

REPORT: PRODUCT OVERVIEW

Inside Salesforce Einstein Artificial Intelligence

**A Look at Salesforce Einstein Capabilities, Use Cases
and Challenges**



Doug Henschen
Vice President and Principal Analyst

Content Editor: R "Ray" Wang & Courtney Sato

Copy Editor: Maria Shao

Layout Editor: Aubrey Coggins

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EXECUTIVE SUMMARY

This report provides a product overview of Salesforce Einstein, which was introduced with much fanfare at the company’s October 2016 Dreamforce event. The introduction marked the company’s official entry into the world of artificial intelligence (AI), but this “beginning” was the result of more than two years of behind-the-scenes data science work and at least nine AI-related acquisitions. With a solid data-management backbone in place and a rich trove of acquired AI assets to draw on, Salesforce brought 11 Einstein features to general availability within three months of the introduction in October. Ten more Einstein features are due in February 2017 and more than 20 additional features are expected to be available before the end of the year.

Salesforce Einstein is not a “general AI” offering that attempts human-like perception, thinking and action. Rather, Einstein is an intelligence capability built into the Salesforce platform and focused on delivering smarter customer relationship management (CRM). The features are designed to discover insights, predict outcomes, recommend actions and automate tasks.

This report explains the data-management underpinnings of the Einstein platform, details the list of available and soon-to-be-released features, explores Einstein strengths and weaknesses, and analyzes planned developments on Salesforce’s roadmap. Readers should use this report to better understand Salesforce Einstein and determine whether it’s a good fit for their organization.

Business Themes			
 Consumerization of IT	 Digital Marketing & Sales Effectiveness	 Matrix Commerce	 Technology Optimization
 Data to Decisions	 Future of Work	 Next Gen Customer	

SALESFORCE EINSTEIN ASSISTS HUMANS RATHER THAN REPLACES THEM

Salesforce stresses that its goal with Einstein is to help people focus on what matters, not to replace them. This is a concept that Constellation refers to as Augmented Humanity. The idea is to uncover insights, predict outcomes, recommend next-best actions and automate routine, manual tasks that keep people from being more productive. The Predictive Lead Scoring Einstein feature, for example, helps salespeople focus on the most promising leads. Automated Activity Capture, a Sales Cloud Einstein feature due in February, will automatically log sales calls, email exchanges and chat interactions so salespeople won't face the drudgery of keeping customer interaction records up to date.

The emphasis on assisting, rather than displacing, humans is, in part, reassurance that Einstein is nothing like the dark, science-fiction depictions of AI seen in movies ranging from "2001: A Space Odyssey" (1968) to "The Terminator" (1984) to "Ex Machina" (2015). The focus on practical, CRM-focused applications contrasts with the overly ambitious false starts experienced in the general AI experiments of decades past.

REQUIREMENTS FOR AI SUCCESS

Constellation views four core capabilities and assets as being essential to developing powerful AI skills (see Figure 1):

- **A large corpus of data** is the first requirement. It's not the case that he who

Figure 1. Four Requirements for Developing Artificial Intelligence Capabilities



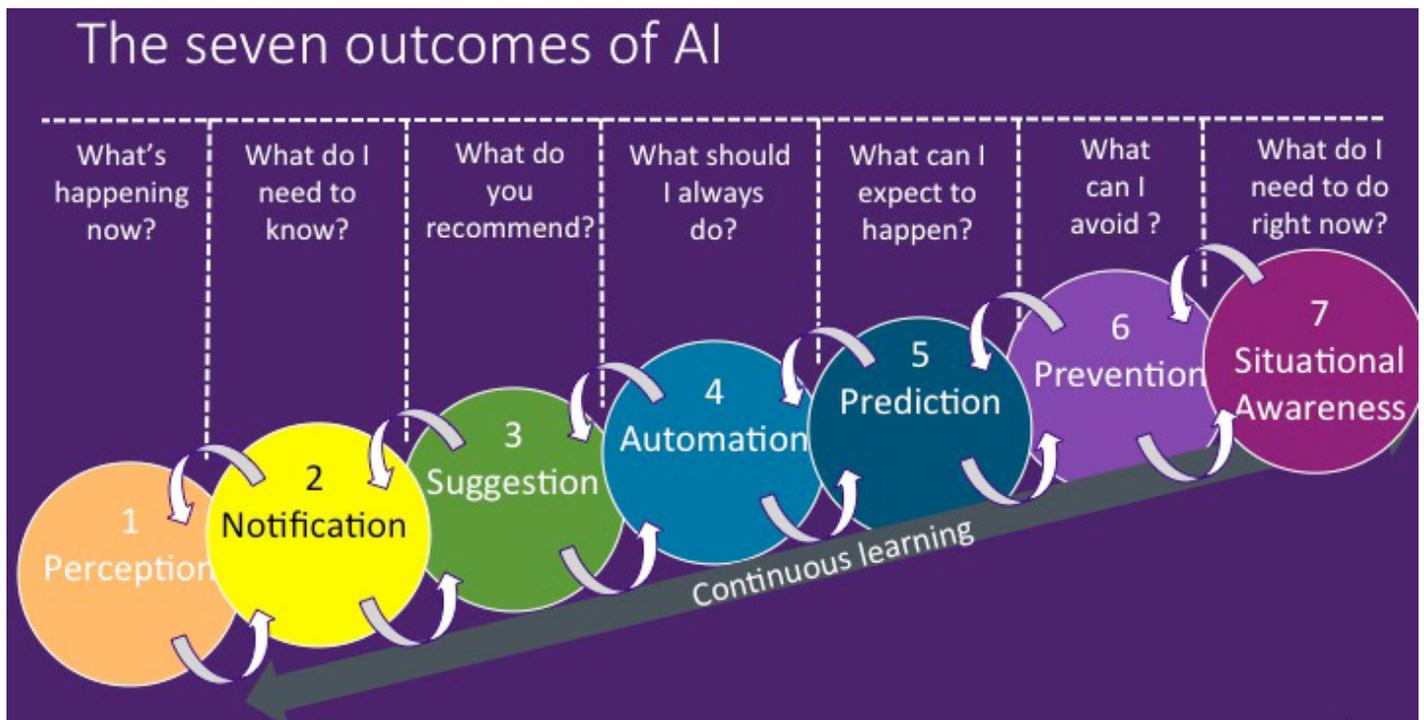
Source: Constellation Research

has the most data wins; the goal is to build the largest graph that maps the connections to data. More data should improve the precision of insights and allow for more patterns to emerge. Data is used to test and train algorithms and models, but the data has to be connected in some way to detect patterns and behaviors and then provide accurate recommendations and suggested or automated actions. The data exhaust of these systems is also brought back into

the data store to support self-learning and continuous learning (see Figure 2).

- **Massive computing capacity** is the second requirement, and it's closely tied to the ability to ingest, store and quickly analyze data at scale. Public clouds have changed the scale and economics of computing, making it possible to tap vast computing capacity on demand. Winners will have access to or own vast computing power.

Figure 2. Continuous Learning Unlocks a Spectrum of Seven Outcomes for AI



Source: Constellation Research

- **Data science** refers to intellectual property (IP), skill and experience. The discovery of patterns, creation of new algorithms and the ability to apply human intuition to computing requires great math talent. The skills range from the basics of data management, data cleansing, integration and transformation to the ability to mine data and apply advanced statistical methods as well as machine and deep learning to any amount of data. IP includes algorithms, models and related proprietary capabilities.

- **Time** is the fourth requirement, and it boils down to the people-years that can be poured into research and development. There is no substitute for time. Early adopters gain an advantage of time. Algorithms need time to improve. Companies can try to buy time by hiring more people or acquiring firms that have already sunk years into research and development. But successful delivery of capabilities depends on time spent generating and learning from data, understanding computing requirements, and iteratively advancing the math and data

science behind AI-based systems and applications.

Other emerging and differentiating requirements of AI include:

- Industry-specific expertise to improve the relevance of specialized AI systems
- Natural user interfaces to take advantage of human voice, visual and gestural interaction
- Robust recommendation engines that take the output of AI and present choices that accelerate decision making

INSIDE SALESFORCE EINSTEIN

There aren't enough data scientists in the world to go around, so Salesforce is counting on automation to develop customized models for each Einstein customer. Salesforce spent more than two years building an automated, machine-learning-based data-analysis pipeline to deliver predictions and recommendations at scale. The work started after the acquisition of Exact Target, part of efforts to develop predictive customer journeys. The system can scale up, Salesforce says, because all

data collection, data preparation, feature engineering and feature selection, model building, hyper-parameter tuning and scoring steps are handled automatically.

This internally developed data-management and predictive engine is powering Community, IoT, Marketing, Sales and Service Cloud Einstein features that are either already available or due out this year (see Figure 3). It's already delivering as many as 300 million predictions, recommendations and lead scores per day, says Salesforce. Most of Salesforce's AI acquisitions (though not all, as yet) will be plugged into this same automated, data-management and prediction backbone.

The Roadmap

Einstein capabilities are designed to complement and enhance existing Salesforce SaaS applications in that they are or will be built into the Analytics, App, Commerce, Community, IoT, Marketing, Sales and Service clouds. Some capabilities will be no-cost enhancements, but the majority of Einstein features will be extra-cost options.

Subscription pricing will vary between per-user/per-month and volume-based (leads, emails, etc.) models. The initial portfolio and applications expected through 2017 are detailed in Figure 3.

A few of Einstein's features to be released were derived in whole or in part from acquired companies. For example, Commerce Cloud Einstein features were derived largely from Demandware, which had developed its own machine-learning-based modeling and data-analysis capabilities. Similarly, BeyondCore is the engine behind the Analytics Cloud Einstein features available at this writing. Salesforce is in the process of integrating internally developed and acquired machine-learning and automated modeling capabilities. The company says it will consolidate best-of-breed assets from across its technology portfolio.

For now, Salesforce is focusing on delivering straightforward Einstein features that will work "out of the box," according to company executives. Salesforce also plans to bring Einstein services and APIs to its App Cloud development platform so customers can build

Figure 3. Salesforce Einstein Features Available or Planned for Release in 2017

Cloud	Einstein Feature	Origin	Availability
Analytics Cloud	Automated Analytics & Storytelling	BeyondCore	GA
	Continuous User Feedback	BeyondCore	February 2017
	Personalized Story Sharing	BeyondCore	2017
	Predictive Wave Apps	Internal development	2017
	Smart Data Discovery	BeyondCore	GA
	Smart Data Prep	BeyondCore	February 2017
	Smart Newsfeed For CRM	BeyondCore	2017
App Cloud	Heroku + Prediction IO	PredictionIO	2017
	Predictive Sentiment Service	MetaMind	2017
	Predictive Vision Service	MetaMind	February 2017
Commerce Cloud	Commerce Insights	Demandware	February 2017
	Predictive Email	Demandware	GA
	Predictive Sort	Demandware	2017
	Product Recommendations	Demandware	GA
	Product Recommendations (Store)	Demandware	GA
Community Cloud	Article Insights	Internal development	GA
	Automatic Topic Creation	Internal development	GA
	Community Sentiment	Internal development	GA
	Company Highlights	Internal development	2017
	Einstein Answers	Internal development	February 2017
	Questions and Article Answers	Internal development	2017
	Recommended Experts, Files & Groups	Internal development	2017
	Recommended Group Members	Internal development	GA
	Session Tracking for Answers	Internal development	2017

Figure 3 Continued. Salesforce Einstein Features Available or Planned for Release in 2017

Cloud	Einstein Feature	Origin	Availability
Community Cloud Continued	Topic Insights	Internal development	GA
	Trending User and Group Scores	Internal development	2017
	Unanswered Questions	Internal development	February 2017
IoT Cloud	Automated IoT Rules Optimization	Internal development	2017
	Predictive Device Scoring	Internal development	2017
	Recommended Best Next Action	Internal development	2017
Marketing Cloud	Predictive Content & Product Recommend	Internal development	GA
	Predictive Scoring & Audiences	Internal development	2017
	Automated Send-Time Optimization	Internal development	2017
	Image Insights in Social Studio	MetaMind	2017
Sales Cloud	Account Health	Internal development	2017
	Account Insights	Internal development	February 2017
	Automated Activity Capture	Internal/RelateIQ	February 2017
	Opportunity Insights	Internal/Implicit	February 2017
	Predictive Forecasting	Internal development	2017
	Predictive Lead Scoring	Internal development	February 2017
	Recommended Connections	Internal development	2017
Service Cloud	Automated Case Classification	Internal development	2017
	Chatbots	Internal development	2017
	Recommended Macros	Internal development	2017
	Trending Issues	Internal development	2017

Source: Constellation Research, based on Salesforce data

custom smart applications. Salesforce says this capability will be a point-and-click affair aimed at developers, with no requirement for deep data science talent.

The first App Cloud Einstein service available will be the Einstein Predictive Vision Service, due in February and based on technology from the MetaMind acquisition. Demonstrated at Dreamforce, the vision engine was shown to be easily trainable by business users by dragging and dropping collections of images. One MetaMind (and now Salesforce) customer, a company focused on providing virtualized radiologist services, is using vision services to save lives by reviewing thousands of brain scans within seconds to spot and help doctors prioritize cases of life-threatening inter-cranial bleeding.

Constellation's Analysis: Einstein features won't be a fit for every company. For starters, it takes lots of data to drive automated, machine-learning-based predictions. If you are dealing with fewer than 100 leads per month, Einstein Predictive Lead Scoring would be overkill, as humans can handle the load and they

probably have a good sense of which leads to prioritize. Salesforce says its machine-learning-based lead-scoring engine needs at least 150 converted leads per month for accurate, automated scoring. Similarly, the BeyondCore engine can spot complex correlations and patterns across as many as 100 columns of data, but it requires at least 10,000 rows of data to deliver statistically reliable results.

It's when data volumes are overwhelming that Einstein features will make the most sense. But that's not to say that Einstein is geared only to big companies. Data volumes depend on the application. Many small marketing teams, for example, send out millions of emails per month. Predictive Scoring & Audiences and Automated Send-Time Optimization, two features coming to the Marketing Cloud this year, might make sense even for small companies, so long as they are marketing at high scale.

Strengths and Challenges

It's the end of the beginning for Salesforce Einstein, but long-term success will depend on the performance and ease of use of the

applications, packaging and pricing, and competitive alternatives. All of the above will hinge in large part on the four underlying requirements for AI success discussed earlier: data, computing capacity, data science and time. Data science talent and time spent in development are strengths for Salesforce, whereas data and computing capacity may be challenges. Constellation's analysis is below.

Data

With its multiple application clouds, 100,000-plus customers and millions of users, Salesforce sits atop a massive trove of application data. As explained earlier in this report, data is used to test and train algorithms and models, so the more data available, the better. The question is to what degree Salesforce can tap into customer data in an abstracted way without crossing data-ownership or privacy boundaries. Abstracted benchmarks will be important in understanding behaviors and developing other insights. Einstein customers will undoubtedly grant access for privacy- and security-protected analysis of their own data, but to what degree will Salesforce face

chicken-and-egg situations in which accuracy might suffer until a sufficient number of customers are using particular Einstein capabilities?

Another question is the scale at which Salesforce will be able to tap into contextually relevant enrichment data. Salesforce owns Data.com, the business-to-business-centric data source developed out of the 2010 acquisition of Jigsaw. But Data.com is not a consumer-centric data source and it can't match the scale of data sources owned by rivals, such as IBM's WeatherChannel, Microsoft's internet search, gaming assets, LinkedIn assets or Oracle's Data Cloud (ODC). Salesforce says it plans to tap into its Pardot consumer engagement data in a future release. Enrichment data contributes to contextual understanding of customers and builds the network graph so that data science can spot correlations and patterns.

Constellation's Analysis: Data scale and access are likely to be challenges for Salesforce if and when competitors present real competition to Einstein. Constellation suspects this was one

motivation behind the company's abandoned attempt to acquire Twitter in 2016. It should be noted that rivals may also face data-ownership and privacy boundaries when attempting to use data in new ways tied to AI applications.

Computing Capacity

With its comparatively small cloud computing capacity, Salesforce (with fewer than 10 data centers globally) on its own would face a competitive disadvantage compared to a cloud giant like Amazon Web Services (with more than 50 data centers) or Microsoft (with more than 30). This is likely why Salesforce selected Amazon Web Services (AWS) as its strategic, long-term cloud computing provider in 2016. AWS computing capacity is many times larger than that of all its largest competitors combined. Thus, Salesforce may have laid this concern to rest with its AWS partnership, although it all depends on the terms it struck with AWS.

Constellation's Analysis: At the industrial scale of the largest public clouds, the competition comes down to the cost of computing capacity

per kilowatt hour. There's no doubt that AWS can beat any one of its competitors by this measure with its economies of scale, but to what degree will it cut Salesforce in on these cost advantages? Will AWS wholesale rates enable Salesforce to undercut its competitors? The cost of computing capacity will obviously have a huge impact on Salesforce Einstein pricing and competitiveness.

Data Science

This is a strength for Salesforce as it has been able to attract top data science and AI talent. More than two years ago, for example, Salesforce lured away Vitaly Gordon from LinkedIn to serve as its Vice President of Data Science. Together with former KXEN veteran John Ball, Senior Vice President and General Manager of Einstein, Gordon helped develop the data-management and machine-learning backbone that now powers Einstein. Salesforce has picked up yet more talent through acquisitions, including deep learning expert Richard Socher, Ph.D, formerly MetaMind's CEO and now Salesforce Chief Scientist.

Constellation's Analysis: The list of names above just scratches the surface of Salesforce data science expertise and assets. Add to the list the personnel and acquired intellectual property of BeyondCore, Demandware and its CQuotient acquisition, PredictionIO, and RelateIQ to cite a few more examples. Salesforce fares better than most enterprise software companies at retaining talent, so the key challenge will be pulling together and consolidating the best-of-breed technologies and best practices from various acquisitions.

Time

Salesforce began work on building an automated data-management and prediction platform more than two years ago. Salesforce executives assert that this achievement represents some 80 percent of the effort that will ultimately be required to deliver on the promise of Einstein. Salesforce is also taking advantage of the years of research and development work behind the companies it acquired, but the algorithms and IP from those companies will plug into a cohesive, automated, high-scale predictive engine.

Constellation's Analysis: Algorithms need time to improve. Data set gathering requires time for better precision. More interactions in the network depend on time. Between early hiring and data-management work and its numerous acquisitions, Salesforce has an edge on time invested in AI, bested only by IBM, and matched, perhaps, only by Microsoft among its direct competitors.

Investment of time is the biggest gap between where Oracle Adaptive Intelligent Apps are at this writing and the broad portfolio of apps envisioned on the company's roadmap. The customer-experience-related apps will launch first because that's where the company can draw on web-scale Oracle Data Cloud (ODC) data that is already organized and modeled for marketing use cases. HR apps are likely to be next, as these, too, will benefit from third-party ODC people profiles.

COMPETITIVE ASSESSMENT

Salesforce is delivering ready-to-run AI capabilities that are extensions of its software-as-a-service clouds. If Salesforce is your CRM

system of record, Einstein should be the first choice for adding AI.

Companies considering AI capabilities should keep a close eye on Salesforce and its closest competitors - IBM, Microsoft and Oracle.

IBM and its multiple Watson partners offer marketing-centric cognitive applications, but they are not as tightly integrated with a particular CRM system, as is Einstein to Salesforce CRM clouds. Microsoft and Oracle are in a better position to integrate AI with CRM applications, but as explained below, at this writing they have yet to introduce CRM-integrated AI applications.

IBM deserves credit for putting AI back on the map with its Watson Cognitive Computing push over the last five years. It has enviable strengths in terms of data, data science, computing capacity and time invested developing AI. The company's strategy is now bifurcated, with IBM itself going after more sophisticated opportunities while also building out Watson platform cognitive services for a growing developer community.

IBM itself offers cognitive marketing solutions around campaign automation, marketing insights, real-time personalization, customer experience analytics, and customer journey analysis. Meanwhile, Watson developer partners, such as Influential, SocialFlow and Equals 3, offer Watson-powered cognitive marketing solutions. Whether offered by IBM or by independent developers, these solutions are likely to require integration with systems of record.

Microsoft has taken a services library approach to AI, leaving it to developers to bring together machine learning, natural language processing, machine vision, sentiment analysis and other services together in finished applications. Templates, sample scripts and other content are available to guide the way, but they're not ready-to-run applications. Microsoft can draw on strengths in data, data science, computing capacity and time, and Constellation expects it will do more to bring customer-experience-specific services and, perhaps, finished AI apps into its Dynamics enterprise application portfolio.

Oracle is taking an apps-centric approach to AI with its Oracle Adaptive Intelligent Applications. Oracle announced five planned Adaptive Intelligent Applications in September 2016 and it promised they would launch within 12 to 18 months. Constellation expects to see the first AI app in spring 2017, with two to three more to follow later this year. Oracle can draw on the petabyte-scale Oracle Data Cloud, a vast, web-scale consumer marketing data source. The Data Cloud also recently gained a B2B data store that rivals Salesforce's Data.com. Oracle also expects to exploit aggregated data from its various SaaS applications, but as Salesforce may find out, that work may require new data agreements with customers before the company can use the data to bring context and insight to smart applications.

Public cloud AI/cognitive services, including those from Amazon Web Services, Google, IBM BlueMix and Microsoft Azure are not direct competitors to Salesforce Einstein because they offer libraries of generic services aimed at developers rather than finished applications or targeted, app-supporting AI features. However, as these libraries mature,

third-party users of these libraries or, indeed, the cloud providers themselves could make use of the services to create purpose-built AI apps. IBM started with cognitive apps and then decomposed Watson capabilities into a library of discrete services now used by partners. Microsoft is using its AI/cognitive library to build smart features into its Office 365 and, soon, Dynamics portfolio. Keep an eye out for customer experience applications that might compete with Salesforce Einstein.

RECOMMENDATIONS: FOCUS ON BUSINESS OUTCOMES

Constellation's first and most important recommendation is to focus on the business outcomes that are priorities for your organization. Forget what's available in this or that AI portfolio. Ask first which business problems are the squeakiest wheels for your organization. Is it a customer-experience-oriented problem and does it relate to being overwhelmed by information? Is there an opportunity to differentiate your business through AI-based human augmentation? Will

the AI-driven recommendations deliver desired business outcomes?

Identify and understand what your organization needs to address and achieve before considering Salesforce Einstein or any other AI app or portfolio. Don't experiment with AI before addressing more urgent priorities and don't force fit an off-the-shelf app into service if it doesn't promise desired business outcomes. Remember that Salesforce is also planning to release custom app-building capabilities and that more competition is likely to emerge later this year.

Competition can only be good for customers, and as it emerges, consider these factors:

- **Cost:** At this writing, Salesforce has yet to publish pricing for Einstein, but the company says it will do so as features become generally available in accordance with its longstanding transparent pricing approach. In a few early examples, Einstein capabilities are being tied to certain features or subscription levels. For example, Einstein features for Marketing Cloud are included

in Social Studio and in certain subscription levels. In the case of Commerce Cloud, Einstein features are included in the license. Pricing for Analytics Cloud Einstein features will be available soon after the February 2017 release.

The competitive stakes in the AI category are high indeed. IBM remains very discrete about the pricing of its Watson-powered apps. Microsoft and Oracle, which have yet to introduce anything comparable to Einstein, will surely be closely monitoring competitive offerings. Constellation suspects that many Einstein features will be bundled with extra-cost optional services or upper-tier licensing levels. This market is very new and, as was the case following the Salesforce Analytics Cloud launch, prices are likely to be subject to change.

- **Value:** The real challenge for customers will be calculating the value of AI capabilities. The standard Salesforce Sales Cloud serves up leads to sales managers and salespeople. Salesforce Einstein Predictive Lead Scoring prioritizes the leads that are most likely to

close first so sales teams can work smarter and be more productive. So it goes with other standard Salesforce capabilities versus Einstein. The key question is how much your business will benefit from these smart features.

- **Diversity of applications:** Salesforce has a head start in the AI market, but it has also been very clear in defining Einstein's scope as "smart CRM." IBM and Oracle have staked out broader ambitions in many application categories. Microsoft, for the time being, is offering general-purpose AI services that can be used to build custom apps. With 11 features generally available and 10 more due by February 2017, Salesforce Einstein is well ahead of would-be competitors that have yet to release their first AI apps. But don't expect smart ERP, HR or supply chain management applications from Salesforce. As always, Salesforce is focusing on front-office, CRM-oriented capabilities, but it is intent on making them smarter.

ANALYST BIO

Doug Henschen

Vice President and Principal Analyst

Doug Henschen is Vice President and Principal Analyst at Constellation Research, Inc., focusing on data-driven decision making. His Data-to-Decisions research examines how organizations employ data analysis to reimagine their business models and gain a deeper understanding of their customers. Data insights also figure into tech optimization and innovation in human-to-machine and machine-to-machine business processes in manufacturing, retailing and services industries.

Henschen's research acknowledges the fact that innovative applications of data analysis require a multi-disciplinary approach, starting with information and orchestration technologies, continuing through business intelligence, data visualization, and analytics, and moving into NoSQL and Big Data analysis, third-party data enrichment, and decision management technologies. Insight-driven business models and innovations are of interest to the entire C-suite.

Previously, Henschen led analytics, Big Data, business intelligence, optimization, and smart applications research and news coverage at InformationWeek. His experiences include leadership in analytics, business intelligence, database, data warehousing, and decision-support research and analysis for Intelligent Enterprise. Further, Henschen led business process management and enterprise content management research and analysis at Transform magazine. At DM News, he led the coverage of database marketing and digital marketing trends and news.

[@DHenschen](#) | www.constellationr.com/users/doug-henschen

www.linkedin.com/in/doughenschen



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