Beyond the Hype:

How to Get Real Value from AI in Data Analytics

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HOW WE GOT HERE

The evolution of BI.

Since its inception in the 1990's, business intelligence has evolved – significantly. What began as a highly technical process restricted to a few specialists in IT has become a much more accessible and intuitive endeavor, extending the power of discovery to users in every area of the business. But the promise of fully democratized data analytics remains to be fulfilled.

1ST-GENERATION ANALYTICS: **CENTRALIZED**

In the early days, a skilled team within IT managed a complex set of technologies that delivered predefined reports and ad hoc responses to business requests for data. A user would formulate a question, submit it to a data analyst, and wait (sometimes for weeks) for a response, usually in the form of a new report.

2ND-GENERATION ANALYTICS: **DECENTRALIZED**

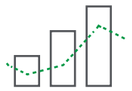
With the advent of user-driven analytics, business users were given the power to prepare data, load it, and interact with it in intuitive, visual ways. Quite a few organizations are still living in this era. And while the benefits are clear, many lightweight visualization tools present challenges around governance and scalability, and their complexity limits adoption to power users.

3RD-GENERATION ANALYTICS: **DEMOCRATIZED**

Now we're experiencing the third-generation of analytics, where AI is augmenting and enhancing human intuition. This represents a shift toward a fully democratized framework in which users of all skill levels have the right tools to work with data, generate insights, and take action immediately.

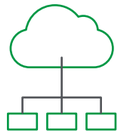
What's driving the new generation?

The emergence of third-generation business intelligence would not be possible without a series of technical developments that have changed the data and analytics landscape:



DATA

In recent years, we've seen a massive transformation in the volume, variety, and velocity of data available, both on-premises and in cloud environments. This requires organizations to have a comprehensive data integration and management strategy.



INFRASTRUCTURE + CLOUD

Data is now spread across on-premises and multiple cloud sites, where organizations need to access it, manage it, and analyze it. At the same time, cloud infrastructure has greatly accelerated our ability to scale and is providing the compute power needed to manage and analyze vast quantities of data.

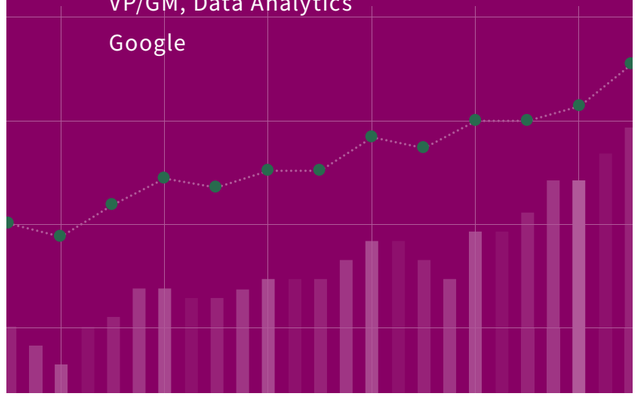
ARTIFICIAL INTELLIGENCE

One of the most important capabilities unlocking the third-generation of BI is artificial intelligence. In the context of analytics, AI leverages machine intelligence to provide insights, automation, and new ways to interact with data, helping drive data literacy across the organization.

ACTIVE INTELLIGENCE

And finally, the arrival of more active forms of BI is enabling organizations to take real-time action based on changing data. Capabilities like alerting, automation, mobility, and embedded analytics – all supported by real-real time data pipelines – are delivering the power of analytics where and when action is needed.

> **"There has never in human history been such an information explosion. You could attribute this to the rise of smartphones, sensors, and connected vehicles and appliances … But the real reason is the growing utility of data analytics and automated responses to analytic decisions."**
>
> **DEBANJAN SAHA**
> VP/GM, Data Analytics
> Google

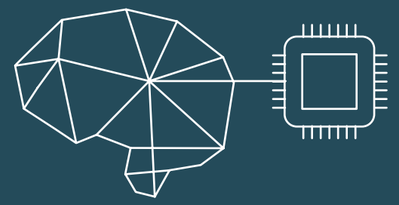


The beauty of Augmented Analytics.

What's the key to successful AI in analytics – today? Augmented Analytics – an approach that brings together the best of machine intelligence and human intuition to speed time-to-insight, surface new and unexpected discoveries, and drive data literacy for users in any role and at any skill level.

While there are niche applications for artificial intelligence that completely rely on machine algorithms, most complex business problems require human interaction and perspective. Augmented Analytics create a multiplier effect, where the human-machine collaboration outpaces anything either the human or the machine could do on their own.

And that's not the only benefit. When people are involved in the analytical process, they tend to have confidence in the results – whereas any conclusion that comes fully formed from a black box will naturally raise doubts. Augmented Analytics breed trust, resulting in more buy-in and ultimately more adoption of analytics and the insights they provide.



"When it comes to BI, you need both man and machine. That's where you get the best decisions. Machines, especially when AI is injected into BI products, can help people generate the initial insights. But then humans, using their experience and intuition, can validate those insights and interrogate them."

WAYNE ECKERSON
Founder and Principal Consultant
Eckerson Group

What do Augmented Analytics look like? Existing capabilities include:

INSIGHT GENERATION

Today's machine intelligence can use a variety of techniques to auto-generate analyses and insights in visual and narrative form, based on input from the user and the nature of the data. Examples include charts and visualizations, narratives explaining key findings, insights into data relationships, and the generation of entire dashboards for further investigation.

AUTOMATION

AI can speed time-to-insight by automating a wide variety of tasks for the user, including combining data sets, preparing and transforming data, and creating visualizations. For example, when a user wants to analyze data from multiple sources, algorithms can determine the best ways to bring it together, profile the possible dimensions and measures, and suggest the right forms of visual representation and analysis.

NATURAL LANGUAGE INTERACTION

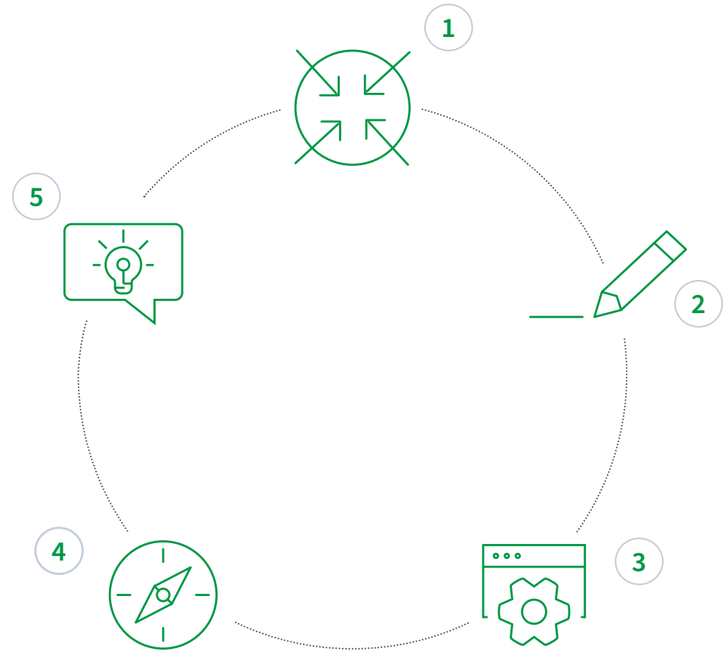
AI supports powerful new ways to interact with data. Users can ask questions in natural language, and the system understands the intent and context, analyzing the data to generate the right responses. Whether this is done through search-based discovery or conversational interaction, the AI delivers narrative answers and visual insights, boosting the innate human ability to question in different ways.

ADVANCED ANALYTICS

As more organizations adopt advanced analytics – including advanced clustering, forecasting, prediction, and modeling – it's often a challenge to put this power into the hands of business decision-makers. Whether calculations are performed by the analytics platform or in third-party engines, users need a way to interact with advanced analytics to ask questions and factor the powerful insights into decisions.

Augmenting the user across the analytics lifecycle.

You don't have to wait any longer to reap the benefits of AI-enabled analytics. Existing analytics platforms can enhance human intuition across the entire analytics lifecycle:



1. ACQUIRE

When acquiring data for analysis, powerful data integration and connectivity create a real-time data pipeline – and data cataloging makes sources available to users across the enterprise.

- Smart connectivity
- Real-time data replication
- Enterprise data catalogs

2. PREPARE

Assisted by smart data profiling and automation, business users can combine, transform, and load data from multiple sources – enabling them to bring raw data to an analytics-ready state without relying on IT.

- Assistance combining data sources
- Smart data profiling
- Automated data transformation

3. VISUALIZE

AI assists users in creating visualizations by suggesting the best chart types and auto-generating analyses and insights – so users don't have to be data experts.

- Chart-type suggestions and automations
- Auto-generation of analyses driven by search
- Custom extensions and integrations

4. EXPLORE

As consumers explore data and analytics, whether through interactive selections or conversation, the machine responds with updated calculations and new insights – at the speed of thought.

- Nonlinear exploration and search
- Fully conversational analytics
- On-board and third-party advanced calculations

5. SHARE

At this final stage of the workflow, users move beyond the dashboard, gaining assistance in sharing their findings, working with others, and taking action where and when it's needed.

- Collaboration and sharing
- Mobile and embedded analytics
- Alerting and application automation

Key considerations for AI in analytics.

How can you select an analytics platform built to maximize the value of AI? When you're evaluating solutions, consider the following:

1 Does the solution have a purpose-built calculation engine?

If the platform simply layers AI capabilities on top of a relational database, you'll run into limitations. Instead, look for a solution that gives users the power to easily combine data, search and explore in any direction, and move at the speed of thought – with no pre-aggregated data or pre-defined queries.

2 Is the solution built on an open, extensible platform?

It's not enough to tack on a few AI capabilities. You'll want the freedom to build and integrate with anything you need as your business, industry, and marketplace evolve. Choose a platform that can be extended to handle new use cases, integrated with third-party tools, and embedded within operational apps and business workflows.

3 Is the solution context-aware?

The system should be able to understand user context and/or intent when accessing data and surfacing insights. If not, so-called "natural-language" interactions won't be natural – or relevant – at all.

4 Can the system analyze both historical and changing data?

In addition to evaluating historical data to provide a picture of what's already happened, the system should enable the analysis of real-time data to trigger action as business events evolve. To do that, it will have to capture changes in data as they occur and deliver them to the analytics platform in real time – and AI will monitor data and evaluate as it changes.

5 Does the system take a "one-size-fits-all" approach?

If your only option for AI is search, you'll quickly have users who need more in-depth visual analysis. Look for a system that supports a full range of augmented capabilities, so you can offer the right experiences to the right people. And make sure that insights are open and transparent. Otherwise, users will become distrustful, compromising adoption and collaboration.

Caution: Relational databases are limited.

As you've seen, AI is delivering real value in today's analytics platforms. But there's an important caveat: If your solution is based on relational database and query-based technologies, any assistance from AI will be throttled. That's because this architecture is fundamentally limited.

What's a relational database?

Relational databases were designed in the 1980's, originally to drive transactional systems. And they still do that job well. But they were never intended to support the free-form, exploratory nature of modern analytics. With relational databases, developers have to make assumptions about which questions users will ask and "hardwire" them into the system. When users are "inside" their data, they can navigate only within the slice of data preselected by the developer.

When these solutions try to leverage AI to generate insights, they hit limits – because they don't have a complete picture of the data or the context required to properly assess it.

LIMITED DATA? LIMITED LEARNING.

Without **access to the complete enterprise data schema, starting with all known associations across the data values, and associative indexing**, machine learning capabilities are hobbled. It's like giving someone just a few chapters of a novel and asking them to determine the underlying themes.

Where relational models throttle AI.

The limitations of relational databases become amplified when analytics technologies start to leverage AI, particularly in these areas:

- **Getting a complete picture of the data**. Any successful AI system needs to see all the data. It needs to be able to analyze any data point in relation to any other data point in the entire schema. But analytics solutions built on relational databases struggle to bring together data sources and limit the AI to accessing narrow slices of data – query result sets only. And a machine can't evaluate what it can't see.

- **"Thinking" like a human.** In a relational database-based system, interactions with analytics will be limited to simple filtering or hierarchical drill-downs. But that's not how the human brain works. The human mind creates associations, and – based on what it sees in relation to those associations – formulates the next questions to ask. AI-powered analytics should align with this model of thinking, supporting free-form exploration with additional context and insight.

- **Neutralizing bias.** Humans frequently make mistakes in reasoning because we're holding onto existing preferences and beliefs, even in the face of contrary information. We look to AI-powered analytics to counter this weakness. But analytics solutions based on relational databases hinge on predefined questions that human developers have selected before analysis begins. These systems tend to reinforce – not counter – cognitive bias.

QLIK'S UNIQUE APPROACH

Augmented Analytics in Qlik Sense®

Our goal at Qlik® is to make people smarter using AI – without restricting them to predefined questions selected by developers or analytical frameworks dictated by machines.

To that end, we've taken Qlik Sense to the next level with the introduction of Insight Advisor, our intelligent AI assistant. Insight Advisor delivers a full range of augmented analytics capabilities, driven by a powerful cognitive framework built into our platform at a foundational level. It works in combination with our Associative Engine to offer context-aware insight suggestions, automation, and natural language interaction that's aligned with user behavior and intuition.

Because our Associative Engine is aware of the selection state at each step in a user's exploratory process, and because it knows all the data that's both related to and unrelated to that context, our machine-driven analysis and insight suggestions are powerfully context-aware – and, accordingly, powerfully relevant.

THE ASSOCIATIVE DIFFERENCE®

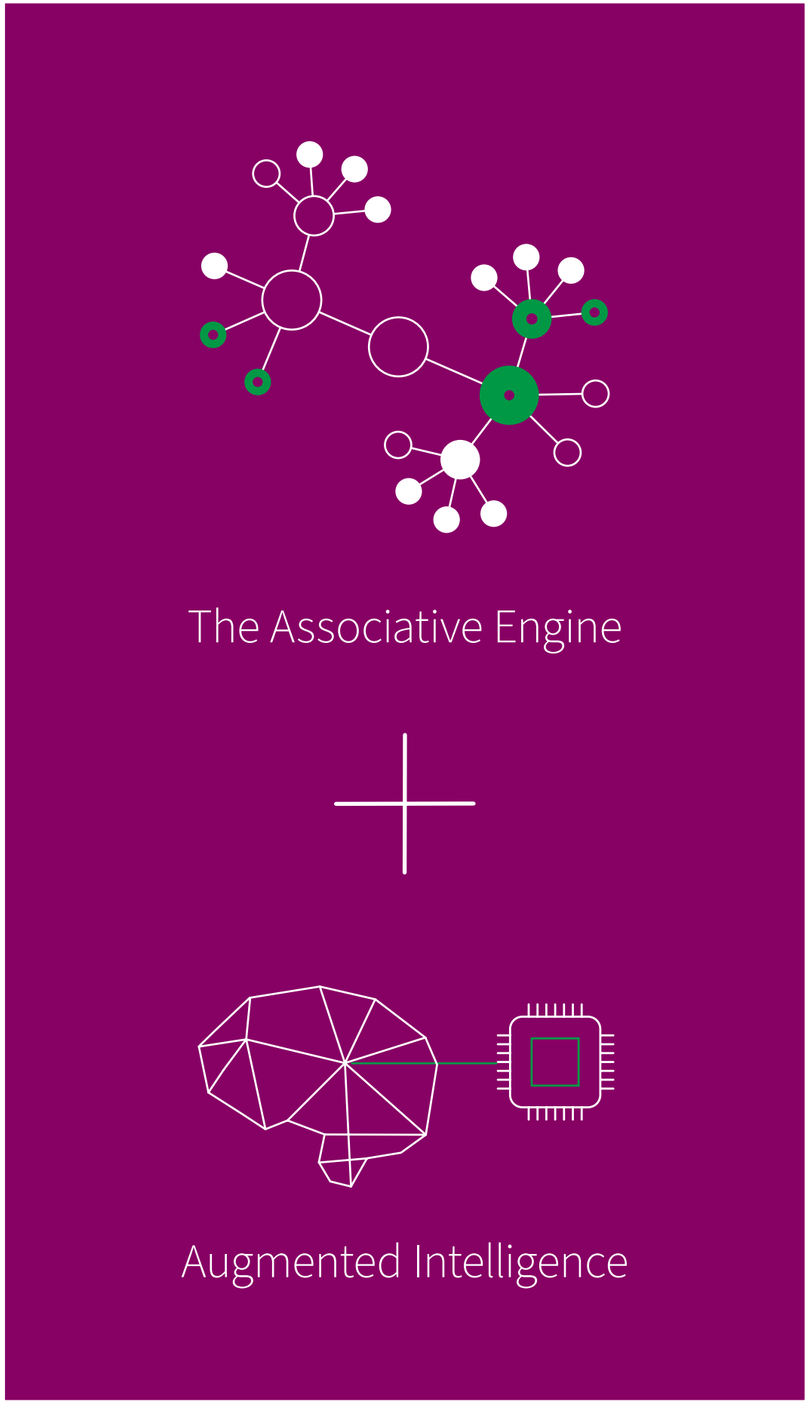
Our unique Associative Engine brings together unlimited combinations of data – both big and small – without leaving any data behind. It offers users unprecedented freedom of exploration through interactive selection and search, instantly recalculating all analytics and revealing relationships in the data. And it does this as fast as the user can think, even when scaled to high numbers of users and large data volumes. By keeping all visualizations in context and retaining both associated and unrelated values in the analysis, the engine helps users discover hidden insights that query-based tools miss.

The Associative Engine and AI, hand in hand.

By suggesting new ways to look at data based on user behavior, algorithmic techniques, and relationships in the data, Qlik Sense gives users “peripheral vision” that guides them to hidden insights and helps them see the previously unseen.

This would not be possible without access to the complete set of enterprise data, the ability to index and understand all the relationships within it, and a vehicle for users to explore and interact through both visual and conversational interfaces.

Insight Advisor is your intelligent assistant in Qlik Sense. It delivers a range of AI-powered capabilities – including generation of analyses and insights, search and conversational interaction, acceleration of data preparation and visualization, and advanced analytics calculation and integration.



Where to go next with Augmented Analytics.

Instead of waiting until your organization reaches “analytics maturity” to take advantage of AI, you can leverage machine intelligence capabilities today. Help users discover hidden insights faster, automate analytics creation, and offer conversational interactions – all of which will greatly boost adoption and data literacy throughout your organization.

Qlik offers a full range of Augmented Analytics capabilities in Qlik Sense, all driven by Insight Advisor. And our open APIs enable developers to build their own smart capabilities and embed analytics in operational applications. With the Qlik Associative Engine on an open, SaaS, and multi-cloud platform, Qlik Sense is positioned to deliver the best of AI and third-generation analytics, now and into the future.

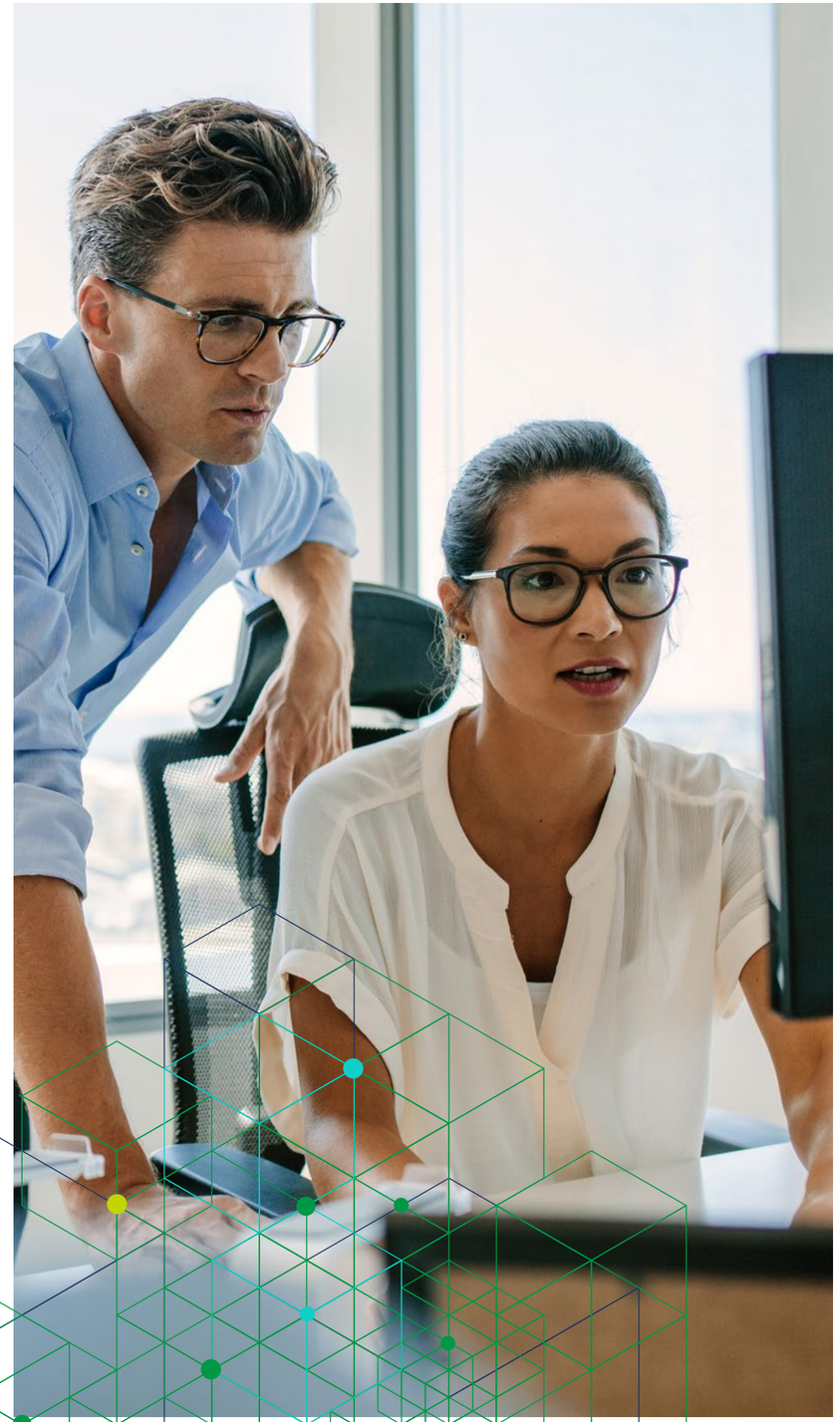
Interested in a complete checklist of considerations for AI?
You'll find one on the following pages.

What to consider when you're evaluating AI in analytics.

Use this checklist to make sure you get the most possible value from AI:

1 Does the solution have a purpose-built calculation engine?

- Do analysts have to create all calculations ahead of time – or can the solution break out data and perform calculations on the fly, as users explore their data?
- Can users define two subsets of data and compare them against each other?
- Can users posit what-if scenarios and evaluate results?
- Can users quickly assemble unique combinations of data from a wide variety of sources, both big and small, while remaining within a governed framework?
- Does the solution respond at the speed of thought, even when challenged by a large number of users and massive volumes of data?

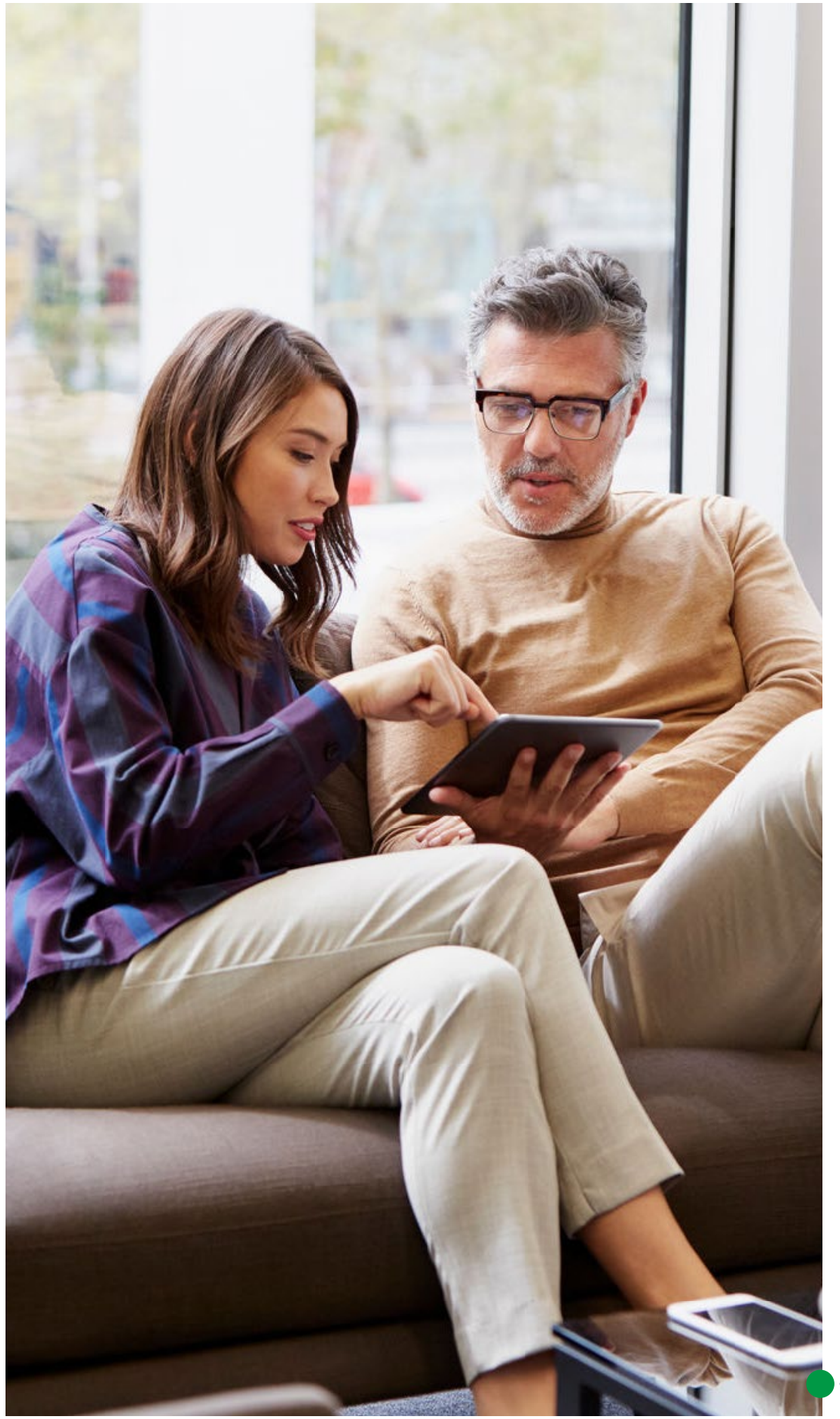


2 Is the solution built on an open, extensible platform?

- Does the solution offer a full set of open APIs and platform capabilities, allowing developers to build new capabilities and extensions?
- Does the solution give you the ability to embed analytics in your applications, allowing users to immediately take action based on insight?
- Does the solution have an active partner ecosystem with extensions for AI-powered capabilities?
- Can you easily integrate – and maximize the value of – specialized data science tools to build models?
- Does the solution enable your developers to build new types of analysis for new use cases, such as augmented reality, voice integration, or computer vision?

“The AI conversation has quickly broadened from technology innovation to business transformation, with powerful success stories abounding in the market.”

JENNIFER HAMEL
Analytics and Intelligent Automation Services
IDC



3 **Is the solution context-aware?**

- Does the system have the capacity to understand the user context and/or intent when accessing and associating data?
- Can the system maintain a global context across all analytics and interaction paradigms?

4 **Can the system look at both historical and changing data?**

- Can the system capture changes to data as they occur?
- Is the system able to transform the changed data to an analytics-ready state and deliver it to the analytics platform in real time?
- Can the system analyze combinations of data coming from both historical and real-time sources?

THE POWER OF COMBINING ALGORITHMS.

Today's AI isn't really about inventing new algorithms; nearly all of them are openly known. Instead, the convergence of several new technologies (cloud-computing power chief among them) has made something else possible: the combination of algorithms in ways that much more closely approximate what the human brain can do. For example, in the past, trend analysis alone was a big lift, whereas today, computers can run a trend analysis and a correlation analysis at the same time.

5 **Does the solution provide visibility into how calculations are made?**

- Does the solution offer only black-box AI – or can users see how calculations are made?
- Does the solution engage the user in the exploration, discovery, and analysis process?
- Does the solution build – or reduce – trust in users?

6 **Does the solution offer the right experience for each user?**

- Does the solution provide simple interactions for beginners and casual users?
- Does the solution offer augmented exploration and data science capabilities for analysts?

Ready to learn more about Qlik's approach? Check out our website to see demos, read analyst reports, and watch on-demand webinars.

Start Exploring

Why choose Qlik?

Qlik is the only complete analytics solution on the market that helps you free, find, understand, and trust your data so you can act on it in real time. With our AI-powered, self-service, data analytics platform, you can:

- ☑ **Bring actionable data into every business decision**
- ☑ **Give everyone – at any skill level – the power to explore data with our unique Associative Engine**
- ☑ **Take action on your data with an agility that balances risk and reward**

With Qlik, you can empower your data users to follow their curiosity, explore their data freely, and make transformative discoveries.

To start your free trial of Qlik Sense, or to learn more, click below.

Start Free Trial | Learn More

ABOUT QLIK

Qlik's vision is a data-literate world, where everyone can use data and analytics to improve decision-making and solve their most challenging problems. Our cloud-based Qlik Active Intelligence Platform delivers end-to-end, real-time data integration and analytics cloud solutions to close the gaps between data, insights and action. By transforming data into Active Intelligence, businesses can drive better decisions, improve revenue and profitability, and optimize customer relationships. Qlik does business in more than 100 countries and serves over 38,000 active customers around the world.

Qlik

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