


# The Evolution of Business Intelligence

HOW CLOUD COMPUTING AND GLOBAL DATA  
CAN HELP BUSINESSES COMMAND THEIR FUTURE

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**Between 70% to 80% of corporate business intelligence projects fail to deliver the insights the business needs**, according to research by analyst firm Gartner. Why? Three major reasons: The inability of most enterprise analytics tools to incorporate internal and external data, the difficulty in gathering the right data to use, and the disconnect between insights and the decisions they intend to drive.

It is no surprise that only one-third of CEOs trust the accuracy of internal analytics, according to a study by KPMG. In other words, business leaders lack confidence to make decisions based on the data available to them currently.

**Business intelligence must evolve to address these challenges and meet the needs of executives today.**

In this report, Prevedere, an industry insights and predictive analytics company, has partnered with Microsoft and Dr. Barry Keating, professor of economics and business analytics at the University of Notre Dame, to describe the critical turning point currently facing traditional analytics, as technology and data merge to help business leaders make smarter, faster, forward-looking decisions.

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# The Value of Evolving Business Intelligence

Accurately predicting the future has the potential to add more value to a business than any single activity.

Companies that get the prediction correct have at least the possibility of getting everything else working smoothly, from finance and marketing to their supply chains. Absent an accurate prediction, however, everything a company does will be reactive as opposed to proactive planning.

Since the advent of business intelligence solutions, their primary task has been to analyze historical data to help leadership make smarter decisions. This would work fine if history repeated itself and nothing external to the company changed.

In the current global environment, the stakes are too high. A company that can predict accurately is nimble and able to take advantage of opportunities presented to it; those unable to “see” the future clearly are prone to missteps and blunders.

**In fact, the market value of companies that evolve their business intelligence capabilities to accurately predict the future is two to three times higher than those that do not.**

Companies may not ever gain 100% perfect foresight, but they can make more accurate predictions now than they ever could in the past if they use up-to-date methods. What has recently changed for businesses is a new set of solutions that deliver tangible results. These solutions not only allow for more accurate predictions, but they also provide information quickly and with more insight into the underlying reasons for the forecasts.

We are witnessing a rapid and exciting evolution in business intelligence. Business leaders can now make bold decisions, confident with the future insights given to them.



**DR. BARRY KEATING**  
Professor of Economics and Business Analytics  
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# Dr. Keating's Evolutionary Stages of Prediction

The earliest methods for predicting the future was based on gut feel and anecdotal feedback. The use of quantitative methods in traditional BI solutions outperformed educated guesses in almost all situations. Now the predictive capability of BI is at another inflection point that stands to be more revolutionary as the initial move to quantitative forecasting methods.

## STAGE **1** Time Series Models

The first stage of the development of quantitative forecasting relied on various time series models. These methods extrapolate historical data patterns from a single metric to make predictions by replicating, or reproducing, those simple patterns into the future.

Surprisingly, **most commercial forecasting software sold and used today** are rooted in time series algorithms, such as moving averages and exponential smoothing. These methods are designed to estimate and project known patterns in business data such as trend, seasonality and cyclicity based on singular, internal metrics.

**LIMITATIONS:** Using time series models, companies extrapolate the future based only on history, ignoring external factors and the complexities of incorporating multiple variables. Time series algorithms are completely blind to changes in the external environment, leading to high forecast errors in long time frames.

## STAGE 2 Casual Models

As research in forecast methods advanced, analysts began using causal models. These models help an organization shape the future rather than just accept an extrapolation of historical patterns. By modeling and explaining causality, forecasters can help organizations better plan for what lies ahead.

With causal models, companies can find links between multiple variables to answer “what if” type questions, such as “what will happen if we raise prices by five percent?” The answers to questions like this formed a breakthrough in prediction and allowed organizations to shape demand rather than simply react to inevitable changes.

**LIMITATIONS:** Causal models are time consuming to create and provide only point-in-time insights. Analysts must determine which factors to use based on assumptions and test all possible combinations. That process can only happen after the data is cleaned and formatted, which is an arduous task. Approximately 80% of a data scientist’s time is spent on data preparation. For a ten-person analytics team, that averages **roughly 16,690 hours each year spent on gathering data** that may not be used at all in the final analysis.



## STAGE

# 3

## Predictive Models

Businesses now have the power to not only analyze internal and external data, but can automatically determine what data to use. The time and resources spent gathering and selecting data can be drastically reduced, allowing data teams to spend most of their time to rapidly test hypotheses, analyze results, and create truly predictive and timely insights.

**What changed to bring about this latest stage? Three primary forces are working simultaneously:**

- 1** Unprecedented accessibility to external data (via API access to public and private sources) gives companies visibility into previously difficult to discover insights.
- 2** Machine learning-based applications can determine which data sets an organization should use based on industry or geography and can run millions of tests to automatically determine the most relevant predictive performance factors.
- 3** Cloud computing allows companies to affordably and easily access the power of billions of processors as computing power has become inexpensive and ubiquitous.

Today, every organization is confronted with a deluge of data. Organizations need the information contained in the patterns of that data. The traditional statistical methods used in the past (i.e., Stage 1 and Stage 2 models) do not suffice. The combination of data, machine learning and cloud computing moved the industry into “Stage 3” in the evolution of predictive analytics.



# Beyond an Organization's Four Walls

Stage 3 is truly revolutionary because it incorporates not only the data available within organizations, but also all the data outside the firm. In time series forecasting (Stage 1), organizations sought simple patterns using only past internal values of what was being forecast (e.g., sales of units in July). By moving to causal models (Stage 2), analysts gained the ability to use internal predictor variables, such as price and marketing effort, to refine the forecasts.

Stage 3 incorporates not only the internal metrics used in Stages 1 and 2, **but also all the data external to an organization (e.g., economic conditions, weather data, Internet searches)**, opening the opportunity to discover and make use of patterns that have been heretofore hidden and unknown.

Fortunately, cloud computing and machine learning help companies sift through the myriad of possibilities. Using today's technology, companies can select the most useful of these predictors in an analysis. Analysts no longer need to spend tedious hours testing which patterns of data will be examined. Unexpected results and unseen relationships can now be discovered.



# Three Steps to Evolve Business Intelligence

Technology innovations of the past required companies to invest millions of dollars in new hardware, software and services, making the disruption of existing processes inevitable as well. Not so with the evolution of BI. Growing a company to Stage 3 can happen in a phased, measurable manner, all while leveraging and augmenting existing technology investments, processes and staff.

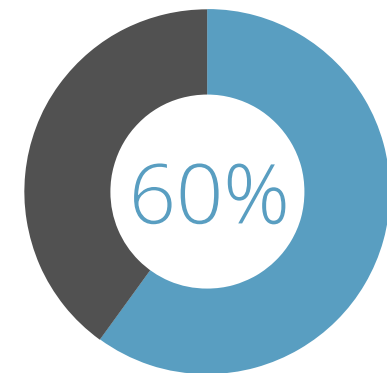
## STEP

# 1

## Augment Internal Analytics With Cloud-Based Analytics

Of all the business intelligence trends to shape the last decade, the move to cloud-based BI has been the most transformative. According to analyst firm Dresner Advisory Services, **31% of survey respondents currently use cloud-based business intelligence (BI), a 6% increase over 2016**. Adoption is wider in North America, with 60% of organizations either using or planning to use a public cloud for BI this year.

As companies move toward Stage 3 of business intelligence, cloud analytics solutions can be used to drastically reduce the time spent on data gathering and allow enterprises to scale based on the analytic power needed. Fortunately, existing investments in BI can be leveraged simultaneously with cloud analytics solutions. The benefit of cloud computing allows for scalability and integration within any enterprise platform.



**60% of organizations either using or plan on using cloud for BI in 2017**

## Tasks best suited for cloud-based analytics:

- **Performing numerous multivariate regression analyses**
- **Analyzing unstructured data**
- **Updating external data sets in real-time**
- **Comparing performance of different analytics techniques, such as machine learning vs. neural net with internal methods**

## Cloud-based analytics can augment:

- **Existing internal BI and reporting platforms**
- **Data science tools such as SPSS or Minitab**
- **Sales and operations planning**
- **Corporate performance management systems**
- **Analysis performed in Excel**

By integrating cloud-based analytics businesses gain the ability to organize and process a previously unimaginable amount of data.



## STEP

## 2

## Embrace the Value of External Data

Understanding internal historical performance and how operational changes impact performance is important, but reliance on this information alone does not provide a holistic view of what truly drives businesses. The analytics in Stages 1 and 2 were not capable of including data outside the organization's four walls, but Stage 3 can do just that. When cloud-based analytics are used to perform the significant task of gathering and analyzing external datasets, this process becomes quick and efficient.

Today's machine learning solutions can support human intelligence by identifying the best external data to use. By reducing the possible choices from millions to a few dozen, data scientists can spend more time leveraging their experience and skills to refine, test and deliver timely insights. This is critical to arming business decision makers with the information they need to make decisions.

Business leaders are acutely aware of external influences on their business:

*"Unexpected changes in capital markets and economic conditions"*

The most cited risk factor found in quarterly reports of the largest U.S. companies (IRRC Institute)

*"Exchange rate volatility and changing consumer behavior"*

Top concerns of executives reported in a 2017 PwC survey of global companies

Despite such advances, many companies continue to rely on traditional Stage 1 and Stage 2 forecasting methods that account for risks and opportunities outside the company's four walls. Companies can only reach Stage 3 in the evolution of business intelligence when forecasters tie analytics to what keeps business leaders up at night - unknown external influences.

**STEP****3****Close the Gap Between Data and Decisions**

Many companies are still using analytics tools that would be considered Stage 1 or Stage 2. Doing so causes a vicious cycle of organizations not having enough time or resources to tackle the problems executives need answered.

Data teams are frequently barraged by last minute, ad hoc data requests. Trying to make the most of existing technology investments, they fulfill these requests through systems and processes that cannot deliver at the speed they need. The manual work required to complete these projects leaves little time for proactive work. In fact, a PwC study shows that only 20% of work done by most analytics team focused on foresight and were truly predictive. That means 80% of an analytics team's time is spent on ad hoc work that cannot be leveraged for additional requests.

This all adds up to a vicious cycle of inefficiency and inaccuracy:





The end result of this cycle is that executives are not acting on the insights they receive. These business intelligence processes are not providing leadership with actionable decisions.

**For BI to be relevant and actionable, executives need insights to be:**

- **Faster**
- **Forward-facing**
- **Accountable**
- **Holistic**

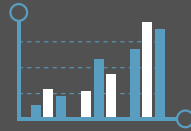
Bridging the data to decisions gap and meeting the needs of executives is where **machine learning** and **cloud computing** shine in forecasting. By mimicking the methodology of industry experts and economists, machine learning facilitates the mining and analysis of hundreds of internal and external business drivers, which is key to driving smarter decisions and gaining a competitive edge. Data professionals can spend more time interpreting the results, delivering timely insights and explanations to business leaders proactively.

Incorporating machine learning and evolving analytics to Stage 3 breaks the cycle of incomplete insights, providing proactive insights while maximizing existing resources. **Companies can evolve to Stage 3 by intelligently invested in cloud-based tools that leverage machine learning to augment - not replace - existing BI investments and processes.**

Prevedere is an industry insights and predictive analytics company helping business leaders make better decisions by providing a real-time view of their company's future.



**Machine learning  
+ human intelligence**



**Internal data  
+ external leading indicators**



**Strategic planning  
+ daily decision making**

Prevedere's ERIN (External Real-Time Insights) engine is the first analysis solution that intelligently monitors external economic and consumer activity and notifies business leaders of future impact on performance. Powered by a combination of human intelligence and machine learning, ERIN propels enterprise executives, sales, marketing, finance and operational leaders with future-focused insights delivered at the speed of business. Built on the Microsoft Azure platform, ERIN determines the best combination of leading indicators, out of millions of possible choices, to develop actionable insights easily consumed by business leaders, creating unprecedented business advantage.

**To see how Prevedere's real-time insights can augment your analytics capabilities and improve your business performance, contact us for an assessment at [inquiries@prevedere.com](mailto:inquiries@prevedere.com) or call 888-686-7746.**

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*"Microsoft knows that the ability of a business to transform data into AI is the key to smart decisions and future success. Having ERIN on the Microsoft Azure platform, as well as leveraging Prevedere as a Microsoft Certified Solution, enables our mutual customers to harness the power of the cloud to obtain an intelligent and in-depth view of their company's future."*

**LEO DE LUNA**  
Managing Director  
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