



# Three Technologies Reshaping the Face of Business Intelligence

And What You Should Do About Them—Now!

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## About the Author

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**Wayne W. Eckerson** has been a thought leader in the data analytics field since the early 1990s. He is a sought-after consultant, noted speaker, and expert educator who thinks critically, writes clearly, and presents persuasively about complex topics. Eckerson has conducted many groundbreaking research studies, chaired numerous conferences, written two widely read books on performance dashboards and analytics, and consulted on BI, analytics, and data management topics for numerous organizations. Eckerson is the founder and principal consultant of Eckerson Group.

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## Executive Summary

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Three technologies are reshaping the business intelligence (BI) landscape: artificial intelligence, the cloud, and mobile applications and devices. This report charts the evolution of BI, explains the benefits and challenges of these three technologies, and provides recommendations to organizations that want to climb aboard before the BI train leaves town.

### Key Takeaways

- There have been three generations of BI since 1990: traditional BI, self-service BI, and augmented BI.
- Three technologies are reshaping the BI landscape: artificial intelligence (AI), the cloud, and mobile devices.
- AI for BI will foster more pervasive self-service, giving more people the chance to interact with data.
- It also provides easier to consume insights through natural language generation and natural language processing.
- Joining the cloud is inevitable and most companies are shifting some or all of their application and data processing there.
- Cloud-based managed services enable companies to focus on what's core to their business, not infrastructure.
- The cloud is where the innovation will happen in the next five years, so organizations need to get on board.
- Mobile BI has evolved to become the primary channel for the delivery of insights.
- When enhanced with AI and native operating systems, mobile BI will become a more natural environment for hands-free workers.

### Recommendations

- Understand the three generations of BI and make sure your organization is positioned to deliver third-generation capabilities. Your business users will be happy with democratized data and your organization will gain a competitive advantage.
- Select BI vendors that have built holistic platforms from scratch to support

AI, the cloud, and mobility. Don't purchase purpose-built tools that rely on a squadron of skilled data analysts to make things happen.

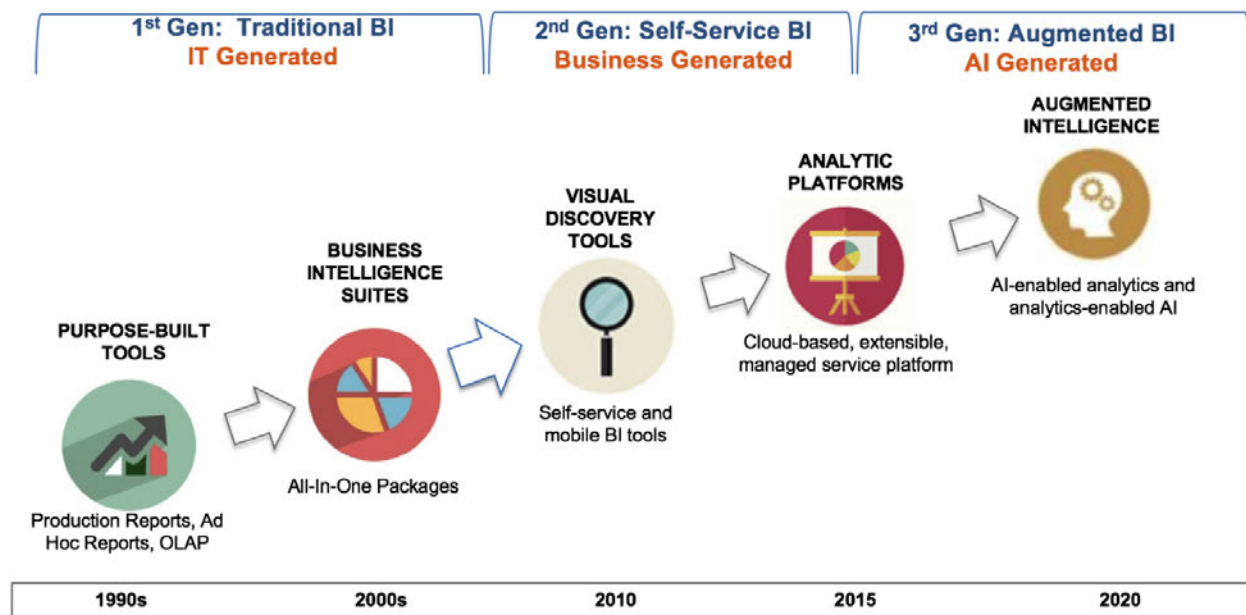
- Test out AI for BI capabilities before unleashing them to your user base. Make sure the text-based queries and automated insights generate relevant, accurate results and perform well.
- Embrace managed services in the cloud to relieve the burden of having to administer data and computing infrastructure.
- Find vendors that offer native mobile applications that are infused with AI capabilities to support totally hands-free and mobile work environments.

## BI's Journey

Over the years, business intelligence (BI) has become synonymous with reporting and analysis tools. That's unfortunate for two reasons. First, BI started out as an elegant term for the people, processes, and technology that make businesses run intelligently; second, the BI tools of old are no longer.

Today, we use umbrella terms like big data, analytics and artificial intelligence (AI) to describe how companies turn data into insights and action. Semantics evolves, just like everything else, and we must accept the term du jour. As for BI tools, things have changed significantly in the 30 years since the advent of reporting and analysis tools. In fact, the three generations of BI products have each fundamentally changed the way people use data to make decisions and manage performance. (See figure 1.)

**Figure 1. Three Generations of Business Intelligence**



The first generation of BI required information technology (IT) specialists to build data warehouses, reports, and dashboards. The second brought self-service to business users, giving them the power to mash-up data sets and create their own reports and dashboards. The third generation, emerging now in 2019, applies AI to make BI infinitely easier to use. With AI, BI users can converse with data and generate insights with the tap of a button. Many companies use a combination of all three generations of BI to meet the end-to-end needs of a diverse consumer population.

**Three technologies that make a big difference.** On this journey, many technologies have fueled the evolution of BI from purpose-built tools in the 1990s to AI-infused tools today. The three most significant are artificial intelligence, the cloud, and mobile deployment. Each technology has disrupted the BI market, spawning startups with eye-popping capabilities and pushing BI incumbents to adapt quickly or fade away.

Today, leading BI solutions providers have wrapped all three technologies—plus many others—into a [modern analytics platform](#) that functions like a proverbial one-stop shop for decision making. A modern analytics (or BI) platform supports all modes of BI, all types of business users and teams, and any type of data.<sup>1</sup> This report sheds light on how these three technologies are reshaping BI—working from the present backward—and what your organization needs to do to reap the benefits.

## AI Inside

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The term artificial intelligence covers a broad spectrum of techniques and algorithms designed to mimic human intelligence, such as the ability to see, speak, converse, correlate, and make decisions. Much of the time, AI requires boatloads of labeled historical data (i.e., data marked with action outcomes) to generate this “intelligence,” whether it’s the ability to recognize images, to understand human speech, or to find correlations and anomalies deep inside data sets.

**How AI helps BI.** AI makes BI tools infinitely easier to use. With AI-infused BI tools, business users can type or speak queries into the BI tool, chatbot, or digital assistant and instantly generate a chart or even a dashboard (i.e., natural language processing). They can select a metric or attribute in the visualization, push a button, and see the key drivers of that object as well as anomalies, trends, and other patterns that might take a trained data analyst hours to discover (i.e., automated insights). (See figure 2.)

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<sup>1</sup> Wayne Eckerson. “[The Modern Analytics Platform: Balancing Dual and Dueling Imperatives](#).” Eckerson Group, 2017.

Figure 2. Automated Insights



With one click, an AI-infused BI tool can display deep insights (i.e., profile, drivers, and anomalies) into a selected metric or attribute, such as attrition in the above screen shot.

AI for BI can also describe the attributes of a visualization using written or spoken text so users need not study the chart to understand its significance (i.e., natural language generation). AI-infused BI tools also can automatically type and format fields within new data sets (i.e., auto-typing) as well as recognize common keys, suggest joins, and craft data models (i.e., auto-modeling.) These tools can also personalize a welcome screen or portal so users see only what they care about and need to know based on their role or team (i.e., personalization).

***AI for BI products won't replace human decision makers; they will augment them.***

Augmented BI. AI for BI products won't replace human decision makers; they will augment them. AI for BI will make tools easier for humans to use, boosting adoption and facilitating self-service. The tools will shrink the time it takes people to generate relevant insights and take action. Business users will converse with this democratized data and find insights themselves rather than having to rely on data analysts or IT specialists. In some cases, AI-infused tools may automate decisions in operational environments with fairly standard, high volume events.

## Recommendation

The challenge for AI-infused BI tools is that if they are not designed properly, they can generate spurious or irrelevant results or bog down performance. They might also contravene security rules and give users unauthorized access to data. To avoid these issues, organizations should assign a few power users to experiment with the AI functionality and test its ability to generate relevant, secure insights. With this experience, these data analysts can then train other business users to apply the features optimally. And they should work with BI vendors to improve AI functionality until it's ready for prime time.

## The Cloud or Bust

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**Times are changing.** In public presentations during the past few years, I've boldly stated, "The cloud is inevitable." I would then compare the cloud to e-commerce in the late 1990s when most people said they would never type their credit card number into a browser and hit the "buy" button. How times have changed!

Likewise, the small but steady outflow of processing to the cloud 10 years ago has recently become a torrent. Organizations are moving all kinds of applications to the cloud, including payroll, human resources, sales, and marketing. The center of data gravity has moved from on-premises data centers to public and private cloud platforms. Once a majority of an organization's data originates in the cloud, it forces the organization to perform their analytics there, too. But forward-looking companies are not waiting; they are running analytics in the cloud and querying data where ever it resides, either on premises or in the cloud or both.

**So long, data center!** Companies large and small have seen the future and are shutting down corporate data centers. They say they no longer want to be "in the air conditioning business"—referring to the sizable costs for heating, ventilation, and air conditioning, not to mention the power consumption, physical and data security, backup, restore, and recovery services required to run a data center. They also don't want to employ legions of IT professionals to install, tune, and maintain racks of servers. Nor the capital expense and lengthy, laborious process required to purchase, install, configure and tune new systems.

*[The cloud is] a plug-and-play environment, versus pay-and-pray.*

On the flip side, the cloud offers more than just relief from the headaches, costs, and red tape of running a data center. It offers unlimited scalability, on-demand elasticity, pay-as-you-go pricing, agile deployments, and instant upgrades. It's a plug-and-play environment, versus pay-and-pray.



**Managed service.** Moreover, the cloud keeps getting better. Ten years ago, companies outsourced their computing infrastructure to the cloud, but they still had to provision servers, install software, and manage users. Today, with the advent of managed services (a.k.a. platform-as-a-service or PaaS), organizations can outsource not only their computing and data infrastructure, but also its management. In other words, they give cloud vendors the responsibility for managing the software and servers, everything except configuring the application and managing users.

From a data perspective, this means companies can subscribe to a managed service, such as Oracle Analytics Cloud, and be up and running within hours rather than months. All they have to do is point the managed service to their cloud or on-premises data sources; assign users; and build reports, dashboards, and visualizations, leveraging the governance they've spent years perfecting. Vendors now boast of how quickly they can onboard new customers and get their data analytics environments up and running.

*The cloud is where technology innovation happens today.*

**Innovation.** Another reason is that the cloud is where technology innovation happens today. Early movers made huge bets on the cloud and proved it works, both technologically and economically. Now, all major software providers are making the transition, focusing their research and development on cloud-based products and services. So, if you want to stay on the cutting edge of technology and not fall behind the pack, you need to migrate to the cloud. The scales have tipped. Your on-premises environment will slowly but surely become an anachronism and drive your company into a competitive dead-end.

**Challenges.** Of course, there are issues to consider before moving to the cloud. Security is the big one, although public cloud platforms are more secure than most corporate data centers. Nonetheless, some regulations require that data remain on premises or in a specific location, making a cloud strategy impractical. Some people believe data transfer speeds and network costs are an issue, but most companies that have migrated to the cloud don't see these as major obstacles. A more common challenge is cloud pricing, which can be opaque and cause sticker shock if not managed properly. Also, cloud platform performance may be a problem if your company's data remains on premises or the cloud provider's data center is remote from your location.

## Recommendations

Even if you face no capital costs or depreciation for your data center, it pays to start moving computer processing to the cloud. Start small and experiment. Run time-boxed projects in the cloud, such as a data science sandbox or an auditor's database. It's critical to get experience with the cloud before taking on a major migration. Where possible, opt for managed services (PaaS) rather than infrastructure services (IaaS) to get the full benefit of cloud computing.

**Hybrid computing.** Also, don't shy away from hybrid computing. Most cloud providers make it straightforward to query data located on premises or on one or more cloud platforms without significant performance degradation. But experiment first before embracing a more complex architecture. It's always best to follow data where it resides (i.e., data gravity) rather than making data conform to a predefined architecture.

Finally, recognize that you can't manage the cloud like an on-premises data center. The cloud works differently. Services are meant to be turned on and off based on demand. Spend time writing or configuring scripts to schedule or trigger processing based on consumption levels. This will keep costs in check and provide more predictable expenditures.

## Go Mobile

Mobile BI is the most mature of the three technologies profiled in this report. It no longer grabs headlines. Most employees today conduct much of their work via mobile phones and tablet computers. Some classes of users—salespeople, field technicians, consultants, and jet-setting executives—use mobile devices almost exclusively.

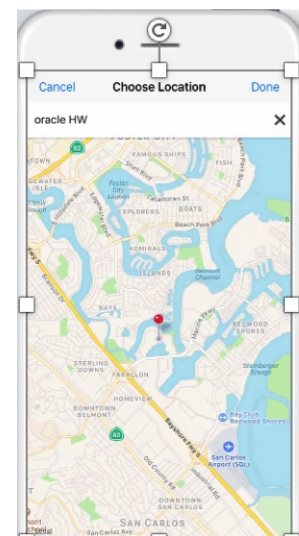
But mobile computing has always been clunky—constrained by small screens, limited storage, and non-native applications (e.g., HTML5) that chew up bandwidth and undermine the user experience. But that is changing. Companies are investing in native mobile applications to ensure fast performance and optimal user interfaces.

*AI enhances the mobile experience, making it truly hands free and mobile.*

**AI for mobile.** In addition, AI enhances the mobile experience, making it truly hands free and mobile. With AI, users can speak a query into a mobile device and instantly receive the answer in the form of a chart or table. An AI assistant can suggest related reports and queries or display the key drivers of a metric in the chart. Users can also configure queries to run on a schedule or when they're in a specific location, such as near a customer's office. (See figure 3.)

With these new capabilities, mobile BI applications enter the realm of self-service. From a mobile device, business users can dictate queries into a device to create charts and dashboards that they can schedule to run by date, location, or event. These turbo-charged business users no longer have to depend on IT professionals. Democratized BI offers an easy-to-use, on-demand, and highly personalized analytics experience for busy working professionals.

**Figure 3. Trigger a query by location**



## Recommendation

Managing native mobile BI applications requires more resources, especially if employees have a multiplicity of mobile devices. But the benefits are worth the investment. Make sure your BI vendor offers both native mobile applications and a seamless process for downloading, securing, and managing the application. Also, make sure that creating mobile dashboards is not a separate process from creating desktop or web applications. At the same time, BI authors should be able to tune charts and dashboards for mobile consumption.

## Time to Act

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Hopefully, this short report has sparked your interest in adopting BI products designed to capitalize on AI, the cloud, and mobile. These three technologies are reshaping the landscape for BI, changing the way business users consume data and make decisions. The sooner you begin experimenting with these capabilities, the better positioned your organization will be to compete in a data-driven industry.

Some BI vendors provide each of these capabilities as purpose-built products. That's not what you want. The future is a BI platform, designed from the ground up to support AI, cloud, and mobility. Don't work with vendors that have added these capabilities as an afterthought. That won't give you the power or integration that business users increasingly demand. You will want to work with vendors that have spent the time and money to build new products or overhaul existing ones to support a modern workforce that wants easy access to data.

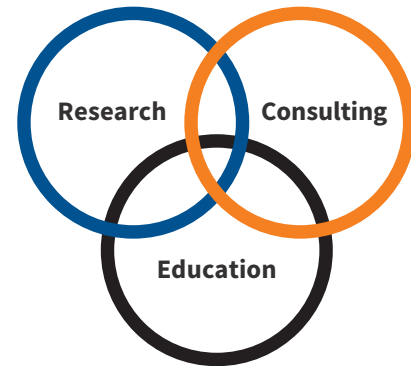
## About Eckerson Group

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Wayne Eckerson, a globally known author, speaker, and advisor, formed [Eckerson Group](#) to provide data-driven leaders like you a cocoon of support during every step of your journey toward data analytics excellence.

Today, Eckerson Group has three main divisions:

- **Eckerson Research** publishes insights so you and your team can stay abreast of the latest tools, techniques, and technologies in the field.
- **Eckerson Consulting** provides strategy, design, and implementation assistance to meet your organization's current and future needs.
- **Eckerson Education** keeps your data analytics team current on the latest developments in the field through three- and six-hour workshops and public seminars.



**We Help Analytics Leaders Succeed**

Unlike other firms, Eckerson Group focuses solely on data analytics. Our veteran practitioners each have more than 25 years of experience in the field. They specialize in every facet of data analytics—from data architecture and data governance to business intelligence and artificial intelligence. Their primary mission is to share their hard-won lessons with you.

Our clients say we are hard-working, insightful, and humble. We take the compliment! It all stems from our love of data and desire to serve—we see ourselves as a family of continuous learners, interpreting the world of data for you and others.

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