggest what could happen in the future based on whether a trend continues.

Predictive statistics suggests what might happen in the future with a certain probability based on data observed during some period before the prediction. If the factors remain, the same predictive analytics tells us what we can expect in the future. ML takes an approach of using algorithms to train models based on large data sets.

A critical point is that analytics informs our decisions — it does not make our decisions for us. Analytics is directional. It might suggest a higher than normal probability of an auto accident with an 18-year-old driving a Corvette. Analytics can predict what that accident will probably cost based on data within a specific range. Therefore, it can provide us with data to determine what to charge for an automobile insurance policy.

What analytics does not do is capture the decisions we make about how to use this information to determine the cost of that insurance policy. Are we going to assume the worst case and charge high premiums to minimize our losses, sacrificing market share, or are we going to charge lower premiums, incurring more risk, but increasing market share? While analytics informs the business decisions, it requires additional input and judgement to apply the results.

Often the basis for these decisions is not captured, nor are the assumptions tested. In many cases, the reasoning behind these choices is only found in meeting notes or the memories of the people that made choices.

Decision management platforms like InRule provide systematic methods and processes to capture the basis behind these decisions and automate these decisions. InRule captures how the analytics and assumptions are applied to the decision-making process.

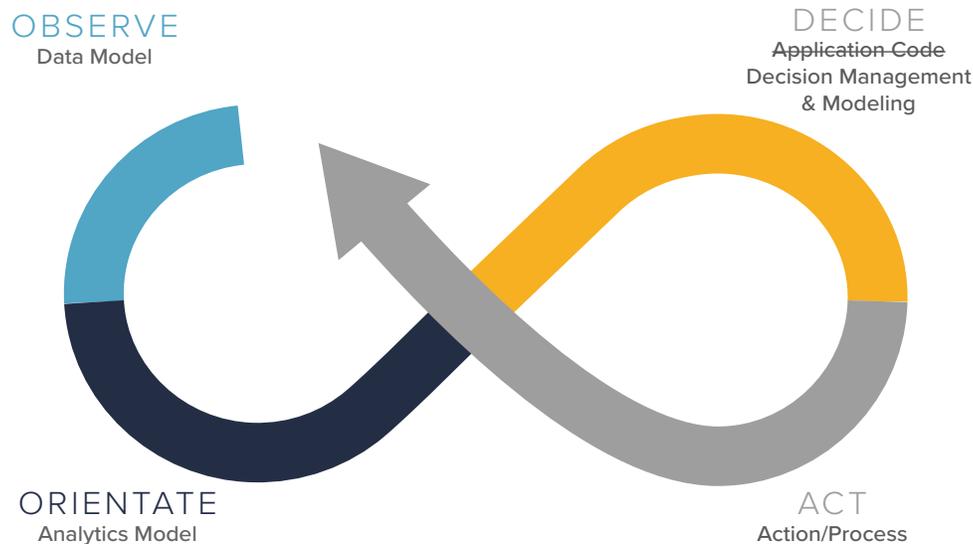
Further, InRule provides a platform to use for What-If analysis, to test how the results might change if current trends continue, but also if business decisions change. Instead of waiting for history to prove us right or wrong, we can use historic data to test a decision.

## Establishing a Decision Framework

People make decisions all the time, sometimes with the data, sometimes in the absence of data, and occasionally even contradictory to it because they “have a feeling.”

Making consistent business decisions requires the creation of a decision framework. A decision framework consists of the factors that influence the decision and how these factors are used in combination to make a decision or choice. Combined, the factors and decision are called a business rule.

The Observe, Orientate, Decide, and Act (OODA) model (Gartner, 2018) provides a framework to look at decision making. Let's take a look at each element of the OODA model:



First, we observe and create a data model from the observed data in a form suitable for analysis. Next, we orientate, which in the OODA system means to create an analytics model. An analytics model is a mathematical statement about the data and the relationships between the different variables or types of data observed. If created as a predictive model, it will indicate the probability of a given outcome based on the historical data. An analytics model will seldom provide us with a 100 percent probability of a given result. In most cases, it will only indicate a tendency towards a given outcome which we can use to take action inside of a decision model.

Next, based on the analytic model, we can create our decision model. Unlike the analytics model, which is probabilistic, the decision model is prescriptive. It tells us what to do, not what might occur. Given a set of specific observations (such as the characteristics of a person applying for insurance), what do we do? While we rely on the probabilities to make the decision, we need a single definitive decision in each case.

Finally, we act. For example, based on the previous steps we might determine the premium and offer a policy to a customer.

From this action, we return to observe the phase of the OODA model. The decision we make, over time, may change what we observe. Also, a variety of other factors such as market trends, competitive environment, or legal rulings can change over time, influencing the results (which could change the model) This rule is combined with others in a decision — say, if a person is a member of a buying group, provide a discount — to determine the final rate that a given individual pays. All the rules invoked determine the final price.

A simple example of a decision rule is: If a person is...

- Male
- Age 45-49
- Overweight
- A smoker



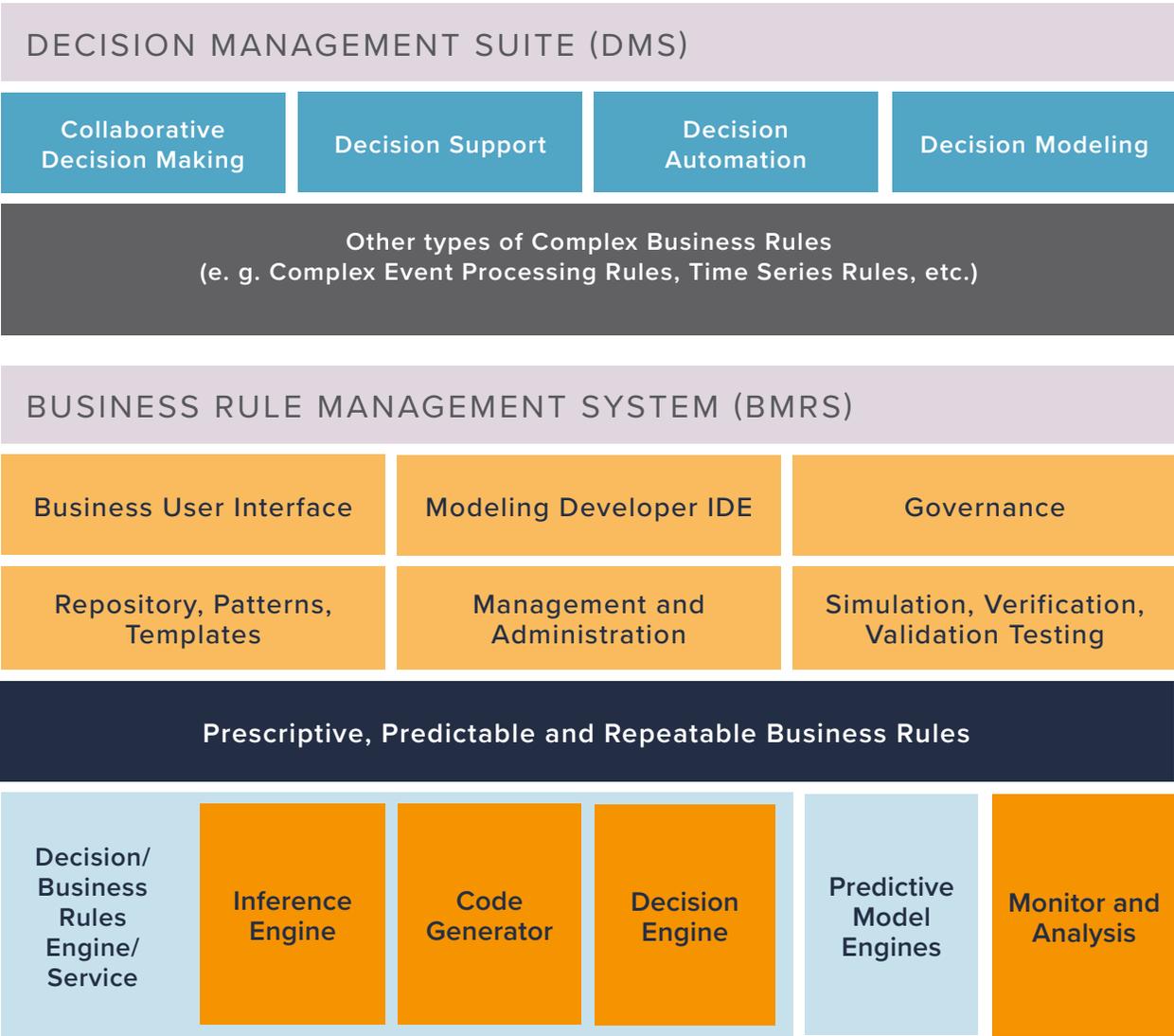
..then charge them 70% more than average premium for a life insurance policy

Organizations may need to create and manage thousands of business rules to make millions of decisions. The increase in data availability and analytics has allowed the creation and implementation of business rules at a much faster pace than in the past. This pace increases the challenge of managing those business rules across an enterprise.

## Taxonomy of a Decision Platform

Organizing, managing, and automating decisions is the purpose of the InRule Decision Management Platform. InRule provides the ability to manage not only the rules, but also the vocabulary that is necessary to support the consistent application of the rules.

The figure below describes the taxonomy of a comprehensive Decision Management Suite (Gartner, 2018). The suite integrates the ability to determine business rules and capture them in a consistent, systematic, and executable manner.



The Decision Management Suite provides support for:



**COLLABORATIVE DECISION MAKING** involves gaining agreement from the various stakeholders about the decision and the factors affecting it. From exploring risks, problems and assumptions to creating journey maps of specific business processes and establishing goals, metrics and KPIs, laying a proper foundation paves the way for project success.

Once the foundation is established, it is time to focus on vocabulary. Finding a common vocabulary to use to make the decision can often be a challenge. Different divisions within a company might use the same term to refer to different concepts, or different terms to refer to the same concept. A word as standard as “revenue” may be defined differently by sales and finance.

Different parts of the organization may have competing agendas driving the direction of a decision. Sales might want the lowest price, while risk management will accept higher prices to decrease risk. When priorities are not compatible, compromise is necessary to develop a prescriptive decision.

The InRule Decision Platform, which includes a Business Rules Management System (BRMS), empowers an organization with the ability to author, manage, execute and analyze these decisions and their components in a language that can be written and understood by business users without needing a deep technical background.

**DECISION SUPPORT** provides the information and framework for automating the decisions. It brings together the various necessary pieces of information. For example, if we are looking at purchasing items for a clothing store, we might want to know information about the designer, the manufacturer, and prior experience of selling similar products in our stores to determine the amount of inventory to purchase. Bringing this information together in a manner that can be understood and acted upon is the purpose of decision support.

**DECISION AUTOMATION** provides the ability to incorporate information into the business rules, and to perform operations necessary to reduce the data and resolve complex factors influencing the decision. Resolving rules that determine the premium to charge a smoker who exercises regularly would be a task for automation. The business rules engine must execute the rules set and determine the result within the time window for the decision. Therefore, the performance of the business rules engine is essential.

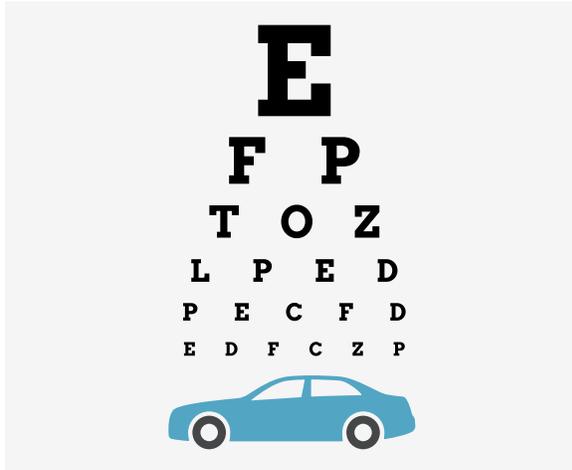
**DECISION MODELING** is the ability to capture and evaluate the rules that go into a decision. It moves decision automation from a black box process to one that is transparent. Decision modeling allows the organization to examine and adjust the logic to provide decisions that are understandable in a business context. Decision modeling also provides the ability to perform What-If scenarios to understand how robust or sensitive the model is under different conditions.

InRule provides a software platform that supports all phases of the Decision Management Suite shown above, including integrating analytics results. InRule orchestrates a symbiotic relationship between analytics and decision making while providing transparency into the decision-making process.

## The Power of What-If

Creating and capturing the decision framework in a decision platform provides us the ability to do What-If analyses on the effect of changing business rules. Decisions that make logical sense on the surface may reveal hidden problems when looked at with the perspective of the entire ecosystem.

For example, after encountering results from a study that showed that visual impairment progresses more rapidly for senior citizens, a state Department of Motor Vehicles (DMV) considered adding a requirement of annual eye examinations for people aged 65 and over. While the study indicated that more frequent examinations make sense, it did not provide guidance as to how often vision exams should be conducted.



Already an InRule customer, the DMV evaluated the concept of annual visual exams for seniors with What-If tests using the InRule BRMS. Business analysts were able to use InRule to quickly update the decision logic to support a yearly eye exam for seniors. This revealed that nearly 500,000 individuals would require annual eye exams.

Next, the agency wanted to know how the increased quantity of annual eye exams would impact existing DMV locations. Since the agency had identified the people impacted under the new rule by running the previous question, they were able to use those results to determine which offices people would likely go to based on their home address. The team was surprised to learn that 90 percent of the individuals required to have annual eyes exams lived in close proximity to only two DMV locations. This new rule was sure to increase wait times and create angry citizens.

Because InRule made it possible to quickly change the rules to require annual eye exams for seniors, and run the rules against existing data, the DMV was able to understand the far-reaching implications of the new age requirement and given that information, they decided not to pursue annual eye exams for seniors.

Had they wanted to, the DMV could have evaluated other scenarios, as well. They could have tested the impact of biennial testing instead of annual testing. Or they could look at the effects of adjusting the rule on the number of seniors who could potentially be denied licenses because of vision impairment and the possible associated reduction of traffic accidents. Evaluating each of these possibilities would require the DMV to combine the results of analytics with a decision platform — the partnership between the two providing practical answers to real problems.

Where decision platforms such as InRule really show their strength are instances where a large number of decisions need to be made at high speed.

An example of this is issuing prepaid credit cards. These cards are a low-margin product, so issuers want to maintain a high sales volume. However, the cost of a single incidence of fraud can wipe out the profit margin on hundreds of cards. Additionally, when cards are used fraudulently, those cards are usually used very quickly (within minutes) after they have been issued. While banks want to decrease their fraud risk, they do not want to reject valid transactions that have some of the same characteristics as fraudulent transactions. The suspect-but-authentic transactions are called false positives.



InRule allows credit card issuers to harness the power of What-If analysis by making it easy to determine which rules caused the rejected transaction. Banks are cautious about revealing their fraud detection criteria, so we will use a brief hypothetical example.

ScoringTable					
Decisions					
	Address Match	Total Monthly Transactions	Total Transactions Amount	# of Applications in 24 hour period	Add Points
1	No	- Any -	- Any -	- Any -	5 points
2	- Any -	> 3	- Any -	- Any -	3 points
3	- Any -	> 5	- Any -	- Any -	4 points
4	- Any -	> 10	- Any -	- Any -	5 points
5	- Any -	- Any -	> \$100	- Any -	2 points
6	- Any -	- Any -	> \$250	- Any -	3 points
7	- Any -	- Any -	> \$500	- Any -	4 points
8	- Any -	- Any -	> \$1,000	- Any -	5 points
9	- Any -	- Any -	- Any -	>= 3	5 points

ScoringAssessmentTable			
Decisions			
	Minimum Score	Maximum Score	Action
1	0	9	- Ignore -
2	10	15	Process Transaction
3	16	20	Process Transaction
4	21	25	Contact and Confirm Transaction
5	26	30	Contact and Confirm Transaction
6	31	35	Decline Transaction
7	36	- Any -	Decline Transaction

In other words, if two or more of the rules were true, then the bank would reject the transaction. In a more realistic situation, there might be hundreds of rules.

Let's assume that the first and second rules were the only ones that were triggered, causing a rejected transaction. The bank could use analytics on their historical data to see the number of fraudulent transactions, and of these, which false positives were caused by this rule pattern. If the number of false positives was too high, they could adjust the weighting of the rules and rerun the analysis to see the effect on the results. In this case, they would be using the historical data to answer the question, "What if we changed the rule weightings?"

Another example is one that impacts issuing loans. Banks need to balance the risk of issuing a given loan with the benefit that they receive from the interest. To assist the loan officer, they implement a decision platform that incorporates the analytics into business decision rules. The factors for a given applicant are fed into the system along with the amount of the loan and interest rate. A decision is made to accept or reject the loan.

It is to the bank’s advantage to know the reason for rejecting the loan. InRule allows the bank to examine the rules that led to the rejection. In some cases, this can be one or two rules. For example, was the loan too high, or perhaps the interest level too low.

What-If analysis allows the bank to examine the set of rules that affected the outcome and, instead of rejecting the application outright, it can provide the loan officer with a set of actions. These actions might consist of raising the interest rate, lowering the loan amount, or both. These are actions that might allow the bank to issue the loan while maintaining acceptable risk levels. As these examples illustrate, the key to using the What-If power of a decision platform is dependent upon:



All of the above factors have been implemented in the InRule Decisioning.

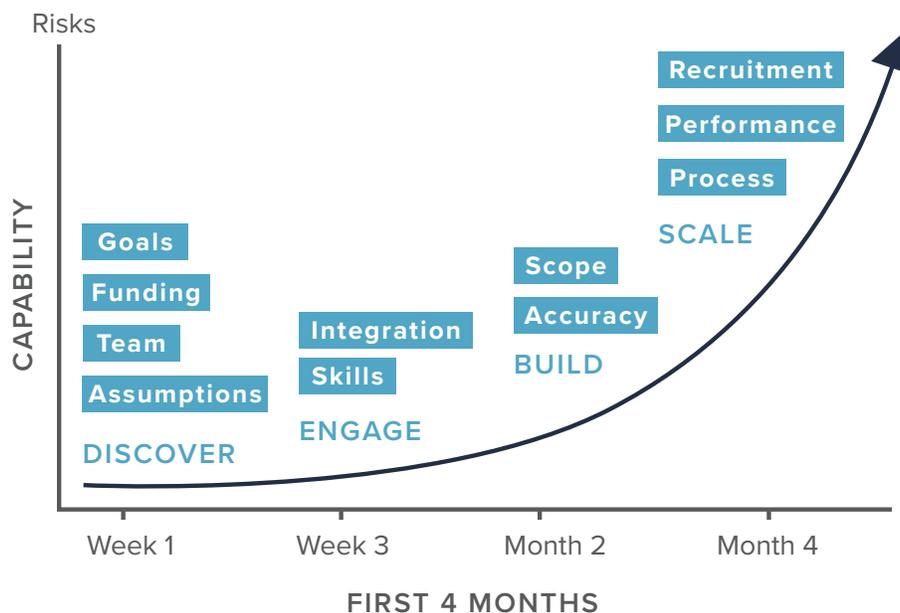
## How to Develop the Decision Ecosystem

Establishing and implementing a decision ecosystem for an organization may seem like an insurmountable, high-risk project. However, InRule has developed a proven methodology to implement all of the components of a decision platform, including both business and technical challenges.

Risk is reduced by developing, testing, and implementing the parts of the decision platform incrementally. A project can take a few weeks to a few months, depending on the size of the decision space.

Using the **Discover, Engage, Build, Scale (Thinking in Rules)** methodology, InRule reduces the guesswork from implementing a decision platform and provides its customers with a foundation that allows for the rapid, orderly, testable implementation of decision-based functions.

For more information on the implementation process, see “Good Beginnings-Wading Into a Decision,” by Chris Berg (<https://www.inrule.com/resources/blog/good-beginnings-wading-into-a-decision>).



## Conclusion

The increasing availability of data and analytics capabilities creates the opportunity to make better decisions. Decision making needs the context, organization, and consistency that analytics by itself does not provide. The InRule Decision Platform allows the organization to systematically implement and automate the OODA process, marrying analytics with decision making.

Further, the What-if functionality that InRule provides gives an organization the power of seeing the systematic effects of decisions on the entire business ecosystem. Through simulating the impact of changing business rules and organization can mitigate the risk of erroneous decisions rather than making a decision and letting history prove the company right or wrong.



## Inrule Technology

651 W Washington Blvd #500  
Chicago, IL 60661  
[www.inrule.com](http://www.inrule.com)