A Call to Rethink Decision Support Software Capabilities: Business Intelligence and Analytics in the Era of AI

Dan Vesset   Chandana Gopal

EXECUTIVE SNAPSHOT

FIGURE 1

Executive Snapshot: A Call to Rethink BI and Analytics Software Capabilities

To help enterprises evaluate a new generation of business intelligence and analytics (BIA) software solutions, we are presenting this IDC Perspective about the role of artificial intelligence (AI) and machine learning (ML) in BIA. Our framework can serve as a basis for assessing the ability of software to automate specific tasks and activities within the overall decision support process.

Key Takeaways

- Over the past four decades, the majority of BIA software solutions have been developed and deployed by not viewing decision making as a process and by equating decision making with information delivery.

- Most traditional BIA software solutions do not provide support for all the activities of the decision-making process, thus leaving users without all the needed information and reliant on personal experience.

- There are several opportunities to start benefiting from AI and ML capabilities within BIA software by using them to automate specific tasks across decision support activities and by applying ML to the monitoring of decision-making processes.

Recommended Actions

- Start viewing decision making as a process, and assess the functionality needed to support each of the activities and tasks within this process.

- Interview internal users to understand how they make decisions, instead of how they want to manipulate data, and use this information to evaluate currently deployed BIA software functionality.

- Evaluate the new generation of BIA software that incorporates ML to improve productivity of business analysts, and provide all users with decision support functionality.
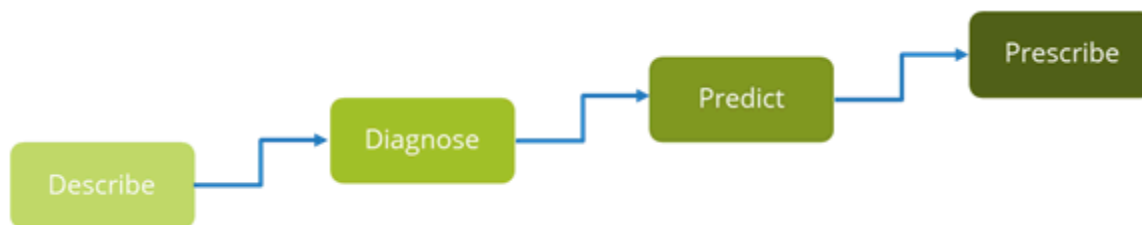
Source: IDC, 2018

SITUATION OVERVIEW

A commonly used framework for analytics initiatives assumes a progression along the analytics maturity curve from basic descriptive analytics to prescriptive analytics. As depicted in Figure 2, this framework assumes that mastering a given category of analytics is a prerequisite for the next, more advanced category of analytics. This suggests that an enterprise can start benefiting from the use of most advanced analytics – prescriptive analytics – which are typically enabled by artificial intelligence (AI) only after it adopts all the preceding categories of analytics. We believe this framework limits enterprises' opportunities to start deriving value from a new type of AI-enabled business intelligence and analytics (BIA) software immediately.

FIGURE 2

Traditional Sequential Analytics Categorization Framework

Source: IDC, 2018

In this IDC Perspective, we refer to AI as a broad range of advanced analytics methods for machine learning (ML), deep learning, and reinforcement learning. The use of various methods or ensembles of these methods depends on specific use case characteristics, such as type of data, volume of available data, and type of output. Regardless of the method, AI is used to automate a task (e.g., assessing quality of a data source), an activity (analyzing data), or a whole process of producing an insight. To understand where AI can make a positive impact on BIA solutions, lets first examine the shortcomings of the previous generations of these solutions.

Shortcomings of Business Intelligence and Analytics Solutions

Commercially available BIA software has existed in various forms for almost four decades. Throughout this time, most of these BIA software solutions have had two primary shortcomings:

- Not viewing decision making as a process
- Equating decision support with information delivery

### Not Viewing Decision Making as a Process

The first major shortcoming of most BIA solutions is that their deployments have not considered decision making as a process but rather a set of discrete steps. A typical "business analytics" process is often depicted using a closed-loop model that looks like the one shown in Figure 3. But the reality in many enterprises is that these four activities are disconnected. There is a group of data engineers tasked with data tracking (i.e., data provisioning), another group of data analysts and data scientists is tasked with analyzing the data, and the results of the analysis are delivered to another group of

decision makers, whose decisions are then passed along to employees who act based on the decisions. In the past, it was rare for one software package to support two or more of these activities.

As market research analysts, when we interview technologists in this area about their job functions, they usually talk about being involved in creating data lakes, building dashboards, providing self-service analysis capabilities, providing a single version of the truth, developing ETL routines, and making all data available to business users. All these statements have something to do with *how* or *what* those of us in the data economy do. But what's usually missing is the *why.* In other words, we rarely hear the statement: "I help my colleagues make better decisions."

FIGURE 3

Analytics Process
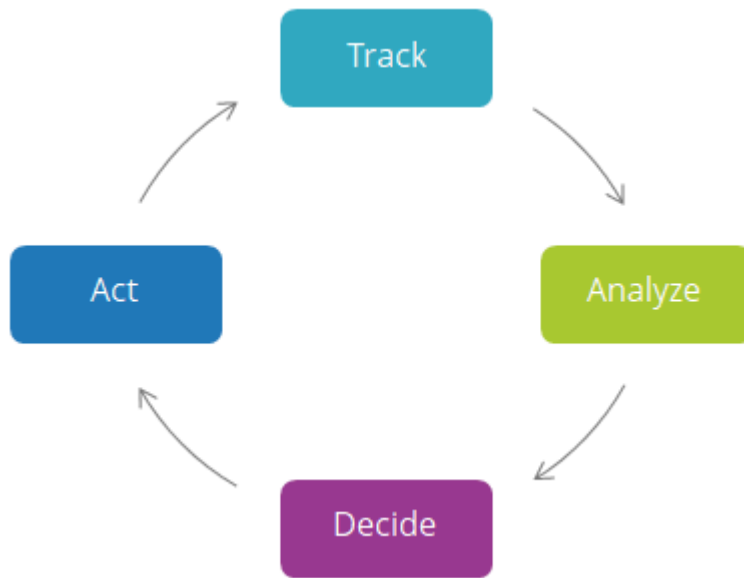
Source: IDC, 2018

Treating each activity discretely has some operational efficiencies. However, it also poses challenges — most notably, not having visibility across the whole process. Without that visibility, it is difficult for an enterprise to learn by identifying best decision-making practices and quality of decisions.

Equating Decision Support with Information Delivery

The second, and related, significant shortcoming of most current BIA deployments is equating decision support with information delivery, where the goal of the solution is viewed as delivering a dashboard or a report (whether static or interactive). This is an important activity, but it doesn't provide the person with access to functionality and information to make decisions.

In many cases, reports, dashboards, and other forms of data visualization are viewed as the end results of analytics. Over the past decade, there have been tremendous advancements in the development of highly interactive and visual user interfaces for BIA tools. This has led to more self-service and lower training costs for these tools. However, it's not enough to simply deliver to a person

facts about historical performance about sales or profits or inventory or customer satisfaction or even facts that a KPI threshold was breached or that a trend in the data has emerged.

It is not enough, because such views of the data don't provide individuals with functionality to evaluate alternatives, to assess the probabilities of potential outcomes based on predictions, to learn from colleagues, to understand drivers of KPIs, and to produce optimized recommendations by evaluating constraints and risks.

Missing functionality includes lack of:

- **Situational awareness:** Historical data is rarely combined with current/real-time data to provide the necessary context between the two data sets. Also, when decisions are made by analyzing snapshots of data, the individual lacks visibility into adjacent or external factors that influence the analysis.
- **Evaluating alternatives:** Analysts (and decision makers they support) must consider a variety of scenarios by conducting "what-if" analysis. They need to understand the impact of changing one or more input variable on outputs.
- **Identifying drivers.** Analysts should also be able to benefit from the use of appropriate analytic techniques to identify which independent variables influence dependent variables and the extent of any causal relationships between them.
- **Predicting potential outcomes.** The software should provide functionality to create predictions and forecasts (depending on specific use cases) to help analysts assess potential future states of the business, of a KPI, or another variable.
- **Understanding risks and constraints.** It is important to have functionality to support optimization not only from a purely mathematical perspective but also within the constraints of internal policies, external regulations, or societal norms.
- **Expert identification.** There are times when there is not enough data to allow for quantitative analysis to drive informed decisions. There are also times when understanding of risks and constraints requires a mix of data analysis and human experience or observation. Most BIA solutions lack the capability for a user to identify experts within their enterprise who may have experience addressing the same situation. These tools also lack the ability to crowdsource input from colleagues and/or external collaborators.
- **Prescribing next best actions.** Analysts (and decision makers) can benefit from the BIA solution's ability to prescribe or recommend actions. These prescriptions should be presented with probabilities and should only be operationalized if they are produced based on all of the other, previously mentioned, capabilities.
- **Capturing institutional knowledge:** Finally, most BIA solutions are not being used to capture decision making processes to build institutional knowledge. Tracking of related tasks and activities is simply not done at a level of granularity and contextual understanding that can help identify best (and worst) practices and leverage them in subsequent decision-making cycles.

Faced with the absence of functionality to support such activities within their current BIA solutions, most individuals default to experience (or gut feel) or dive into spreadsheets to conduct the type of further analysis that actually does help them make a decision.

## Addressing the Shortcomings of Business Intelligence and Analytics Solutions

The first step in addressing these shortcomings is to expand the framework for viewing the decision-making loop. Instead of the four steps previously shown in Figure 3, let's expand it to seven steps, as shown in Figure 4, and let's add a set of activities inside the loop.

By expanding the set of activities, we can be much more precise in identifying the functionality needed to support decision making. Instead of treating "analytics" as a blob of ill-defined data manipulation, we can see the value of different categories of analytics and their relationship among them. We can also start mapping capabilities of each category of analytics to the functionality identified as shortcomings in the previous section.

The inner loop, depicting learn, adapt, and explain steps, adds another dimension to our framework (see Figure 4). It is the key in differentiating this model from the linear view of the categories of analytics previously shown in Figure 2. Learning, in this case, refers to the use of machine learning to monitor, analyze, understand (and when possible), and explain decision-making tasks and then adapt tasks within each activity to improve them over time. By using this model, enterprises don't have to wait to benefit from AI until the enterprise is ready to reach the prescriptive analytics stage. In other words, AI can benefit each of the activities now!

FIGURE 4

Analytics Infused with Artificial Intelligence
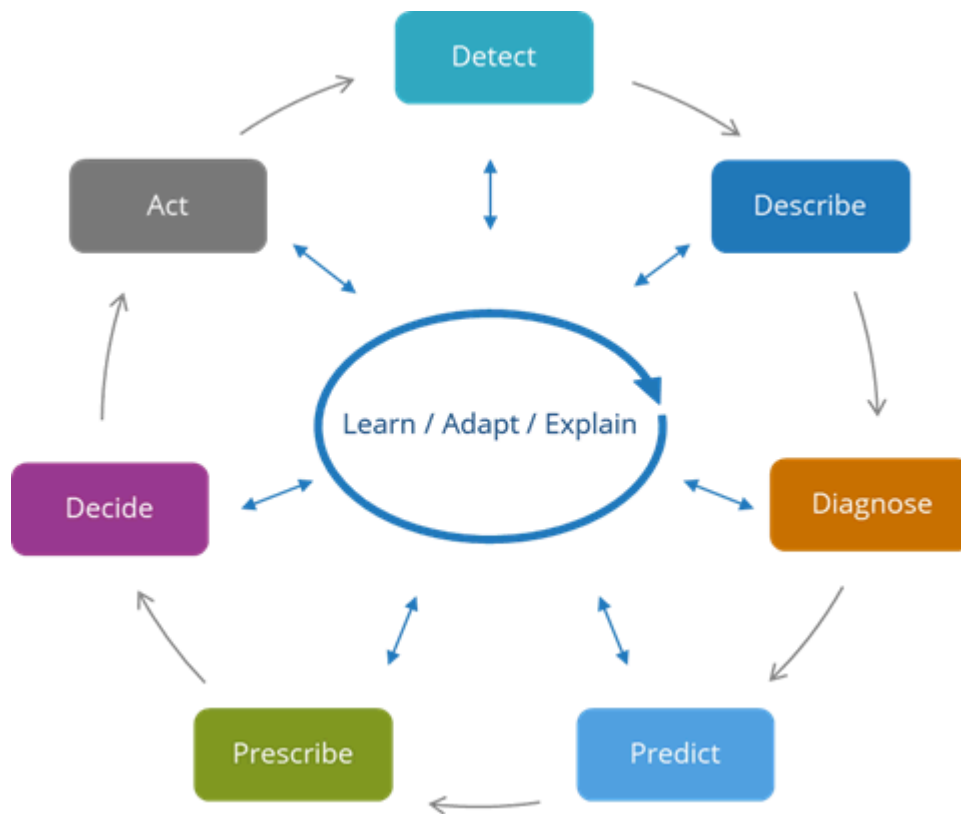
Source: IDC, 2018

To date, BIA software has come up short in addressing many decision support requirements. But that is starting to change in this early phase of the commercial AI era. If BIA tools are to continue to produce the promised value, they need to expand their functionality to address all steps of the decision-making process. That's where AI comes in.

The Use of Artificial Intelligence in Business Intelligence and Analytics Solutions

The AI headlines today are often dominated by opinions about extreme job losses and potential to solve problems of global magnitude. Too many vendors claim the ability to automate end-to-end processes without the technical ability to do so and without acknowledging the nontechnical difficulties of most process automation efforts. The associated hype is driving many decision makers who work with us to be either irrationally exuberant about AI or uncertain about the needed level of investments in data, algorithms, technology, and staff.

Instead, if you're involved in purchasing, deploying, or using BIA software, consider where AI can benefit your enterprise today. Referring back to Figure 4, here are some examples where AI can automate specific tasks and thus augment or enhance the related activities and the overall decision support process:

- **Detect:** AI can be used to detect data quality issues, suggest data sources, and track popular sources and effectiveness of decisions taken. AI can also be used to monitor interactions among analysts and others using the BIA software to make decisions.

- **Describe:** Descriptive analysis looks at prior performance attributes and metrics. AI can help define metrics and KPIs that are relevant based on the data being described. AI can also guide the user toward most appropriate data visualizations.

- **Diagnose:** For users who want to delve into reasons for results provided by the descriptive analytics in the prior step, AI can provide guided root-cause analysis to answer the "why" in the decision support life cycle.

- **Predict:** Where descriptive analytics look at history, predictive analytics are forward looking and often require data scientists to know which techniques to use and how to build models. Market research continues to show that 80% of analysts' time is spent on manual data preparation tasks and 20% on actual analysis. AI can automate many of these manual tasks related to data collection, model deployment, and model management and allow business analysts and data scientists to focus on analysis. In some cases, AI can also provide suggestions to less sophisticated users on which algorithms to use.

- **Prescribe:** This is one of the most promising areas for the application of AI. People can't identify patterns and evaluate all the dependencies in vast amounts of data or evaluate all outcomes to prescribe the best action. On the other hand, machines, using AI, are well suited for such uses.

- **Decide:** When all the alternatives are available, AI can be used to evaluate constraints and goals. If there are rules that must be created, AI can be used to develop rules that allow certain tactical and operational decisions to be automated.

- **Act:** Finally, AI can be used to help automate execution of digital processes such as creation of content, distribution of offers, or execution of financial transactions. In a growing number of cases, AI is also being used to execute actions in the physical space using operational technology.

ADVICE FOR THE TECHNOLOGY BUYER

In 2018, enterprises across the globe will spend about $50 billion on software for data visualization, data warehouses, data lakes, predictive analytics, and related functions of the overall analytic life cycle. With a few exceptions, today's headlines that prominently reference AI, big data, and analytics neglect to mention the ultimate reason for these solutions – decision support, that is, using technology to augment people's ability to make better decisions. We believe, it is this mindset that is significantly to blame for the still suboptimal adoption rate of BI and analytics technology among enterprises and the still deficient BIA software tools provided by IT vendors.

It is no surprise that data and analytics is a core asset in the digital economy. Connecting data assets across different lines of business, encouraging collaboration based on high levels of data literacy, and using the power of AI to enhance the decision-making process will provide significant business benefits to enterprises. BIA tools have been around for several decades, but the new generation of BIA software includes AI/ML in ways that can improve the productivity of this software's users while enabling them to focus on value-added activities dependent on human judgement.

Buyers that are interested in investing in BIA tools of the future should look for vendors that have concrete examples of how AI has enhanced their products and their road maps. Consider the following advice:

- Start viewing decision making as a process and assess the functionality needed to support each of the related interconnected activities and the tasks within those activities.
- Consider that the goal of all the investments in data and related data processing software and staff is not simply information delivery. It is not about delivering a more visually appealing dashboard or a report or a self-service data manipulation tool. When interviewing internal users don't ask them what data or data manipulation functionality they need. Instead, start by asking what decisions they need to make and how they make these decisions today. This information will lead you to a more fruitful assessment of BIA software functionality.
- Begin exploring and evaluating a new generation of BIA software – some of which has already been made available in the market. Review the use of machine learning within these software packages and assess the extent to which they are capable of automating specific tasks that will make your data engineers and data analysts both more productive and able to deliver greater value by focusing on activities that are not or cannot be automated.

LEARN MORE

Related Research

- *Artificial Intelligence-Based Automation Evolution Framework* (IDC #US44524318, forthcoming)
- *Analytics and Information Management Digital Transformation: Deriving Value from Data* (IDC #US44462218, November 2018)
- *Worldwide Big Data and Analytics Software Market Shares, 2017: Healthy Growth Across the Board* (IDC #US44237418, September 2018)
- *Worldwide Big Data and Analytics Software Forecast, 2018-2022* (IDC #US44243318, September 2018)
- *The DX Platform Data Architecture* (IDC #US44150818, August 2018)

- *IDC's Worldwide Digital Transformation Use Case Taxonomy, 2018: Analytics and Information Management* (IDC #US43978218, June 2018)
- *New KPIs – The Foundation of Transforming Your Enterprise* (IDC #US43976518, June 2018)
- *IDC MarketScape: Worldwide Enterprise Performance Management Analytic Applications 2018 Vendor Assessment* (IDC #US43847618, June 2018)

Synopsis

This IDC Perspective discusses the role of artificial intelligence and machine learning in business intelligence and analytics (BIA) solutions.

Over the past four decades, majority of BIA software has been developed and deployed by not viewing decision making as a process and by equating decision making with information delivery. Most of the traditional BIA software solutions do not provide support for all the activities of the decision-making process, thus leaving analysts to rely in substandard information and personal experience. There are several opportunities to start benefiting from AI functionality within BIA software by using the former to automate specific tasks across the set of decision support activities and by applying AI to monitoring of decision-making processes.

"To help enterprises evaluate a new generation of business intelligence and analytics software solutions, we are presenting this IDC Perspective about the role of artificial intelligence in BIA. Our framework can serve as a basis for assessing the ability of software to automate specific tasks and activities within the overall decision support process," said Dan Vesset, group VP, Analytics and Information Management.

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Global Headquarters

5 Speen Street
Framingham, MA 01701
USA
508.872.8200
Twitter: @IDC
idc-community.com
www.idc.com