

Business Analytics (BA): Core of Business Intelligence (BI)

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Abstract— Business analytics (BA) is the practice of iterative, methodical exploration of an organization's data with emphasis on statistical analysis. Business analytics is used by companies committed to data-driven decision making. It is used to gain insights that inform business decisions and can be used to automate and optimize business processes. Data-driven companies treat their data as a corporate asset and leverage it for competitive advantage. Successful business analytics depends on data quality, skilled analysts who understand the technologies and the business and an organizational commitment to data-driven decision making.

Keywords— Business analytics, iterative, methodical exploration, data, statistical analysis, data-driven decision making.

I. INTRODUCTION

Redefining Business Intelligence

Let's step back for a moment and think about the definition of business intelligence. Among the popular definitions today are David Loshin's "... the processes, technologies and tools needed to turn data into information, information into knowledge, and knowledge into plans that drive profitable business actions" and Larissa Moss' "... an architecture and a collection of integrated operational as well as decision-support applications and databases that provide the business community easy access to business data."

To add to it, Business intelligence isn't about processes, technologies, tools, applications, data and databases. Nor is it about OLAP, scorecards and dashboards. When a BI program gives more attention to technology than to finance, R&D, marketing, sales, operation, and customer support, then it is time to put the business back into business intelligence!

To that end, we can propose a new definition of business intelligence. Let's begin with the essence of intelligence. Wikipedia provides a simple layperson description of intelligence as "*the capacities to reason, plan, solve problems, think abstractly, comprehend and*

learn." Wikipedia also defines business as "*the social science of managing people to organize and maintain collective productivity toward accomplishing ... goals.*" Combining these thoughts, following can be the next-generation definition of business intelligence:

Business intelligence is the ability of an organization or business to reason, plan, predict, solve problems, think abstractly, comprehend, innovate and learn in ways that increase organizational knowledge, inform decision processes, enable effective actions, and help to establish and achieve business goals.

Processes, technologies, tools, applications, data, databases, dashboards, scorecards and OLAP all have roles to enable the abilities that define business intelligence. But they are only the means to BI – not the intelligence itself.

The "Intelligence" in Business Intelligence

The intelligent business, then, is one that has the capabilities itemized in the definition. Consider what it means for the culture, efficiency, effectiveness, sustainability and profitability of a business that is capable of:

- **Reasoning** – the ability to perform or the act of performing three activities – identifying root causes, understanding cause and effect, and logically developing conclusions based on understanding of root causes.
- **Planning** – determining a course of action based upon understanding and reasoning.
- **Prediction** – envisioning the future with a sound basis of reasoning and with a high degree of probability that the actual future will be much like the envisioned future.
- **Problem solving** – getting beyond symptoms to address fundamental causes of undesirable patterns and behaviors that are found in root cause analysis.
- **Abstraction** – removing details and specifics from a situation to see general concepts, patterns, ideas and impacts.
- **Comprehend and understand** – the ability to perceive, discern and distinguish – in particular, to

perceive situations and conditions, and to distinguish problems from symptoms.

- **Innovate** – the ability to create something new through study and experimentation. Innovation often occurs by combining or connecting existing things in different ways.
- **Learn** – a cognitive process of acquiring skill and knowledge; learning is the ultimate feedback loop.

II. BUSINESS ANALYTICS

Analytics is the science of analysis – the processes by which we interpret data, draw conclusions and make decisions. Business analytics goes well beyond simply presenting data, numbers and statistics. The essence of analytics lies in the application of logic and mental processes to find meaning in data. Through these mental processes, we create the capacities that define intelligence – abilities to reason, plan, predict, solve problems, abstract, understand, innovate and learn.

Viewed in this context, business analytics is a powerful thing. Yet it is also a large and complex field that encompasses statistical analysis, predictive analytics, text and speech analytics, web analytics, visualization, causal analysis, decision processes and much more. Most importantly, business analytics involves people – the business analysts who apply the logic and mental processes. Once the business goal of the analysis is determined, an analysis methodology is selected and data is acquired to support the analysis. Data acquisition often involves extraction from one or more business systems, cleansing, and integration into a single repository such as a data warehouse or data mart. The analysis is typically performed against a smaller sample set of data. Analytic tools range from spreadsheets with statistical functions to complex data mining and predictive modeling applications. As patterns and relationships in the data are uncovered, new questions are asked and the analytic process iterates until the business goal is met. Deployment of predictive models involves scoring data records (typically in a database) and using the scores to optimize real-time decisions within applications and business processes. BA also supports tactical decision making in response to unforeseen events, and in many cases the decision making is automated to support real-time responses.

Recognizing the growing popularity of business analytics, business intelligence application vendors are including some BA functionality in their products. More recently, data warehouse appliance vendors have started to embed BA functionality within the appliance. Major

enterprise system vendors are also embedding analytics, and the trend towards putting more analytics into memory is expected to shorten the time between a business event and decision/response.

Business analytics is surely the next major evolutionary step in the continuously changing field of business intelligence (BI). First we tackled data integration – that was the data warehousing era of the early 1990s. In the late '90s and the early part of this century, attention shifted from data to delivery of information – the OLAP, scorecards and dashboards movement. Today we are pretty good at delivering information. Yet for many, true intelligence remains elusive. Surprise! Intelligence is not about how you acquire information; it is about how you use the information that you have. Examples of BA uses include:

- Exploring data to find new patterns and relationships (data mining)
- Explaining why a certain result occurred (statistical analysis, quantitative analysis)
- Experimenting to test previous decisions (A/B testing, multivariate testing)
- Forecasting future results (predictive modeling, predictive analytics)

To satisfy these goals, analytics must meet three criteria:

- **Purposeful:** Business analytics are purposeful when we know why we create the information and perform the analytic activities. The understanding derived from analysis aligns with business functions (finance, marketing, sales, etc.) and with the issues and objectives of management (performance, compliance, risk, etc.).
- **Insightful:** Business analytics are insightful when they help us to discover new facts or information, to become aware of things previously hidden. Cause-and-effect insight is often the most valuable in business decision making. Analytics that simply confirm status quo or reaffirm conventional wisdom offer no insight – they don't have the power to make a difference. Perhaps Oliver Wendell Holmes best expresses the power of insight: "A moment's insight is sometimes worth a life's experience."
- **Actionable:** Actionable information is an often used but rarely defined term. The popular definition is "information that makes action possible" – a circular but not very informative. Information is actionable when it supports the entire process of action-taking including discovery and insight, determination and resolve, decision

making, innovation and creativity, and the implementation of decisions. Actionable information is aligned with the knowledge of the person taking action and integrates with the processes where actions are to be implemented.

time-series analysis, though many of your analytic studies are likely to involve time series. But the heart and soul of analytics is about making a difference – providing the insight and understanding to support informed decisions and confident actions, and providing the feedback that is needed to create a learning organization.

Business Analytics and Business Intelligence

So what is it that distinguishes business analytics from business intelligence? Where does the subject of analytics fit in the scope of business intelligence?

Business analytics, then, is an integral part of business intelligence. It takes its place alongside data integration, data access, and reporting to complete the sequence that The Data Warehousing Institute (TDWI) describes as the BI value chain – the sequence that begins with data and ends by delivering business value.

By mapping the value chain to the activities of business intelligence, it becomes easy to see the role of business analytics. Conventional data warehousing and reporting ends at the data-to-information stage. Business analytics extends through the knowledge stage with analysis and understanding, which in turn support decision and action. A complete analytics system measures the results that are produced and provides a feedback loop that facilitates organizational learning.

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BI vs BA	Business Intelligence	Business Analytics
Answers the questions:	What happened? When? Who? How many?	Why did it happen? Will it happen again? What will happen if we change <i>x</i> ? What else does the data tell us that never thought to ask?
Includes:	Reporting (KPIs, metrics) Automated Monitoring/Alerting (thresholds) Dashboards Scorecards OLAP (Cubes, Slice & Dice, Drilling) Ad hoc query	Statistical/Quantitative Analysis Data Mining Predictive Modeling Multivariate Testing

III. CONCLUSION

So business analytics isn't really about linear regression, although it is a useful technique in analysis. Nor is it about