

USING BUSINESS INTELLIGENCE IN ALL ACTIVITIES

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ABSTRACT: Making smarter business decisions quickly and confidently drives business value across an entire organization. To accomplish this in today’s competitive global marketplace, leading organizations are complementing their current approaches to Business Intelligence (BI) and analytics. In particular, top organizations are: (a) seeking to incorporate deeper insight into their reports and dashboards; (b) making that information available to more people who may interact with it on the device of their choice; (c) expanding the use of analytics to solve more business challenges. This paper discusses how to drive BI deeper into an organization with easier to use descriptive analytics solutions and how to transform an organization from being reactive to being pro-active by embedding predictive and prescriptive analytics in existing BI solutions.

KEY WORDS: business intelligence, business decisions, descriptive, predictive, prescriptive

1. INTRODUCTION

Organizations are expanding their analytics efforts to include new types of data that are now accessible and a broader range of analytics techniques. This is allowing them to apply analytics in more operational areas, extend the use of analytics beyond upper management to more groups and individuals, and go beyond analysis of historical data to include predictive capabilities.

In particular, companies are adopting increasingly sophisticated analytics methods. The evolution that is occurring builds on the success of enterprise reporting and dynamic dashboards that extract and summarize customer, inventory, financial, and other data to provide visibility into what has happened or is happening based on historical data. Complementing these descriptive analysis tools and methods, companies are now using predictive and prescriptive analytics

that provide a view to what might happen next [1].

Organizations use these sophisticated analytics techniques to gain insights into their financial and operational performance and their customers’ behaviours. With these insights, organizations can make accurate predictions and better-informed decisions on emerging opportunities, competitive threats, and shifts in their markets to increase competitive advantage. While these sophisticated techniques have long been available, there are many compelling business reasons today driving the adoption of advanced analytics to augment BI.

CIOs (Chief Information Officers) rank analytics as the number one contributing factor to an organization’s competitiveness. In fact, organizations that embrace analytics perform two times better than their peers. Furthermore, top performing organizations use advanced

business analytics five times more often than low performers.

Additionally, there is a direct correlation between the use of sophisticated analytics and the organization's bottom line. Organizations that use advanced analytics have 33 percent more revenue growth and 12 percent more profit growth, compared to those who do not make extensive use of sophisticated analytics [2]. In particular, financial top performers are 64 percent more likely to use analytics to evaluate multiple business factors on an ongoing basis compared to low performing peers.

1.1. Beyond statistical analysis

The goal of any analytics solution is to provide an organization with actionable insights for smarter decisions and better business outcomes. Different types of analytics, however, provide different types of insights. There are three principal types of analytics:

- **Descriptive**, which uses BI and data mining to answer the question: “What has happened?”
- **Predictive**, which uses statistical models and forecasts to answer the question: “What could happen?”
- **Prescriptive**, which uses optimization and simulation to answer the question: “What should we do?”

These types of analytics build on one another, with descriptive analytics being the most pervasive and prescriptive analytics the most advanced. Taking a deeper look at each of these analytics reveals how organizations can benefit by moving up the ladder to adopt increasingly sophisticated analytics techniques.

Most companies today make some use of descriptive analytics. However with the increased volume and number of types of data available and increasing pressure to act on data swiftly, the demand for advanced analytics that can pair with descriptive analytics has never been greater. To that end, descriptive analytics mines data to provide trending information on past or current events giving business

managers the context they need for future actions [2].

Characterized by the use of key performance indicators, descriptive analytics drills down into data to uncover details such as the frequency of events, the cost of operations, and the root cause of failures. The most common type of analytics used by organizations, descriptive analytics typically displays information within a report or dashboard view.

Predictive analytics provides capabilities that move beyond using historical data as the principal basis for decisions. It helps managers anticipate likely scenarios - so that they can plan ahead, rather than react to what has already happened. In many cases, predictive analytics uses regression analysis, modelling, neural network, and simulation algorithms taking into account multiple independent variables to determine the likelihood of an event happening in the future.

Descriptive and predictive analytics are sometimes used together for what might be called diagnostic analytics to discover the root cause of problems or unexpected changes. Descriptive analytics might be used to spot a deviation from the normal trend - for example, a large spike in sales of a particular product.

While a predictive analytics forecasting model that assesses the impact of several variables on a trend might help identify the contributor to any deviation from the normal trend- for example, strong social media sentiment about a product could have contributed to the large spike in sales of that product.

Prescriptive analytics builds on the power of predictive analytics to recommend one or more courses of action - and showing the likely outcome of each action. Characterized by rules, constraints, and thresholds, prescriptive analytics makes use of advanced capabilities such as optimization and mathematical models to not only reveal recommended actions but also explain why they are recommended,

along with any possible implication the actions might have.

Building on traditional BI efforts, organizations can expand the use of BI to more operational areas and to more groups of people taking advantage of today’s easier to use, more powerful descriptive analytics solutions.

Such solutions are capable of working with today’s mix of data types and deliver insights in time to make faster and smarter decisions. Additionally, this expanded use of BI can be complemented by forecasting capabilities of predictive and prescriptive analytics.

For example, IBM Cognos Business Intelligence software lets people freely explore information, analyze key facts, and collaborate with key stakeholders to make the decisions that drive a business forward [3].

The software includes visualizations that bring data to life in a variety of reports, dashboards, and info graphics that can be centrally authored and distributed or that can be created or augmented in a self-service manner with ad hoc analysis and personalized reporting.

The Cognos BI platform offers stunning visualizations and there is evidence that people can understand much more about the underlying data when it is depicted visually [3]. However, for visualization to be effective, organizations need technology that guides them to the best visual presentation of specific data.

Advanced visualization, helps individuals and groups gain insight from the myriad data that their company generates. This brings powerful capabilities to people and groups that do not necessarily have the time or expertise to use stand-alone visualization tools.

Unlike desktop visualization tools, IBM Cognos is an enterprise business intelligence platform that enables organizations to:

- expand the reach and impact of the organization’s information and gather input from different perspectives;

- share insights with others and promote organizational alignment;
- comment on and annotate documents as a basis for informed dialog;
- take advantage of integration with Microsoft Office to share ideas in a familiar interface;
- communicate and coordinate tasks to engage the right people at the right time.

Predictive analytics software complements the descriptive capabilities of the business intelligence platform to help organizations predict with confidence what will happen next so that organizations can make smarter decisions, solve problems, and improve outcomes.

Examples of type the solutions that integrate descriptive analytics and predictive analytics include:

- **Predictive Customer Intelligence**, which personalizes the customer experience by making recommendations that are most relevant to each customer based on buying behavior, web activity, social media presence, and much more. Using automation, this integrated software solution gathers customer information from multiple internal and external sources and models customer behavior. Scoring then provides organizations with customized actions they can take to provide the right offer to the right customer at the right time.
- **Predictive Maintenance and Quality**, which helps organizations proactively detect failure patterns to improve productivity and product quality. It analyzes various types of data, including usage, wear, and conditional characteristics from disparate sources, and detects failure patterns and poor quality parts earlier than traditional quality control methods. This reduces unscheduled asset downtime and ensures quality metrics are achieved or exceeded. With Predictive Maintenance and Quality, organizations can better optimize operations and supply chain processes, resulting in better quality products, higher profit margins, and competitive advantage.
- **Predictive Analytics for Big Data**, which helps organizations, derive insights from big data sources. Hadoop distributions to

improve decisions and outcomes, a powerful data mining and text analytics workbench that helps organizations build accurate predictive models quickly and intuitively without the need for programming.

With these solutions, one additional factor must still be considered to evolve to a forward looking BI organization. The need to analyze large volumes of diverse data and shorter lead time to insight extraction places new demands on IT (Information Technology) infrastructures [4].

Specifically, choosing the right infrastructure for analytics is the key to turning the mountains of data that exist in many organizations into opportunities for both the line of business and IT teams.

The following chapters in this paper will take a deeper look at how different industries are using these analytics techniques to improve operations, increase revenues, reduce costs, engage and retain customers, and improve customer service [5 - 7].

2. USING BI IN RETAIL

Today retail organizations must deal with price pressures from increased global competition and a customer base that can be swayed by social media comments and reviews.

To better serve their customers, keep operations running efficiently, and spot trends that can impact the bottom line, many retailers have used descriptive analytics on data in their systems of record including their ERP and CRM systems. These systems contain valuable historical data about customers, their purchases, their preferences, and their payments.

Increasingly, these efforts are complemented by analysis of data in systems of engagement. Such customer-facing systems let customers interact with the business and can provide additional insight into customer preferences.

The application of analytics to these data sets is used by many departments and

supports efforts in marketing, operations, and risk assessment.

Most of these efforts are reactive. For example, a retailer might find that sales for a particular month or a particular store have slumped compared to the past. Knowing this, the retailer would look for sources that have led to this drop in business and take actions (such as short-term promotions or discounts) to increase sales.

Using predictive and prescriptive analytics, retailers can transition from responding to changes after they occur to taking actions in advance to prevent a problem from happening and to improve results.

In particular, predictive and prescriptive analytics give retailers real-time actionable insight into customer buying behavior and the supply chain to enhance the shopping experience and improve merchandise reporting [8, 9]. BI helped retailers:

- create personalized marketing campaigns using real-time actionable insight into customer shopping behavior across all channels;
- improve cross-selling and increase sales by analyzing patterns to better understand customers' purchase intent;
- avoid stock-outs and overstocks by analyzing product and customer data to predict product demand and manage assortment at the local level;
- predict uptrend in demand for certain products by applying real-time analytics to streaming social media feeds to see what customers want and need.

Moreover, retail analytics tools can help companies understand consumers more as individuals than as segments - using personal profiles, browsing history, recent purchases, and current activities to deliver a smarter retail shopping experience. In doing so, retailers can create a single view of the customer, keeping each one happy and loyal.

Understanding what customers buy and why they buy, allow retailers to develop targeted marketing campaigns, and

personalized shopping experiences. Using such techniques, one retailer achieved a 250 percent higher conversion rate (the proportion of visitors to a retail outlet who make a purchase), boosted online sales, and enhanced customer loyalty.

3. USING BI IN HEALTHCARE

Healthcare systems around the world are facing aging populations, chronic illness and revolutionary - but expensive - treatments, which all put pressure on healthcare payers and healthcare providers. The massive amounts of data and ever expanding treatment options are making it difficult to balance patient care while controlling operational costs.

With BI and performance management capabilities, healthcare organizations gain an understanding of what's behind critical issues, trends, and opportunities. Use of descriptive, predictive and prescriptive analytics [8, 9] lets healthcare organizations:

- track and monitor revenues, margins and operational performance;
- analyze results, identify trends, detect patterns and predict outcomes;
- model the impact of business decisions and improve financial processes;
- monitor quality initiatives and care programs;
- support pay for performance goals and initiatives;
- gain an enterprise - wide view of performance against organizational goals, key performance indicators (KPIs) and strategic objectives;
- quickly adjust plans to meet financial objectives and support profitable growth.

The tools to perform these tasks have existed for years, but in most cases, these technologies have failed to recognize the central issue. The data required for complete analysis resides in disparate systems, some within older legacy applications, all of which exist in relative isolation. Thankfully business intelligence

provides the means to pull together data from a wide range of sources.

With BI analytics software, healthcare institutions can aggregate data, better understand the current state of operations, and set and monitor specific targets that improve operations and patient care.

BI analytics software [7] delivers easy to understand, complete, consistent and accurate information that healthcare decision-makers trust to improve performance. The data can be brought to life with meaningful and compelling visualizations and the ability to collaborate and share data and insights across the entire health care organization can drive alignment to decisions.

Combined with rich industry solutions, proven practices and professional services, healthcare organizations can leverage BI analytics to drive the highest productivity and deliver better results. With BI analytics offerings, healthcare organizations can implement a complete framework or pick and choose the products that best suit their requirements, budgets, or existing systems.

Moreover, BI predictive analytics software can help healthcare organizations predict future events and proactively act upon that insight to drive better outcomes. Predictive analytics helps healthcare organizations to anticipate change – so that they can plan and carry out strategies that improve results.

By applying predictive analytics solutions to data, healthcare organizations can uncover unexpected patterns and associations and develop models to improve clinical and operational performance.

As a result, healthcare organizations can better serve patients, more accurately predict staffing requirements, and develop successful services more efficiently. Predictive analytics gives healthcare organizations the knowledge to predict – and the power to act.

4. USING BI IN FINANCIAL SERVICES INDUSTRY

Leading financial services institutions are constantly exploring new ways to develop insights across customers and markets. And although seeking the information advantage is nothing new in the industry – the ability to incorporate new types of data, both internal and external, is producing new results for leading firms. These firms have been able to incorporate data from a wider pool of digitally available information that is now easier to access, manage and make sense of than ever before.

To compete in a consumer-empowered economy, it is increasingly clear that banks and financial markets firms must leverage their information assets to gain a comprehensive understanding of markets, customers, channels, products, regulations, competitors, suppliers, employees, and more. Financial institutions will realize value by effectively managing and analyzing the rapidly increasing volume, velocity, and variety of new and existing data.

Financial institutions have always been high on the maturity curve for employing business analytics to solve business problems. Now, they are leading the charge in the use of more advanced analytics. The efforts vary widely from organization to organization, but three common areas are of particular focus including:

Customer profitability analytics: Determining customer profitability is not a simple endeavour for most financial institutions. Disparate data sources and disconnected systems make it difficult to aggregate client account level information for key dimensions like product, line of business, and geography and to gain actionable insight from structured and unstructured data related to marketing, sales, and service interactions. These obstacles can prevent financial institutions from determining what makes a customer

profitable in the long term, identifying their most valuable customers, developing account retention strategies, and raising the lifetime value of the rest of their customer base.

Managing risk: Driven by both external and internal forces, banks are under great pressure to adopt more sophisticated and effective strategies for managing risk across the enterprise, to ultimately improve performance and sustain competitive advantage. These forces include increased oversight from ever expanding global, regional and national regulations such as the Dodd-Frank Financial Reform Act and Basel III. There are also increasing internal demands to improve profitability by aligning risk, capital and performance management objectives, and to instil greater confidence among investors, customers and line-of-business units.

Operational efficiency: To keep pace and stay ahead of today’s highly competitive marketplace, financial services organizations must shore up internal operations to ensure that the entire organization is running at peak efficiency. They need to streamline operations and increase flexibility so they can respond more quickly to market changes. However, achieving a high level of operational efficiency can be an overwhelming goal considering the broad scope of people, processes, and assets within an enterprise.

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