




# LEVERAGING DATA

How Advanced Analytics  
is Changing the World  
of Risk Management



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## Billy Beane knew better.

As the Oakland A's general manager, he knew he couldn't rely on traditional scouting methods to rebuild his player roster. He'd just lost three of his top players (Jason Giambi, Johnny Damon, and Jason Isringhausen) to other bigger baseball teams. And he knew Oakland couldn't compete with the likes of the New York Yankees, especially when his player salary budget was just \$44 million -- and the Yankees could muster up to \$125 million. It was clear that old-fashioned recruiting methods were not going to be able to fill those gaps.

So, in 2002, he took a different approach. He decided to leverage statistical analysis to help him evaluate players and build a better roster -- using a lot less money. In the "old" system, players were judged by batting average, stolen bases and runs batted in. His "new" method used analytics that focused on slugging percentages and the ability of players getting on-base. This system allowed him to analyze hundreds and hundreds of players. The key was not to find the best players. The key was to identify those individuals with the strengths and abilities that could be leveraged to "piece" together a new team at a third of the cost.

### The result of Billy Beane's innovative approach?

The Oakland A's went on a 20-game winning streak that year, stretching from August 13 to September 4, and setting an American League record. The team ended the regular season with 103 wins. And the A's became champions of the American League Western division. They were eventually defeated by the Minnesota Twins by a score of 3-2 in the divisional series playoff. But the results of that amazingly successful season had repercussions for the entire baseball league. In fact, the Boston Red Sox "copied" that statistical method and ended up winning the World Series just two years later.

It is interesting to note that this analytical concept was epitomized in the book "Moneyball: The Art of Winning an Unfair Game" written by author Michael Lewis in 2003. This was followed by the release of the "Moneyball" movie in 2011 starring Brad Pitt and Jonah Hill.





## The Rise of Data and Analytics

No one can argue that data is big today. Really big. And data continues growing every day -- at an exponential rate.

According to the nonprofit organization The Conversation, it is estimated that each day we generate 500 million tweets, 294 billion emails, 4 million gigabytes of Facebook data, 65 billion WhatsApp messages and 720,000 hours of new content added daily on YouTube.

The Conversation also recorded the following astonishing numbers:

In 2018 alone, the total amount of data created, captured, copied, and consumed in the world was 33 zettabytes (ZB) – the equivalent of 33 trillion gigabytes.

In just two years (2020), that number almost doubled to 59ZB. (That's 59 billion typical 1TB computer storage drives.)

And by the year 2025, it is predicted to reach a mind-boggling 175ZB. (Keep in mind that one zettabyte is equal to 8,000,000,000,000,000,000,000 bits.)

Having access to all that data is one thing. But the ability to ingest, digest and extrapolate that data is something entirely different. The human brain -- as powerful as it is -- has a limit on the amount of data and information it can process at any one time. It is increasingly difficult for humans to keep up with this torrential flood of data that drives today's competitive world.

One could argue statistical analytics and data analytics have been around for a very long time. But it wasn't until the 1940's and 1950's -- with the introduction of the computer and the advent of the digital age -- those analytics began a whole new transformation. The ability to capture and synthesize a host of data enabled major advances in planning, production, and decision-making. Since then, simple statistical models have morphed into sophisticated algorithms, neural networks, and artificial intelligence.

**This paper will look at how these newer analytic models are impacting risk management and business operations across the enterprise.**



## 1. Strategic Initiatives

According to McKinsey, it's time to bring analytics into the realm of business strategy.

In their article, "The strategy-analytics revolution", they suggest advanced analytics can provide new strategic insights that can be used to accomplish the following:

### **Reduce Bias In Decisions**

Based on their own experience, many planners tend to take an "inside view" of project costs, timelines, and outcomes. This often results in an overly optimistic approach and projects that are doomed to failure. Today, planners can use real-world case data and advanced analytics to provide an "outside view" to a business strategy. This enables staff to better estimate the chances of success for that strategy before allocating precious resources.

### **Unearth New Growth Opportunities**

It doesn't matter whether a strategic focus is on the development of new products, identifying new market segments or seeking acquisitions targets. Many growth opportunities are just hard to spot. By mining a myriad of data sources (both structured and unstructured), advanced analytics can effectively augment and enhance traditional brainstorming methods to uncover hidden growth opportunities.

### **Identify Early-Stage Trends**

Trends come and go. But the ability to identify a trend early on can have tremendous impact on business initiatives. Advanced analytics can comb through millions (if not billions) of real-time data and extract valuable patterns that can help identify emerging trends. It can provide the impetus to jump on an opportunity -- before your competitors do.

## Anticipate Complex Market Dynamics

There are a host of mathematical models available today to instill greater insight into the complex dynamics of the marketplace. These models help company staff to view, understand and predict competitive movement, customer behavior changes, and market demand.

Unfortunately, technology can't change everything. Take Kodak for example, the company that was at one time synonymous with the art of photography. Kodak was way ahead of the competition when it invented the digital camera back in 1975. Sadly, it did not view this technology as the major disruptor it eventually became in the marketplace. Instead, for the next 10 years, the company maintained its course, and took no action to change its market strategy. The result: the company lost 75% of its value before filing for bankruptcy in 2012.

Businesses should -- and often do -- adjust their business strategies over time. And while trends and objectives will ebb and flow, advanced analytics can help identify patterns and next steps with data-driven reasoning. Rather than taking a leap of faith, risk management systems that are augmented with data analytics and artificial intelligence can discover the best course of action based on actual patterns in data.

## 2. Financial Forecasting and Performance

It is imperative that today's financial data is timely, up-to-date, and accurate. But according to [research by IBM](#), 58% of midsize and large companies still use spreadsheets to manage their planning and budgeting processes. The study cited several cases:

- “In the spring of 2018, a major liquor and wine retailer in the UK lost 60 percent of its market value – £500 million – in a matter of weeks, due in part to an “arithmetic error” in a spreadsheet. The Times of London commented, ‘Not for the first time, human error with spreadsheets has led to disaster.’”
- “In early 2019, a large Canadian firm in the emerging legal cannabis industry cited ‘spreadsheet error’ as a cause of under-reporting earnings. The company’s news release said, “The correction was made due to a formula error in the spreadsheet supporting the year- to-date adjusted EBITDA loss calculation.”

Spreadsheets and other static financial tools tend to be cumbersome, prone to error and limited in their capabilities. As data volumes continue to grow, much of it is captured in individual silos across the organization. Today's businesses need better tools and processes to collect and integrate that information. Even more importantly, they need the ability to effectively plan, budget and forecast financial performance.

Smart, automated workflows can help. As can advanced analytics and data tools that run sophisticated algorithms to reveal patterns and relationships in the data. Combined with new visualization tools, financial personnel can “see” the data in ways they could only dream of before. Artificial intelligence and machine learning can take the mass amounts of financial data and consolidate them into something meaningful and actionable.

Here are some of the best uses for advanced analytics to mitigate financial risks:

- Predicting market interest fluctuations
- Calculating cash flow and potential changes
- Analyzing international exposure and assets to manage suppliers and forecast finances
- Automating trades, deals, and sales
- Developing and executing contracts
- Automating and optimizing insurance renewals
- Generating automatic reports to assess financial health
- Reporting cost-allocation justifications for business departments

Of course, financial planning will look different in every organization. However, using AI and machine learning can streamline several processes and identify places to save money. This may add up and make a huge difference in the long run.



### 3. Operational Risk Management

Risk to business operations tends to be a rather large area to address. It encompasses a host of risks emanating from four major categories: people, process, systems, and external events.

One major event (a long-lasting event that continues to have ramifications today) was the enormous disruption caused by the outbreak of COVID-19. The world has dealt with global pandemics in the past. But this one had unforeseen -- and largely unanticipated -- impacts on business operations around the world. Entire regions and economies in lockdown...loss of human life, jobs and entire businesses...fragmented supply chains.

A recent article by [Accenture](#) highlighted the impact on the fragile supply chain:

- 94% of Fortune 1000 companies experienced supply chain disruptions from COVID-19
- 75% of companies have had negative or strongly negative impacts on their businesses.
- 55% of companies plan to downgrade their growth outlooks (or have already done so)

COVID-19 highlighted the lack of global resiliency and just how costly supply chain and operations have become. Technology such as artificial intelligence and machine learning can play a huge role. This includes:

Some examples of how analytics can address operational risks include:

- Improve claims monitoring and management
- Manage equipment failures and safety-related loss events
- Automate internal controls to reduce instances of human error and fraud
- Performance management across the organization



## 4. Cybersecurity

It is true that the global COVID-19 pandemic wreaked havoc on the economy, causing supply chain disruption and stock shortages, reduced productivity and limited resources, and the reduction (or elimination) of jobs and businesses. But even more importantly, the pandemic turned the traditional workforce model upside down.

Consider these statistics from [Global Workforce Analytics](#):

4.1%

of all U.S. employees  
were telecommuting  
half-time or more  
before the  
pandemic

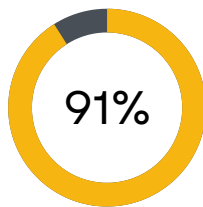
69%

of all U.S. employees  
worked remotely  
during the peak of  
the pandemic

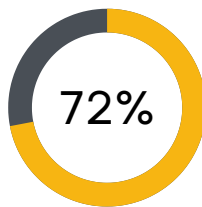
215%

recorded growth of  
regular  
telecommuting  
between 2005 and  
2019

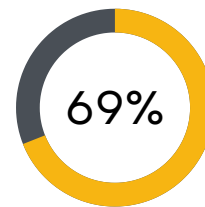
While these workforce changes offer many benefits, they also open companies up to a wide array of risks from cyber threats including ransomware attacks, data breaches and online hackers. According to [RightScale's 2019 State of the Cloud Report](#):



Respondents Who  
Have Used A  
Public Cloud



Respondents Who  
Have Used A  
Private Cloud



Respondents With  
At Least 1 Public &  
1 Private Cloud

In an era of big data and the Internet of things, the lack of data security can result in substantial penalties, financial fallout, and damaged brands. The worst-case scenario is business failure or bankruptcy. Take Equifax as an example:

- In 2017, Equifax suffered a data breach caused by a website application vulnerability. The company lost the personal details of 145 million U.S. citizens, including names, social security numbers and drivers license numbers. This all occurred during a three-month period (May to July, 2017) but was not discovered until September.

How can advanced analytics help? Here are a few examples:

- Analyzing third-party cloud services to assess for security risks
- Evaluating past cyberattacks and predicting risk in similar situations
- Using pattern recognition to mitigate recurring cyber threats
- Conducting penetration mapping to identify any system “backdoors” or vulnerable areas.

For businesses that suffer from gaps in their security systems, advanced analytics can help identify and illuminate them. These tools also allow users to automate system testing and maintenance to keep things running smoothly.

## 5. Talent Acquisition

Businesses today are awash with data. Unfortunately, many departments are challenged with utilizing that data to their advantage. Human Resources (HR) is a perfect example.

According to [Gartner](#), while the volume of data and metrics available for HR to report on has increased exponentially, most companies are not able to realize the value from their analytics investments. In fact, only 21% of HR leaders believe their organizations are effective at using talent data to shape talent acquisition and recruiting strategies, improve employee engagement and inform other business decisions.

But marketplace activity is signaling that Human Resources is upping the recruitment game. According to a recent report by Gartner, 70% of organizations expect to increase the resources they dedicate to talent analytics in the coming years.

Advanced analytics can assist HR departments in several ways, including:

- Predicting the potential for success in prospective hires
- Automating and optimizing onboarding processes
- Analyzing exit interviews for trends that may then be used to adjust hiring processes
- Utilizing performance management to identify indicators of low – or favorable – employee performance

The result?

- Hiring the right talent with the right skills
- Reducing burdensome costs
- Reducing unnecessary (and time-consuming) paperwork
- Boosting employee performance
- Boosting employee morale
- Boosting company revenue

Consulting firm [Acuvate](#) put it succinctly. “Advanced analytics can be leveraged by HR teams to positively impact both talent and business decisions in the organization. HR can evolve from being just a people-management function to playing a more transformational role in human capital management and being a strategic business partner in the company.”

## 6. Driving The Customer Experience

Companies like Amazon and Google and Apple have changed the way companies do business with customers. And how the customer has become the centerpiece of every interaction and transaction.

But just how important is the customer experience (CX) in today's world? [Forbes](#) recently provided some key statistics to highlight the true value of CX:

- Companies with a customer experience mindset drive revenue 4-8% higher than the rest of their industries.
- Two-thirds of companies compete on customer experience, up from just 36% in 2010.
- Companies that lead in customer experience outperform laggards by nearly 80%.
- 84% of companies that work to improve their customer experience report an increase in their revenue.
- 73% of companies with above-average customer experience perform better financially than their competitors.
- 96% of customers say customer service is important in their choice of loyalty to a brand.

Customer surveys have been the traditional method of gauging customer satisfaction over the years. But [according to McKinsey](#), this approach is old, outdated and full of shortcomings. In a recent study of CX leaders:

- Ninety-three percent of these respondents reported using a survey-based metric (such as Customer Satisfaction Score or Customer Effort Score) as their primary means of measuring CX performance.
- But only 15 percent of leaders said they were fully satisfied with how their company was measuring CX.
- And only 6 percent expressed confidence that their measurement system enables both strategic and tactical decision making.



- Leaders pointed to low response rates, data lags, ambiguity about performance drivers, and the lack of a clear link to financial value as critical shortcomings.

McKinsey suggests that data and analytics is helping to transform the entire customer experience and are reaping value by “harnessing predictive insights to connect more closely with their customers, anticipate behaviors, and identify CX issues and opportunities in real time.”

Data analysis is now helping to drive value with these activities:

- Align content with specific touchpoints in the buyer’s journey
- Analyze customer feedback to gain insights on improving products or services
- Better understand customer needs, interests, goals, and pain points
- Refine target markets to optimize customer interaction
- Personalize content and communications at every touchpoint

## 7. Regulatory Compliance

The Fair Packaging and Labeling Act of 1966. The 1938 Fair Labor Standards Act. The Employee Retirement Income Security Act. The Safety and Health Act of 1970. The Health Insurance Portability and Accountability Act (HIPAA). The Sarbanes-Oxley Act of 2002.

The list of government regulations is long, very long. It can make your head spin.

The ability to maintain compliance with these acts is vital for any business today. And the ability to leverage data -- and the technology to analyze that data -- can play a crucial role in monitoring a company-wide compliance program. Lack of this oversight can have major repercussions.

PwC, in an article in [strategy & business magazine](#), highlighted the significant increase in prosecutions and fines that have been levied against companies for corruption. “Fines imposed for FCPA (Foreign Corrupt Practices Act) violations, for example, have increased exponentially. The average fine in 2010 was a few million dollars; in 2019, it was US\$135 million – out of a total of more than \$2.5 billion levied in sanctions, according to research by Stanford Law School in collaboration with law firm Sullivan and Cromwell. The single biggest fine this year was nearly \$4 billion.”

## How can analytics help?



**Ongoing management of third-party vendors and partners**



**Insights on behavior patterns of employees (to address potential wrongdoing)**



**Oversight of the sales contract life cycle**



**Identification of odd transaction patterns our unusual sales activity**



**Highlighting anomalies in manufacturing or the supply chain**



**Risk management for drug testing, drug trials, and advertising**

PwC states that machine learning can dramatically impact several areas across the enterprise, from sales and marketing to finance. “It can lead to higher-quality deals for the sales force with fewer discounts. It can lead to higher levels of service and better partner satisfaction. It can build trust through the whole value chain. The new importance that prosecuting authorities are giving to robust compliance data analytics will likely spur investment in these technologies, but the message is that they are not simply a defense. They can be an integral part of strategic decision-making.”

## What Does The Future Hold?

Both risk management -- and the technology that supports it -- are constantly evolving. Autonomic computing (combining automation and cognitive technologies) is helping companies move beyond traditional risk management models.

For instance, Deep Knowledge Ventures, a Hong-Kong based venture capital (VC) focused age-related disease drugs and regenerative medicine projects, appointed a software algorithm to its board of directors. This program, called VITAL, sifts through huge amounts of data to make investment recommendations on life sciences companies. It makes these decisions by scanning prospective companies' financing, clinical trials, intellectual property, and previous funding rounds.

**One could argue that Billy Beane was right -- well, mostly right.**

The traditional baseball scouting system still exists today. And so does the Moneyball concept. The two approaches are now designed to complement each other.

What has changed is the art -- and science -- of analytics both on and off the sports field. Statistical analytics has helped to fuel data analytics which has helped to fuel artificial intelligence and machine learning in organizations and businesses around the globe. And that evolution continues.

Deloitte may have summed it up best:

“While many successful companies avoid risk, great companies embrace risk -- but only after assessment, deliberation, understanding and planning. This methodical, Risk Intelligent approach, elevates the entire profile of success and failure, raising the peaks and filling in the valleys. As a result, the linkage between taking calculated risks and earning significant awards becomes clearer, with plans in place to minimize the one while maximizing the other.”



## Appendix: The Five Types of Analytics for Risk Management

### **Descriptive Analytics – What has happened?**

Descriptive analytics lets risk managers look at the past by analyzing historical data. It is traditionally used in the day-to-day operations of the organization. Using simple math and statistical tools, this type of analytics collects and organizes historical data -- which can include sales numbers, revenue figures, inventory, equipment purchases, etc. -- to provide a report or snapshot of the company's operations.

### **Predictive Analytics – What will happen?**

As the name implies, predictive analytics uses data and trends to predict how likely it is that an event or outcome will happen (based on the current situation). This enables company executives to take a proactive, data-driven approach to business decision making. For risk managers, this helps them identify which areas to focus their attention on to reduce certain risks or occurrences.

### **Diagnostic Analytics – Why did it happen?**

Diagnostic analytics is also known as root cause analysis. It utilizes drill down techniques, data discovery, and data mining to help determine why a particular event or occurrence happened. Insights derived from these tools are valuable for analyzing historical trends and developing forecasts.

### **Prescriptive Analytics – What should we do next?**

Prescriptive analytics uses data to determine the best course of action. With the ability to comb through huge amounts of data, It makes recommendations for next steps in the decision-making process.

### **Cognitive Analytics - the Human Intelligence Factor**

Considered the newest -- and most advanced form of analytics -- Cognitive analytics combines intelligent technologies like artificial intelligence, machine learning algorithms, and deep learning models to draw inferences from existing data, relationships, and patterns to make conclusions. By attempting to imitate human thinking, this type of analytics is expected to make cognitive applications smarter and more effective over time.



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