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2019
Business Intelligence Trends

Table of Contents

01

The rise of explainable AI

As organizations rely more on artificial intelligence and machine learning models, how can they ensure they're trustworthy?

The promise of artificial intelligence (AI) suggests that machines will augment human understanding by automating decision-making. Josh Parenteau, Director of Market Intelligence at Tableau explained how artificial intelligence and machine learning will act as another perspective, "helping uncover those insights that have gone previously undiscovered." Gartner research indicates that by 2020, "85% of CIOs will be piloting artificial intelligence programs through a combination of

buy, build, and outsource efforts." But as organizations become more reliant on machine learning models, how can humans be sure that these recommendations are trustworthy?

Many machine learning applications don't currently have a way to "look under the hood" to understand the algorithms or logic behind decisions and recommendations, so organizations piloting AI programs are rightfully concerned about widespread

85% of CIOs will be piloting artificial intelligence programs through a combination of buy, build, and outsource efforts.

adoption. As outlined by Adrian Weller, senior research fellow in machine learning at the University of Cambridge, "Transparency is often deemed critical to enable effective real-world deployment of intelligent systems" like machine learning. This is the case for a variety of reasons—mainly, to ensure that models are working as designed, or to establish trust with users so they can confidently make decisions based on predictions.

The need for transparency has led to the growth of explainable AI, the practice of understanding and presenting transparent views into machine learning models. Decision makers expect to be able to ask follow-up questions around why a model says something, how confident it is, and what it would say if inputs were different—very similar to how a leader would query a human expert when making critical decisions. As Richard Tibbetts, Product Manager for AI at Tableau, notes, "Decision makers are right to be skeptical when answers provided by AI and machine learning cannot be explained. Analytics and AI should assist—but not

completely replace—human expertise and understanding."

Line of business leaders in organizations—particularly organizations concerned with risk like financial services and pharmaceutical companies—are demanding data science teams to use models that are more explainable and offer documentation or an audit trail around how models are constructed. As data scientists are tasked with explaining these models to business users, they are leaning on BI platforms as an interactive method for exploring and validating conclusions.

Ultimately, companies have embraced the value of artificial intelligence and machine learning. But to make a disruptive impact in organizations, AI has to be trusted. It must justify its conclusions in an intelligible fashion, as simply as possible, and dynamically answer follow-up questions—all to help humans better understand their data.

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Analytics and AI should assist—but not completely replace—human expertise and understanding.

Richard Tibbetts, Product Manager for AI, Tableau

02

Natural language humanizes your data

Advancements in NLP systems enable all people to have natural conversations with data.

Natural language processing (NLP) brings together computer science and linguistics to help computers understand meaning behind human language. Today, BI vendors are offering a natural language interface to visualizations so that users can interact with their data naturally, asking questions as they think of them without deep knowledge of the BI tool.

Within the context of modern BI, natural language is being applied to support the analytical conversation. Analytical conversation is defined as a human having a conversation with the system about their data. The system leverages context within the conversation to understand the user's intent behind a query and further the dialogue, creating a more natural conversational experience. For example, when a person has a follow-up question of their data, they don't have to rephrase the question to dig deeper or clarify an ambiguity. You could request for a BI tool

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Natural language is a way to bring all kinds of technology to a much broader audience. It decreases the technology barrier, so you don't have to learn the software. You don't even have to learn about analytics. You just need to have the business context to ask the right question.

Stephanie Richardson, Senior Director of Product Marketing, Tableau

to "Find large earthquakes near California" and then ask a follow-up question "How about near Texas?" without mentioning earthquakes for a second time. Machine learning enables systems to gain deeper domain knowledge over time based on a company's data and the types of questions their users ask.

"One of the key characteristics of analytical conversation is avoiding dead ends—being able to ask a question, get a result, and pivot off that original question," explains Vidya Setlur, Development Manager on the Natural Language team at Tableau. "Everybody has a thirst for getting insights about their data. And natural language is one important modality for bridging that gap."

Natural language will also allow users to ask questions based on a data visualization: "Let's say I ask a question from my BI tool about disease outbreaks and get a resulting visualization. I could ask 'What is that orange spike?'" says Ryan Atallah, Software Engineer at Tableau. "It's a follow-up question, but it's not based on my data. It's based on the encodings of the visualizations." And when an existing visualization doesn't make sense in the context of the next question, it will offer an alternative.

Natural language represents a paradigm shift in how people ask questions of their data. When people can interact with a visualization as they would a person, it opens up areas of the analytics pipeline that were traditionally reserved for data scientists and advanced analysts. Users aren't limited by their analytical skillset—only by their own breadth of questions. It also allows advanced users to answer richer questions in less time and to provide more engaging dashboard capabilities to others. As natural language matures across the BI industry, it will break down barriers to analytics adoption across organizations and further embed data into the core of workplace culture.

The natural language generation market size is estimated to grow to **$825.3 million** by 2023 (Markets and Markets)

03
Actionable analytics put data in context

BI platforms evolve to put data where people want to take action.

Data workers want and need their data and actions in the same place. Rather than performing analysis in one silo and taking action in another, anyone who works with data should be able to stay in the context of their business processes and workflows. Business intelligence platforms are meeting this need by merging with core business operations, workflows, and processes through capabilities like mobile analytics, embedded analytics, dashboard extensions (also known as add-ins), and APIs. As a

result, actionable analytics are expediting the decision-making process for both technical and non-technical roles.

These capabilities allow data workers to analyze data and take an action after finding an insight—all in the same place. An example of converging insight and action is embedded analytics. Embedded analytics puts data and insights where people are already working so they don't have to navigate to another application or

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In order to make analytics actionable, we need to make sure that we're providing the right message to the right person, at the right time, in a way that they can understand.

Peter Benson, Head of Strategic Alliances, Automated Insights

shared server. Analytics may be embedded in internal portals (like SharePoint) or within other commonly-used applications.

For example, organizations embed analytics into customer relationship management (CRM) software like Salesforce. Salespeople can view valuable account data in context —like product preferences or spend over time—which may inform a better conversation or influence next steps with the customer.

Dashboard extensions approach this convergence from the other side. For those who spend the majority of their time in their analytics platform, extensions bring access to other systems right into the dashboard. Now individuals can take an action without ever leaving their analytics workflow.

For example, IT managers who lean on analytics to monitor ticket queues can use a dashboard extension to edit case information or perform actions directly from within their dashboard rather than switching over to their ticketing system. This keeps them in their flow, enabling faster action from where they're already spending their time.

While embedded analytics and dashboard extensions bring action and insight together within platforms and tools, mobile analytics brings these capabilities to users wherever they are physically. Consultants can leverage customer data while on-site, while a mechanic may leverage Internet of Things (IoT) data to repair a device in the field.

The act of putting analytics in context carries even more impact as it helps to customize the analytics to a specific line of business or industry. The convergence of analytics and action will shorten the time and effort between insight and decision-making. It will also make data more widely available within business workflows, encouraging more people to incorporate data into everyday decisions.

By 2022, **50%** of digital business technology platform projects will connect events to business outcomes. (Gartner)

04

Data collaboratives amplify social good impact

Focused efforts from public and private-sector organizations strengthen 'data for good' movement.

Data has transformed the way organizations operate, including non-governmental organizations (NGOs) and nonprofits. And now the "data for good" movement is exploding across both private and public-sector organizations. Gartner research indicates that "social media mentions of data for good have increased 68% in the last year" as the general public becomes more aware of how data can make a positive impact on society.

Private sector companies like multinational telecommunications company, Orange, are establishing projects that use data-driven insights to further social good efforts. Through Orange's Project OPAL, the company created a governance committee,

in partnership with local governments, to regulate how data is collected, anonymized, and protected. This allows them to share detail call records with social impact organizations in a safe and secure way. In Senegal, this data was recently used to assess literacy rates based on text message use, helping social impact organizations make resource allocation decisions around literacy programs.

Historically, NGOs and nonprofits haven't had the resources to invest in sophisticated data infrastructure or large teams of data workers. Now, with the cost-efficiency and flexibility of cloud computing, these organizations can develop sophisticated data environments, without massive on-premise investments, paving the way for more data-driven social impact initiatives.

One practical example is the emergence and growth of data commonwealths—platforms for sharing and collaborating across organizations to achieve a common goal. The Hutch Data Commonwealth, for example, "is a multi-disciplinary team on a mission to empower Fred Hutchinson Cancer Research Center researchers with innovative data science tools, infrastructure capabilities, and collaborations to accelerate their research." In an article for GeekWire, Matthew Trunnell, Chief Information Officer and Executive Director of the Hutch Data Commonwealth shares how the cloud serves as the "foundation of a scientific data commons." The cloud becomes the place where we convene and collaborate, a place

> " **Data commonwealths allow organizations to share data between themselves and with the world in a way that is safe and secure—and in a way that protects the privacy of any individuals from whom the data is collected.**
>
> Neil Myrick, Global Head of Tableau Foundation

Social media mentions of 'data for good' have increased **68%** in the last year.

A recent report from the Governance Lab at the NYU Tanden School of Engineering primarily focuses on the challenges surrounding sharing social media data between private and public-sector organizations[1], but its principles apply to a variety of data sharing partnerships. GovLab predicts that more organizations will appoint data stewards to drive data collaboratives under the notion of ensuring "a due process to respond to data requests; a system for filtering or prioritizing certain kinds of information; and a method to ensure that the data being released matches public needs and demands."

where everybody comes together for the common good." The commonwealth relies on partnerships with other research institutions and technology providers with data at the center of its mission.

These partnerships, either through public and private-sector projects or commonwealths, require a foundation of trust. Organizations are assessing the critical elements of a successful partnership, including legal implications and governance standards involved with sharing data. This includes assessing privacy risks and instilling protections around sharing personally identifiable information.

Access to a wealth of diverse data sources under the proper controls—like in the case of Fred Hutch—can create a transformational impact. While challenges remain in these large-scale, collaborative projects, the "data for good" movement is a testament to the the altruistic potential of sharing data. Advancements in technology, increased data literacy, and a focus on collaboration are creating an opportune environment to solve some of the world's most difficult problems.

[1] http://datacollaboratives.org/static/files/social-media-data.pdf

05

Codes of ethics catch up to data

In light of regulations like GDPR, leaders assess the future of ethical data practices.

The topic of data privacy has risen in prominence and consumers are more conscious than ever around sharing personal data. This is affecting how businesses approach data monetization, data collection, and data sharing. And with new regulations like GDPR, companies are having crucial conversations around data ethics and privacy in the context of their day-to-day business practices. This surfaces through:

Codes of ethics: Many roles are already bound to professional codes of ethics including those in law, medicine, and accounting. And as data continues to proliferate in every area of business, companies are starting to evaluate how to apply these same principles to data analytics practices. As Gartner shared, "the digital business era has blurred the boundaries between technology and business" and data is now a critical piece to the strategic puzzle. More companies are

The number
of CDOs
saying ethics
is part of their
responsibilities has
increased by
10
percentage points
(Gartner)

relying on data to shape business decisions within every department and role—meaning more people have a stake in how data is used and shared.

In response, leaders, particularly chief data officers (CDOs), are leading the charge in shaping internal guidelines for company-wide data practices as part of digital transformation efforts. In fact, Gartner's Chief Data Officer survey from 2017 revealed that "the number of CDOs saying ethics is part of their responsibilities has increased by 10 percentage points from 2016 to 2017." These codes of ethics will serve as a framework for future infrastructure, governance, and staffing decisions.

Changes in business processes:
Companies are thinking critically about the entire lifecycle of their data from collection to analysis. This opens up an opportunity to assess the company's data management strategy as a whole to ensure compliance with both regulations and their internal code of ethics. This review process isn't a one-time occurrence. As Accenture noted in its Universal principles of data ethics report,

"governance practices should be robust, known to all team members and reviewed regularly," adapting as the company grows and changes.

Data ethics isn't restricted to data collection or data governance. It also applies to how data is interpreted and acted upon. Modern BI platforms have opened up data analysis to the many, and more roles will be responsible for following data ethics principles. Bridget Winds Cogley, Senior Consultant at Teknion Data Solutions proposes that anyone analyzing data or communicating insights should "consider biases and whether or not facts are being presented clearly" and whether or not "the limits of the data are understood and fit the question." As more people become data workers, data ethics will be a core part of data literacy efforts, affecting how people approach data in both personal and professional contexts.

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The practice of ethics helps practitioners step back and evaluate a situation from an ethical lens. Above all, data ethics are designed to act as speed bumps in our work so we understand how to face dilemmas both personally and professionally.

Bridget Winds Cogley, Senior Consultant, Teknion Data Solutions

06

Data management converges with modern BI platforms

Governed data curation bridges the gap between data and business.

As data sources become more complex, diverse, and numerous, data management is now even more critical in modern BI deployments. As more of the workforce uses data to drive decisions, organizations must ensure accuracy within their data and its use in analysis.

Organizations have turned to data curation to address the data management and

governance challenges that come with this broader data access. Data curation encompasses the way an organization captures, cleans, defines, and aligns disparate data. This process creates a bridge between the data and its real-world applications.

Organizations are already spending millions of dollars on technologies that integrate data definitions with the analytical tools

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Data curation is the process of identifying which data sources are needed, putting that data in the context of the business so that business users can interact with it, understand it, and use it to create their analysis.

Mike Hetrick, Senior Product Marketing Manager, Tableau

that help analyze the data—aiming to remove ambiguity across teams and organizations. In response, data curation tools and processes (like data catalogs and semantic governance) are converging with BI platforms to link data with business context.

A data catalog acts as an enterprise business glossary of data sources and common data definitions. Subject matter experts like data engineers and data stewards can add descriptions and definitions to data sources and fields, tagging for better discoverability, and even helpful data quality indicators— including notifications for certifications of trusted content, or maintenance or deprecation of data assets.

Everyday users don't need to know where data lives in the data source, but they do need to understand what the data represents in the real world. For example, analysts and consumers of content often need to verify the origin of a piece of data (also called a lineage analysis). And if data sets change, data engineers and data stewards need to analyze the downstream impact to assets connected to tables or schemas they manage. Combining

a data catalog and BI platform helps to streamline all of these tasks, providing usage metrics to quickly identify the most frequently-accessed data sources and dashboards.

As necessary as data catalogs may be, there is arguably greater opportunity beyond metadata governance in the area of semantic governance. Semantics help to connect not just the context of data, but the intent of analytical actions—such as mapping synonyms to connect commands like "order size" with "quantity." This enables new modalities for the full spectrum of data workers to interact with data and quickly arrive at new insights. One way is through natural language interactions, where a BI platform understands layers that involve multiple queries, such as "Highlight the highest, lowest, and average."

As these technologies and processes continue to converge, data curation and semantics will provide a stronger foundation for the rest of the analytical experience. This will unify more disparate components of the data ecosystem—like cleansing and downstream analysis—and feed stronger machine-

generated recommendations for tables, joins, and data models. Ultimately, advancements in data curation will enable the workforce to move beyond just asking questions of their data during analysis, toward asking questions of their business.

Digital data will grow at a compound annual growth rate (CAGR) of
42%
through 2020 (IDG)

07

Data storytelling is the new language of corporations

Finding and communicating data insights is now a team sport.

However much we automate, however big our dataset, however clever our calculations, if you cannot communicate findings to others, you can't make an impact with your analysis. This is the power of data visualization. Data visualization is a language and it's becoming standard for analysts to know how to convey information to decision makers in a way that is actionable and easy to understand. This skill, combined with the ability for analysts to share the steps they took to discover the insights in data, is often defined as "data storytelling."

Data storytelling is a critical element of the analytics process. And a changing workplace culture, where analytics reigns supreme, is refining the definition of data storytelling. As organizations create cultures

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As audience members we need to be willing to be informed, to be able to interpret, we need to have a degree of subject knowledge. If that's not something we hold, then the designer has to take the responsibility to provide us with a sense of what all this means.

Andy Kirk, Founder, VisualisingData.com

According to a Dresner 2018 Market study, **75%** of respondents found data storytelling to be critical or important to their business intelligence initiatives.

of analytics, analysts' data storytelling methods are more about nurturing a conversation around the data and less about arguing for a singular conclusion. These analytical cultures are also fostering data literacy efforts aimed at teaching people to truly understand the data and to be participants in the analytical conversation—from the moment of discovery to the resulting business decision.

Andy Kirk, Data Visualization Specialist and Founder at VisualisingData.com shares the seven hats of data visualization. One of these is the communicator—"a person fundamentally concerned with all the human relationships involved in any project (the commissioners, the stakeholders, and the audience)." Andy explains how "all visualization work, at least in the communication sense, has to be audience centered." Data workers need to understand the audience's process in forming a conclusion from a visualization. And at the same time, the audience has a responsibility to have the subject knowledge necessary to interpret the data and must be "willing to be informed."

This shift in data storytelling also manifests in data visualization trends. Long-form storytelling formats—through scrolling or multi-page dashboards—become more common, allowing the analyst to display their step-by-step approach to a conclusion. These methods allow analysts to show the progression of their analysis, highlighting the insights they encountered in the data and the resulting assumptions. The next step is to create an open conversation around these insights. This leaves room for people from different roles or departments to bring additional business context and invites a diversity of perspectives before making a business decision.

Data storytelling will continue to permeate workplace culture as more organizations create work streams and teams focused on analytical collaboration. This approach is shaping how organizations use data to engage, inform, and test ideas. And as more people understand how to interpret data and explain their analytical process, it amplifies the potential for business impact.

08
Enterprises get smarter about analytics adoption

What happens when leaders focus less on adoption and more on engagement?

Business intelligence initiatives often have a well-defined start and end date and it's not uncommon for them to be considered "complete" after they are rolled out to users. But merely providing access to business intelligence solutions isn't the same as adoption. Chief data officers, primarily, are reevaluating how BI adoption plays a part in a strategic shift towards modernization, because true value isn't measured by the solution you deploy, but how your workforce uses the solution to impact the business.

The assumption that everyone is getting value out of a BI platform just because they have access to it can actually be an inhibitor to real progress with analytics. As Josh Parenteau, Market Intelligence Director at Tableau states, gauging return on investment based on number of licenses "can leave both learnings, growth, and the possibility of more success on the table."[2] Instead of adoption in its simplest terms, leaders are focusing on whether or not data and analytics are changing the way that decisions are made throughout the organization. For example, if you took the BI platform away from employees, would it impact the way they make day to day decisions in their job?

In the same way that downloading an application on your phone doesn't necessarily mean you're using it, opening up a report one time per month doesn't mean that it is driving any action or influence. Leaders are evaluating programs that encourage engagement, like internal communities and user groups. These efforts that were previously considered grassroots programs will be considered

fundamental elements of an organization's BI strategy, helping users ramp up faster, self serve, and get answers to their questions quickly. Adoption follows as a result, driving leaders to increase their investment and help communities to scale.

JPMorgan Chase's (JPMC) center of excellence team, led by IT, used this model to onboard thousands of analysts and grow its user community. They held full-day sessions—what Steven Hittle, Vice President and BI Innovation Leader, refers to as "data therapy sessions"—to share data visualization and governance best practices. These sessions were just one of many activities used to spark the engagement and conversation between roles and departments that helped JPMC scale its modern BI platform to over 30,000 people.

As these internal communities onboard workers onto a BI platform, organizations can start to delegate analytical responsibilities and create new user champions. This will ultimately reduce the heavy lifting for maintenance and reporting, traditionally reserved for IT. More

internal champions will start to emerge, acting as subject matter experts who socialize best practices and align people on data definitions. Inevitably, all of these movements will lead to more people using and getting value out of BI software. And most importantly, your workforce will become more efficient and your organization more competitive.

60%
of CIOs plan to increase spending on analytics in the next 12 months.

(IDG CIO Tech Poll: Tech Priorities 2018)

[2] https://www.tableau.com/about/blog/2017/10/three-reasons-your-business-intelligence-adoption-has-stalled-77448

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We need to rethink how we actually measure the benefit of BI. It's not just about who has access. It should be about how people are actually using analytics to inform their decision-making processes. That's adoption.

Josh Parenteau, Market Intelligence Director, Tableau

09

Data democracy elevates the data scientist

Data scientists develop soft skills to drive organizational change.

Data scientists are in demand. In its 2017 U.S. Emerging Jobs Report, LinkedIn cited that "data scientist roles have grown over 650 percent since 2012" and "hundreds of companies are hiring for these roles" in a variety of industries. The candidate pool is getting deeper as "machine learning engineer, data scientist, and big data engineers rank among the top emerging jobs."

But as more departments and roles are expected to work with data, organizations are seeing an overall increase in data literacy and the emergence of more citizen data scientists. Gartner defines a citizen data scientists as "a person who creates or generates models that use advanced diagnostic analytics or predictive and prescriptive capabilities, but whose primary job function is outside the field of statistics and analytics." These people aren't replacing data scientists, but they are becoming key partners in developing and testing hypotheses.

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Statistical modeling and machine learning are now becoming table stakes in order to become a data scientist. The differentiator is how well those working in the field can communicate their findings in a simple, but actionable way.

Sonic Prabhudesai, Manager of Statistical Analysis, Charles Schwab

Data scientist roles have grown over **650%** since 2012 (LinkedIn)

This is shifting the definition of data science, and blurring the lines between those with traditional data expertise and business domain knowledge. Sonic Prabhudesai, Manager of Statistical Analysis at Charles Schwab shared how "More business workers understand how to work with data, while data scientists are becoming more familiar with the inner workings of the business."

Today, data scientists are expected to have advanced statistical and machine learning knowledge, but they are also expected to have a strategic mind for the business, including a deep knowledge of their industry. "Data science is more than just number crunching: it is the application of various skills to solve particular problems in an industry," explains Dr. N. R. Srinivasa Raghavan, Chief Global Data Scientist at Infosys. "Data Scientists need to have a thorough understanding of the domains in which their insights will be applied."

The outputs of algorithms and models are only effective if they help solve the right problem in the right context. This means working hand in hand with stakeholders to identify and refine the problem statement and hypothesis at the beginning of the process and keeping them involved throughout the workflow. And at the end of the workflow[3], it means knowing how to communicate the results to business partners in a way that is relevant and actionable.

"Statistical modeling and machine learning are now becoming table stakes in order to become a data scientist," shares Sonic. "The differentiator is how well those working in the field can communicate their findings in a simple, but actionable way." Instead of handing over results, data scientists will have a core role in how those results are applied to the business.

With self-service analytics tools, both data scientists and advanced users can explore and get a better understanding of their data. This sparks insights that can direct the rest of the analysis and ultimately, impact the business.

[3] https://medium.com/@sonicmsba/how-to-build-an-effective-business-context-for-data-analytical-problems-cb02906341cd

10
Accelerated cloud data migration fuels modern BI adoption

Data is moving to the cloud faster than ever, driving organizations to rethink their data strategy.

Modernizing your data strategy often means rethinking where your data is stored. More companies are seeing the benefits of moving their data to the cloud, including added flexibility and scalability at a lower total cost of ownership. In fact, Gartner research indicates that the "public cloud services market is projected to grow 21.4% in 2018 to total $186.4 billion."[4] The cloud makes it easier for companies to capture and integrate different types of data. This means moving away from an environment where all data resides in a highly-structured, on-premises warehouse and into a more scalable, flexible infrastructure—either a full-cloud or hybrid solution.

This brings us to data gravity, a concept

suggesting services and applications are pulled in the direction of where the data resides[5]. As more organizations move workloads to the cloud at an accelerated rate, this data gravity is pulling analytics processes to the cloud as well. "As companies move to Google Cloud, we're seeing leaders rethink their entire data analytics strategy and how the cloud can impact their business and bottom line," explains Sudhir Hasbe, Director, Product Management at Google Cloud.

The driving factors behind this gravitational shift are latency—the amount of time required to perform an action—and throughput—the number of times an action can be performed or result achieved per given unit of time. When data, applications, and services are closely aligned, there is a decrease in latency and throughput, resulting in increased efficiency. Naturally, when data resides in the cloud, these applications and services will start to follow.

As organizations asses their broader data strategy, they are also rethinking their analytics

model, moving from traditional to modern BI. McKinsey notes that the value of the cloud comes when companies approach cloud infrastructure and systems "not as one-off tactical decisions but as part of a holistic strategy to pursue digital transformation."[6]

Traditional business intelligence relies on IT departments to provide answers to questions, creating bottlenecks and keeping analytics separate from the business context. In the same way, traditional BI deployments are often built on a rigid on-premises model meant to support this mode of enterprise reporting.

In contrast, cloud analytics offers a variety of benefits, including the opportunity to think about new deployment models—and leaders are eager to leverage these opportunities.

This includes pushing out mobile dashboards to employees in the field so they can access data without first having to clear a firewall. The cloud also enables secure dashboard sharing with partners or customers, creating one source of

truth that goes beyond internal processes.

Although not all companies are prepared to move all of their data to the cloud, many are experimenting with hybrid solutions to take advantage of diverse data sources. As a result, companies are assessing modern BI platforms on the premise of whether or not they can support a future transition to full-cloud analytics.

The public cloud services market is projected to grow 21.4% in 2018 to total **$186.4 billion**

(Gartner)

[4] https://www.gartner.com/newsroom/id/3871416

[5] https://www.techrepublic.com/article/how-data-gravity-both-hurts-and-helps-cloud-adoption/

[6] https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/cloud-adoption-to-accelerate-it-modernization

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We're seeing leaders rethink their entire data analytics strategy and how the cloud can impact their business and bottom line.

Sudhir Hasbe, Director, Product Management at Google Cloud