

BOOK EXTRACT



# Data to Diamonds

Delivering valuable business insights



**CGI**

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CGI invites you to preview our new Data to Diamonds book. The following pages provide the book's table of contents and first chapter: Executive Summary-Drivers of Change. For more information on obtaining a full copy of the book, created for our clients and partners, please visit [www.cgi.com/d2d-book](http://www.cgi.com/d2d-book) or email us at [data2diamonds@cgi.com](mailto:data2diamonds@cgi.com)

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# Executive summary— Drivers of change

# 1



# 1 Executive summary – Drivers of change

It was not too long ago that data was just a byproduct of business operations. Information about transactions, customer contacts, machines and images were stored and put to use, but very limited analysis was done. Now we are seeing transformative changes. Data is not just useful for understanding the business of an organization, but the ability to manage and analyze it is key to remaining competitive. To thrive in this new world of data and analytics, executives must align their organizations to make use of skills and technologies that may not yet be second nature.

Data describes people and their relationships with the organization, it describes machines and other assets, and it describes the details of internal operations. CGI's Data2Diamonds approach is all about analyzing and drawing insights from each of these kinds of data.

First, let's define the context, starting with digital transformation. Most organizations have multiple touchpoints for communication, including websites, social media, sensors, mobile apps, call centers and bricks and mortar locations. Digital transformation is the reinvention of these touchpoints, changing the way relationships are built, data is exchanged, transactions are fulfilled, insights are gained and value is created.

From its origin in customer experience management, digital transformation is now reaching core operations, such as asset maintenance, patient care and employee engagement. It is creating disruption in all sectors, from government to financial services, manufacturing, healthcare, transportation and utilities. It challenges how organizations manage data, ensure security, adapt legacy systems and introduce new technologies. Many businesses and governments are now looking to achieve step changes in business agility, at reduced costs, through both the communication and analytical aspects of the digital revolution.

Customers and citizens are well informed. They expect consistency across all touchpoints. If they are disappointed or frustrated, not only can they take their business elsewhere, but they also can vent their frustration over social media, damaging hard-earned reputations.

At CGI, we believe that successful enterprises in the digital world combine a customer-centric culture with the pursuit of operational excellence. This might mean, for example, ensuring that relevant customer and product data from multiple channels is made accessible to customer-facing employees. While cloud computing and Software as a Service offer flexible and cost-effective service delivery options, not every organization can combine operational improvements with instant modernization of their mission-critical legacy systems. Their challenge is to evolve their systems and processes while focusing on integrating the data in those systems to improve business outcomes.

Digital Customer Experience	360° Enterprise Views	Harnessing the Internet of Things	Monetization (New data-based services)
Improving “ <b>digital customer experience</b> ” using insights from customer data	Integrating data across silos to enable “ <b>360° views</b> ” of customers, facilities, and other elements	Using data from sensors ( <b>IoT</b> ) to improve operational effectiveness, e.g., predictive maintenance	<b>Monetizing</b> data by bringing new and innovative information services to market

**Fig 1: Top trends in producing valuable business insights**

Digital enablers such as cloud computing, big data, social media, mobility and the Internet of Things (IoT) touch everything from the very core of mission-critical systems and processes, to the way billions of devices are used. Their impact is felt in changes to customer experiences and the need for trust in data privacy, in expanding options for monitoring and maintenance, and on the darker side, in growing cybersecurity threats.

All of these enablers require the availability of data along with the capacity to consume, process and analyze that data to produce valuable business insights (Fig 1). Big data analytics is an umbrella term for the broad area of technology and applications related to getting business value from data, ranging from traditional data warehousing and reporting, to predictive and prescriptive analytics based on all relevant data and content.

We believe big data is a game changer, but does not replace the existing data warehouse and information foundation concepts and capabilities. Big data provides the opportunity to open up the average one-size-fits-all enterprise data warehouse architecture to become more cost-effective and aligned with business demands.

## Putting business value first

Data2Diamonds is CGI's methodology for the design and implementation of data and analytics solutions. The essential idea behind Data2Diamonds is that data contains valuable insights that can produce business improvements when put to work. We call these insights "diamonds." The more high-quality data you can access, and the better you can analyze it, the greater the potential for value.

Our approach comes from decades of experience in implementing systems that derive value from data. The high-level principles of Data2Diamonds are:

- **Collaboration** – understanding and bridging the business domain and the technical side of data and systems
- **Evolutionary approach** – pursuing big data opportunities while safeguarding existing investments
- **User experience** – recognizing that users will adopt what they can use and what brings them value
- **Agility** – being highly adaptive to changing business environments and user needs.
- **Sustainability** – providing service levels beyond business expectations at affordable cost levels

Valuable insights may come from reports, visualizations such as graphs and charts, or advanced analytics (Fig 2). As a result, it is crucial to investigate the real needs in each situation and not assume, for example, that a sophisticated machine learning system will maximize the value of the organization's data in every case.

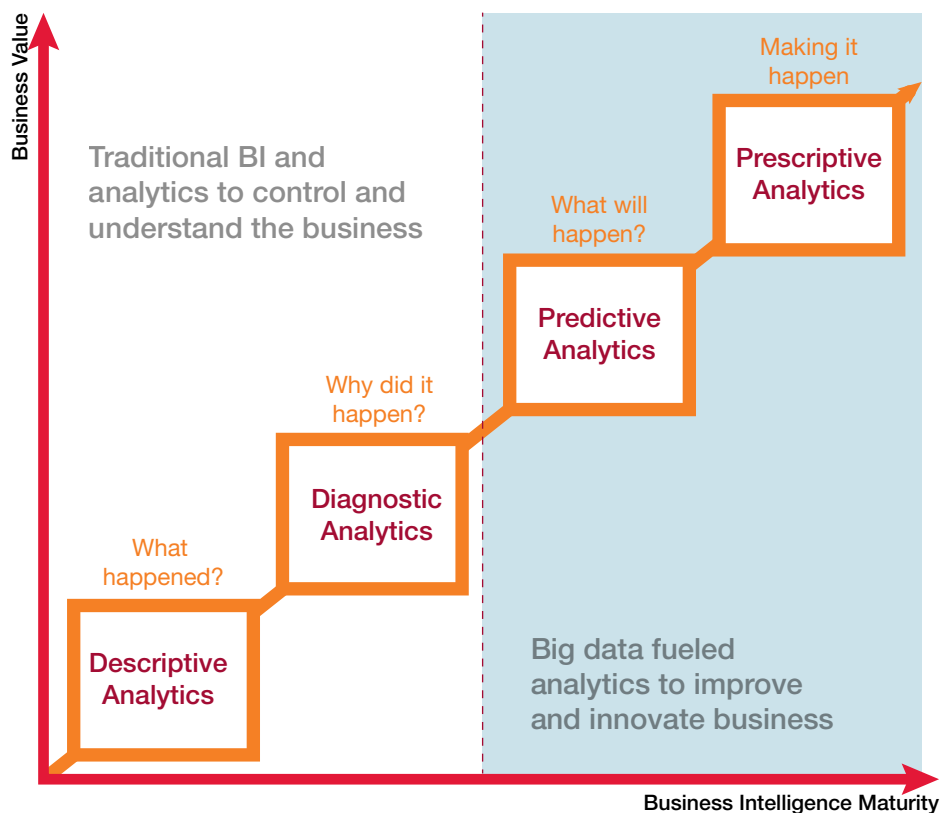


Fig 2: Data and analytics evolution

Business functions such as performance reporting, compliance reporting and drill-down analysis provide essential information for day-to-day management. The insights they provide also give business leaders the ability to envision improvement scenarios for future performance. Although these functions are essential, and in competitive industries they are among the table stakes necessary to stay in business, they focus primarily on past events and do not produce a competitive advantage.

Realizing the next level of value involves linking the insights and predictions produced through analytics with the relevant business processes. Porter's value chain\* (Fig 3) provides a widely accepted model for positioning the primary business processes in an organization. There are several specific ways that data and analytics can potentially be used to create value in all of these processes:

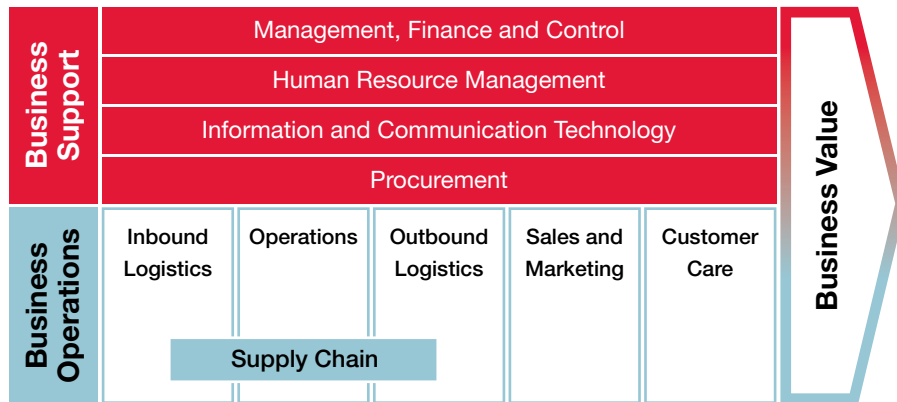


Fig 3: Porter's value chain

- Creating transparency by making information more easily accessible to the people who need it
- Enabling experimentation to discover new possibilities, expose variability and improve performance
- Segmenting populations to customize actions
- Replacing or supporting human decision-making with automated algorithms
- Creating new lines of business by generating revenue from the data itself (monetizing)

The key is to take a practical approach that is completely focused on business results, and not be distracted by “shiny objects” in the form of technologies. Executive attention is needed on multiple levels to achieve analytics excellence:

- Nurturing and developing data science skills and capabilities
- Applying the right level of governance to establish a smoothly-functioning data- and analytics-driven culture
- Leveraging advancing technologies to the right degree for the business
- Putting the processes in place to proactively identify data-driven business opportunities and deliver value accordingly

It is true that advances in technology have made some things possible that were not possible before, but technology should always be in the service of business needs, not the other way around.

\*Michael E. Porter, *Competitive Advantage*

## The data foundation

While data as an asset is growing ever larger in importance, it can also grow in complexity and cost. Containing the cost of the data asset, while maximizing its business benefits, is the pivotal management challenge of this century.

The governance challenges faced by many organizations relate to the degree of centralization versus line-of-business control, how to best foster innovation, and achieving standardization. Realizing value from data involves linking the insights and predictions produced through analytics with the real economics and mission of the business (Fig 4).

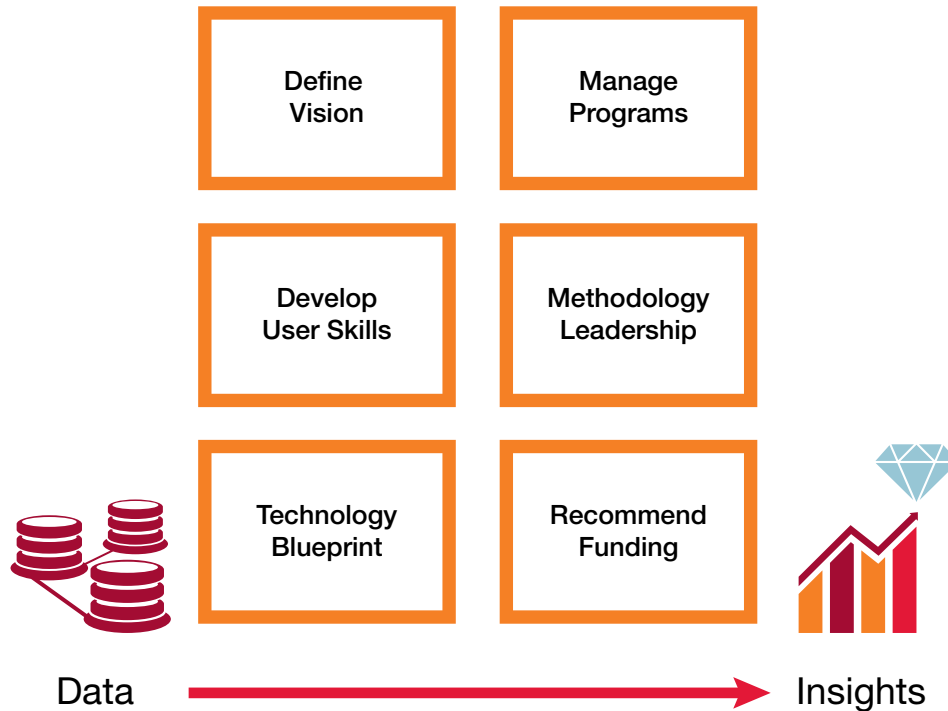


Fig 4: Managing for analytics excellence

Many organizations are creating a new chief data officer role with the charter to get the most value from the data asset at the lowest cost. This role is evolving rapidly and takes different forms, but common responsibilities include governance, innovation, change management and exploring opportunities for monetizing data.

We see an ever-increasing variety of data being captured from internal operations, transactions with other parties and external sources, leveraged by evolving data and analytics technologies (Fig 5). While the types of information available are different from one organization to another, there are a few broad themes that are nearly universal:

- **Data about people** – People may be customers, members, patients, citizens, taxpayers, benefit recipients, employees, investors, social service clients, hackers, criminals, enemy combatants, etc. The data they produce or volunteer helps organizations understand their behaviors and preferences so appropriate responses can be made. The response in some cases may be to try to influence behavior in beneficial ways, such as encouraging on-time payment or adherence to a doctor's course of treatment. Social media and the nearly ubiquitous use of mobile devices have brought about an explosion in the amount and availability of data about people and their behaviors.
- **Data about things** – Machines, vehicles, pipelines and other physical assets are being fitted with sensors at a rapidly accelerating pace. These sensors emit streams of data describing their condition, location and use. The Internet of Things (IoT), as this sphere of networked data-emitting devices is called, is growing even faster than the adoption of social media and mobile devices, which are driving data about people. The business value from IoT currently comes primarily from applications in predictive maintenance, insurance pricing and supply chain management.



One area where the spheres of people and things come together is in location-sensitive applications. Smart beacons can be placed throughout a store, shopping area, theme park or airport to detect devices like smartphones in their vicinity. They can then beam data to a central engine that is programmed to send tailored messages back to the individual phones, as long as the owners have opted into the service through a special app. Such messages can provide discount coupons for products the customer is browsing, restaurant recommendations or information to help navigate the venue. Sensor technology combines with an understanding of human behavior to create applications that benefit both the organization and the customer.

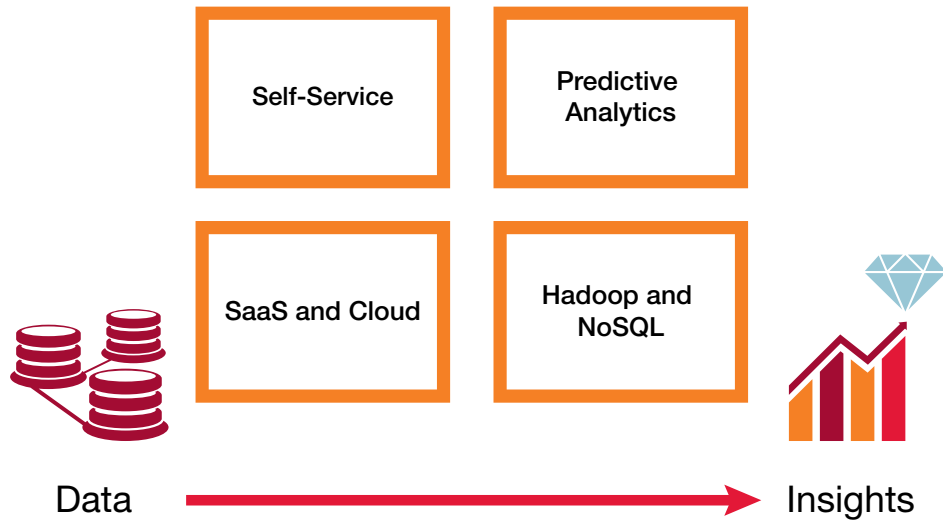
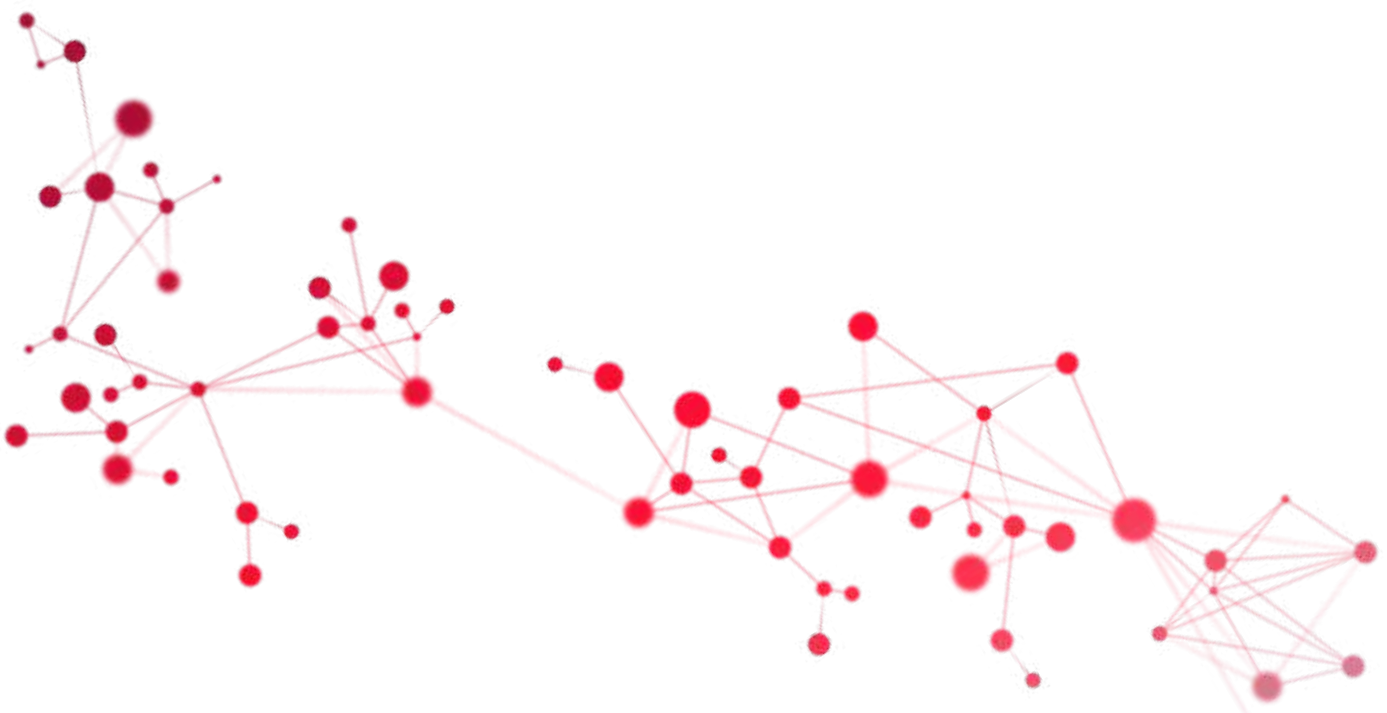


Fig 5: Evolving data and analytics technologies

## Avoiding the “creepy” line

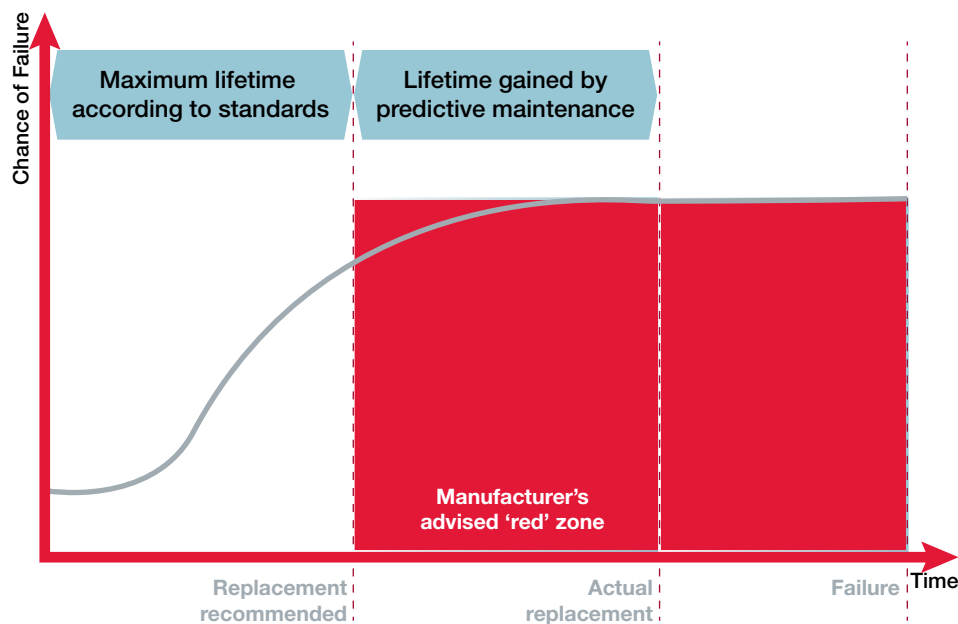
Any use of data about people must pass both legal and cultural tests to be an appropriate business tool. Even when a proposed application complies with legal requirements, the people affected still may find it “creepy”—thus undoing the intended effect. For example, Google’s use of e-mail content analytics to generate advertising feeds is fully disclosed, requires opt-in and is well publicized, yet users often report an uneasy feeling when they see the words they have used in their “private” communications come back to them in the form of targeted ads. Some individuals will look for any opportunity to opt out of data-driven programs, but the good news is that most will agree to their data being used if there is a clear benefit to them. The better news is that many applications raise no privacy concerns at all, such as predictive maintenance and supply chain optimization.



## Discovering the diamonds

The analytical techniques with the best opportunities for high-ROI applications are predictive and prescriptive analytics. To illustrate why this is so, consider this example in predictive maintenance. Monitoring the actual state and performance of a machine is the starting point. In addition to the data sources used in scheduled maintenance, the data generated by the machine itself and its environment are included in the analysis. Combining all of this data in a mathematical model enables an organization to predict the short- and even long-term condition of the machine much more accurately. Together with the production schedule and availability of staff and spare parts, these predicted conditions can be used as an input for dynamic maintenance planning.

As a result, predictive maintenance has a number of measureable benefits. It reduces premature replacement of vital parts, as illustrated in **Fig 6**. In addition, it predicts when a machine is about to fail before it actually does and thus provides a means to prevent failure and resulting costs. In some cases, replacements or maintenance might be needed earlier than the standards would have prescribed, but in most cases it occurs at a later point. On average, because uncertainty is reduced and failure is prevented, stock levels of spare parts are lower, service costs are lower and the effective lifetime of equipment is extended. As a result, operational efficiency and customer satisfaction are higher.



**Fig 6: Lifetime optimization**

## Applying predictive models

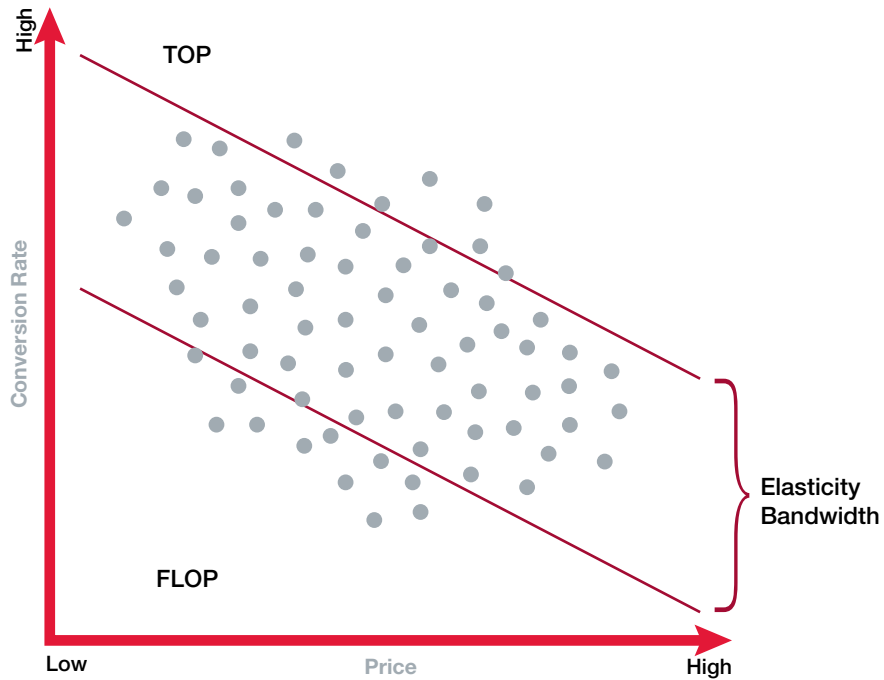
The way predictive models in general produce value is simple in concept. Information that is known at the time a decision is made can be put into a model to quantify the likelihood of different outcomes—good as well as bad.

The model makes possible more “right” decisions, more quickly and with less expense. It can either provide support for human decisions, making them more efficient and effective, or in some cases can be used to automate a decision process completely.

Typically, predictive models are implemented along with logical rules for making or recommending decisions, as well as tracking reports to show how well the models and rules are working to produce more “right” decisions. This combination of models, rules and tracking is one form of prescriptive analytics.

Let's look at an example in online retail pricing strategy to illustrate this point.

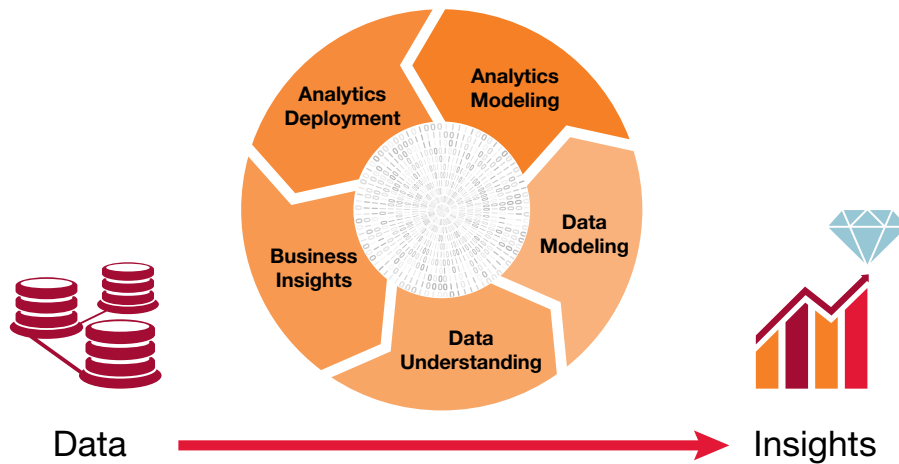
Imagine being able to fully automate an online pricing strategy in real time, optimizing revenue and margin, by factoring in the state of the supply chain and competitive position. In the case of this online retailer, the process starts with categorization of the products, taking into account competitor pricing, supply chain information and the company's strategy for the specific line of products. In the second step, conversion rate simulations are run, comparing more than 20 online competitors' offerings (**Fig 7**). Based on the simulations, an automated pricing recommendation is generated based on the chosen sales strategy for the specific product.



**Fig 7: Conversion rate simulation**

Online sales and margins have exceeded expectations as a result of using the automated pricing adjustments. This combination of predictive models with decision rules and tracking has also enabled continuous improvement in the process and its results.

This is a great example of prescriptive analytics at work. The approach (Fig 8) can be used in applications as diverse as equipment maintenance, cybersecurity, customer loyalty, tax collection, location-based marketing, community policing, patient care and fraud prevention. An especially attractive aspect is that ROI can be measured and monitored over time.



**Fig 8: Analytics process**

## The transformation opportunity

At one time in the not-so-distant past, only a few banks, phone companies and government agencies were thought of as “data-rich” and able to use analytics to sharpen their operations. Now, everyone is data-rich, or can be. The digital age brings not only new ways of interacting with people and organizations, but also enables much more information on which to base good decisions.

The goal of Data2Diamonds is to empower all organizations to make the best use of their data to improve how they fulfill their missions and create more value for stakeholders.

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