Data to Decisions
Business and Technology Trends Enterprises Must Track Through 2024

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EXECUTIVE SUMMARY

The Constellation AstroChart™ supplies a visual guide of the trends impacting Data to Decisions. After assessing boardroom priorities, organizations should employ AstroCharts to inform portfolio management.

This report contains two AstroCharts: one identifying Business Trends and one identifying Technology Trends. The AstroCharts’ vertical axes plot “Organizational Adoption” rates from Mainstream to Early Adopter to Bleeding Edge. Horizontal axes plot “Business Impact,” the impact of the trend on an organization's business model, from Incremental to Transformational to Exponential. The Constellation AstroChart moves beyond both the hype and constraints of the standard 2 x 2 grid to identify the dynamics impacting the entire market.

This report applies Constellation’s AstroChart to the Constellation’s business theme of Data to Decisions. This research domain examines the enablement of data-driven decisions across organizations. Holistic, data-informed decisions require a multidisciplinary approach that incorporates performance monitoring with traditional business intelligence and analytic technologies.
CONSTELLATION'S ASTROCHART™ OVERVIEW

Constellation's AstroChart has two axes: Organizational Adoption and Business Impact. The intent of the Constellation AstroChart is to move beyond both the hype and constraints of the standard 2 x 2 grid to identify trends impacting the entire market.

Its vertical axis of “Organizational Adoption” rates adoption using three adoption styles:

- **Mainstream.** An organization style that prefers generally accepted technologies.
- **Early Adopter.** An organizational style that begins using new and emerging technologies upon general availability.
- **Bleeding Edge.** An organization style that proactively uses new and emerging technologies prior to general availability.

Its horizontal axis of “Business Impact” estimates the impact on an organization's business model using three likely effects on business:

- **Incremental.** A business effect that results in marginal improvement.
- **Transformational.** A business effect that that results in a noteworthy improvement and innovation.
- **Exponential.** A business effect that results in extraordinary improvements and innovation.

These two axes are applied to the market’s Business Trends and Technology Trends.

**Business Trends**

Constellation's AstroChart of Business Trends identifies the impact of trends on business models. These trends are identified via Constellation's Futurist Framework and PESTEL model as well as via inquiries and primary research. Refer to Constellation's AstroChart of Business Trends to plan your corporate strategy, develop your overall boardroom strategy and identify your organization's business trend adoption style.
**Technology Trends**

Constellation’s AstroChart of Technology Trends identifies the adoption rate and business model impact of emerging technologies. Refer to this AstroChart to develop your overall technology investment strategy and as a benchmark of your organization’s adoption rate.

**ABOUT DATA TO DECISIONS**

Data to decisions examines the enablement of data-driven decisions across organizations. Holistic, data-informed decisions require a multidisciplinary approach that combines performance monitoring with traditional business intelligence, analytic technologies and, increasingly, machine learning, deep learning, natural language processing and robotic process automation technologies. In addition, data-driven recommendations and decisions are increasingly delivered in the context of business applications rather than in separate, analytic interfaces.

**CONSTELLATION’S ASTROCHART OF BUSINESS TRENDS**

![AstroChart of Business Trends](image)

Source: Constellation Research

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Description of Trends

Exponential-Bleeding Edge

• General AI. An aspirational type of artificial intelligence where machines mimic human behavior and intelligence in a manner indistinguishable from a human. Sometimes this type of AI is known as strong AI or deep AI. General AI is different from a superintelligence that can surpass human behavior and intelligence.

• Narrow AI. One of the types of artificial intelligence. When machines mimic human behavior and intelligence using a sharply confined range of parameters and context, this is known as narrow AI. As a purpose-built system, narrow AI represents a range of simple to sophisticated technologies that can function autonomously.

Exponential-Early Adopter

• Digital monetization platforms. The emergence of a subscription economy coupled with digital business models drives the creation of a new type of solution known as smart services digital monetization platforms. Legacy monetization systems lack the ability to support subscriptions, consumption-based models and one-time transactions. Smart services digital monetization platforms provide a monetization solution for organizations operating untraditional business models. Expect them to back business models built on smart services for the Internet of Things (IoT), blockchain consensus and sharing economies.

• Digital transformation. Digital transformation is typically defined as the application of digital technologies to drive agility, flexibility and innovation. In Constellation's view, it is more than a technology shift; it's about digital disruption that comes from both transforming business models and changing how brands, enterprises, organizations, people and machines will engage. The goal is being first to product, first to market and first to profit.
Transformational-Bleeding Edge

• **Artificial intelligence ethics.** This concept involves developing culturally appropriate decision-making faculties for AI. For example, algorithms for machine vision should not exhibit overt prejudices, and robots and autonomous vehicles should put people first and avoid conflicts that would pit the interests of one person against another. Constellation sees AI ethics as crucial for the socialization of robots. While some academics are already debating “robot rights,” Constellation finds that the subject of AI ethics has yet to be framed convincingly as a research field and, as such, will remain on the bleeding edge for some years to come.

• **Autonomous logistics.** Smart vehicles will be able to function without human intervention within factories, between supply chain locations and eventually between any two points in the world. This will have great implications for agility, efficiency and competitive disruption.

• **Customer understanding.** In today’s business environment, every company, regardless of industry, faces potentially disruptive new competitors. Pressure from customers has shifted attention from an internal focus on operational efficiency to an external, customer-centric view of engagement and effectiveness. Focusing on customers and how best to serve them determines success or failure. For most companies of any significant size, however, this simple principle is far from easy.

To make matters worse, the ever-expanding array of technology tools that promise to improve customer engagement have often done anything but that. This combined with deep silos between marketing, sales and customer service is harming rather than helping customer relationships. With digital transformation now a top priority for chief executives, it is imperative to put customers at the heart of any new strategy. Companies must build a consistent and cohesive picture of the customer across all departments. It’s time to put the customer at the center of transforming cooperation across marketing, sales, service—and every other function in the business. And this time, to do it right with customer understanding.
• **Digital ecosystem networks.** An economic and business model where organizations, individuals, stakeholder journeys, processes, assets and data are interconnected to create value. A commonwealth of self-interest drives value exchange and facilitates both breakthrough innovation and rapid commoditization of innovation.

**Transformational-Early Adopter**

• **Agile DevOps.** A broad categorization of multiple types of development methodologies. Agile represents a methodology that incorporates flexibility and stresses rapid iteration along with business stakeholders in the software application development process. DevOps describes a collaborative approach to application development by operations and IT teams. DevOps often includes both the cultural aspects and the technical aspects of efficiently delivering a final outcome. Lean principles often play a role in optimizing efficiency and maximizing return on investment.

• **Design thinking.** This problem-solving and creative methodology allows teams to solve complex problems and find empathy-centered solutions that evolve from where the users sit. Constellation defines design thinking as a methodology to unlock solutions to problems that have not yet been defined, a process to identify the unknown unknowns. Key principles include the human rule, the redesign rule, the ambiguity rule and the tangibility rule. Traditional phases include inspiration and empathy, problem definition, ideation, prototyping and testing.

• **Digital ethics.** The study of how humans and technology will interact and engage drive digital ethics. The consequences of technological innovation on humanity often drive questions on privacy, data usage, impact on society, the future of work and changing norms on engagement or even disengagement. Moreover, which governing bodies or social movements will enforce these policies or reinforce social norms against less scrupulous individuals or organizations?
• **Enterprise acceleration.** Enterprises have always been faced with competition because it is a key characteristic of a vibrant free-market economy. But the need for adopting and reacting to the competition and creating new creative strategies has never been as high as it is today. Digital transformation has substantially changed the game here, forcing enterprises to move faster toward a new objective, while having less room for error than ever before. Constellation Research has shown that in digitally transformed industries, the leaders are taking more than 70 percent of revenue and greater than 77 percent of profit. This means the risk of being left behind is bigger than ever before. Worse, it is almost impossible to catch up after being left behind. As a consequence, what matters for enterprise leaders is how much their enterprise can accelerate as a unit. Because it is impossible and unrealistic for an enterprise to catch all the successful trends that become relevant in an early phase, it is even more important that CxOs look at the speed at which their enterprises can adopt to challenges as thrown at them from existing and new markets.

• **Mass personalization at scale.** One-to-one personalization is old hat. Truly disruptive organizations deliver products, services, insights, experiences and outcomes that are geared to individuals. Only data-driven organizations can get there. Using context, choose-your-own-adventure journeys and anticipatory analytics, mass personalization at scale can predict next-best actions and next-best offerings for customers because companies using them have tapped into myriad sources and can separate the signals from the noise.

• **Price optimization.** Price optimization helps organizations predict how buyers will react to different price points and pricing models. These optimization techniques often use big data, predictive analytics, machine learning and AI tools to craft initial pricing, promotional pricing, discount pricing and substitute pricing. Optimization begins with customer segmentation. Using different attributes such as sales channel, time of day and location, math is applied to determine what constraints can be included in the optimization process. Optimization strategies can be determined by understanding the pricing problem through factors such as yield management, markdowns, list pricing and customized pricing.
• **Real-time data to decisions.** Plenty of organizations have evolved from gut feel to data-driven decisions, but the early adopters are now moving on to real-time decisions. Whether it’s triggering the right ad or offer, restocking at the right level or choosing the right delivery route, smart companies recognize that decisions don’t get better as people think them over. Fortunately, cloud resources and modern data management options are making real-time decision-making easier for early adopters.

Transformational-Mainstream

• **Chief digital officers.** A CDO can focus at a C level on developing new digital markets and business models as a profit and loss center. While the role is still nascent in the Fortune 1000 and Global 2000, its creation—although increasingly combined with the CIO role—is key to ensure that digital transformation is not eclipsed by operational concerns in the legacy business. However, when digital transformation is perceived as vital to the success of the organization, CDOs may find themselves reporting to the CEO. Constellation expects the CDO role to go extinct by 2025 as remaining organizations complete their digital transformations.

• **Data monetization.** Data monetization refers to how value-added services are built on data to sell not only services but also insight streams and new experiences. Most organizations would claim that information is their most valuable asset, yet too few have pioneered new business models based on deriving revenue from their information. Early examples include predictive and prescriptive services, sensor-based, IoT-style applications and supply chain optimization applications based on finely segmented customer benchmarks. These are the early days, but there are many possibilities for profitable, value-added services.

• **Innovation centers.** Whether public, private or academic, innovation centers bring a community of innovation experts across multiple disciplines to instigate breakthroughs. Common approaches start with education, collaboration and co-innovation, and incubation. Innovation centers succeed when they’re part of a holistic and strategic initiative that is supported from the top.
Incremental-Bleeding Edge

• **Privacy rights.** The notion that natural rights protect individuals from intrusion upon seclusion or solitude, public disclosure of embarrassing private facts, appropriation of name and likeness, and publicity that places a person in a false light in the public eye. These rights to privacy, first introduced by legal scholar William Prosser in 1960, form the foundation for tort law in the United States. Some legal scholars note that inherent personal data such as digital footprint, genetic markets and biometrics can serve as a property right for the digital age.

Incremental-Early Adopter

• **Sharing economy.** Everybody knows about Zipcar, Uber and Airbnb, but the sharing economy is disrupting the fashion, music and jewelry industries as well as the automotive, taxi and hotel trades. More categories will follow, but it takes a platform for brokering the transactions as well as a sense of community and, most importantly, the right economic model. Constellation identifies four components of the sharing economy, including: identification of underutilized assets; optimization of value through renting, leasing or borrowing; trading on the goodwill and generosity of others; and building a big data treasure trove.

Incremental-Mainstream

• **Business process management (BPM).** BPM (formerly known as business process outsourcing or BPO) is the practice of handing off existing business processes, including management of underlying systems and technologies, to services providers. Often operating offshore, these service providers promised reduced costs, but organizations often got what amounted to “your mess for less.” Many such arrangements eventually failed because they simply kicked the can of legacy system modernization down the road. Sooner or later, executives faced business disruption from more agile and innovative competitors. The moral? Start with digital transformation and innovation and see if there's anything left to outsource.
• **Demand-driven networks.** The laws of supply and demand always apply, but they operate much more quickly when a network is connected and data-driven. Demand-driven supply chains and other value networks provide the most optimal sourcing for an enterprise and direct the overall activities of a supply chain based on demand signals. However, these networks only succeed with enough scale (i.e., transaction volume) and value exchange (i.e., monetary and nonmonetary) to make it a real network.

• **General Data Protection Regulation (GDPR)/California Consumer Privacy Act (CCPA).** GDPR is a sweeping reform and strengthening of privacy rules that safeguard data about European citizens in their home countries and around the world. The regulation affects all data and IT services operating in Europe and anywhere else if they are handling European Union citizens’ personal information. The GDPR took effect in May 2018 and involves very substantial fines for serious noncompliance. Its far-reaching consequences make the GDPR a mainstream issue. The GDPR can be approached as a model for future data protection practices and a way of future-proofing a business when the U.S. enacts similar regulations, such as CCPA.

**Analysis & Recommendations**

Constellation recommends:

1. **Assess boardroom priorities.** Take stock of strategic priorities and use the AstroChart to guide portfolio management.

2. **Experiment with caution.** Logarithmic, bleeding-edge projects require very informed or founder-led boards.

3. **Invest appropriately.** Identify the organization’s adoption type and invest accordingly. Market leaders invest 50 percent of their portfolios on disruptive projects and 30 percent of their portfolios on bleeding-edge projects. Fast followers invest 80 percent of their portfolios on early-adopter projects.
Description of Trends

Exponential-Bleeding Edge

- **Artificial intelligence.** AI describes the theory and development of computer systems that can replicate tasks of human intelligence. These actions include sight and vision, hearing and speech recognition, conversations and translations, cognition, sense and touch, and smell. While the technology is rapidly evolving, today’s AI is not the “general AI” or “strong AI” envisioned decades ago that attempts human-like perception, thinking and action. This practical AI blends capabilities including machine learning, natural language understanding and deep learning, and it applies them to specific business domains. Closed-loop learning improves the quality of decisions over time. AI will be disruptive because it promises huge advances in automation and optimized decision-making.
• **Quantum computing.** A novel approach to computing using quantum-mechanical phenomena, quantum computing uses quantum bits (or qubits) to store data in a number of states simultaneously, a concept known as superposition. This approach contrasts with the binary nature of today’s computing models, which have a defined set of two states (i.e., 0 or 1). Quantum computing relies on probabilistic algorithms, which is why this type of computing is also known as probabilistic computing. Today, scientists strive to identify use cases where this approach is more effective than classical computing.

• **Synchronous ledger technologies (SLTs).** This designation, created by Constellation in 2017, refers to an ever-growing range of advanced transactional data management techniques derived from the earlier blockchain. Broadly, SLTs are more widely applicable than the original blockchain (which was specific to cryptocurrency) but share certain blockchain characteristics, such as redundancy, decentralization and participation by multiple parties in agreeing on the state of a data set. In appropriate applications, SLTs promise to radically transform the efficiency and certainty of complex, multiparty transactions, such as trade documentation, trade finance, supply chain tracking and complex interbank settlements. While some adopters of this technology will develop and/or implement it for themselves, managed SLT (or “blockchain as a service”) is also coming rapidly onto the market, shifting this category from bleeding edge for a technology to early adopter for a business trend (see definition in Business Trends above).

**Exponential-Early Adopter**

• **Prescriptive analytics.** Descriptive analytics tells you what happened (think rearview mirror). Predictive analytics tells you what will happen and why. The next step is prescriptive analytics that tells you what you should do and why you should do it. It’s an advance over static rules because the insights are dynamic, based on optimization, simulation or modeling that leans from new data and adapts as conditions change. Only early adopters have achieved this level of sophistication.
Exponential-Mainstream

• **Big data.** Dealing with vast sets of internal and external data in a timely manner remains one of the top trends in the industry. Big data technologies and techniques are being broadly adopted by many organizations, though big data technologies like Hadoop, Spark, object-store-based data lakes and distributed data platforms are still evolving and shifting. Big data, managed strategically within a master data management effort, is a springboard for innovation and disruption.

Transformational-Bleeding Edge

• **Deep learning.** Deep learning is the study of artificial neural networks and machine learning algorithms that contain more than one hidden layer or “net.” These systems learn multiple levels of representations that correspond to different levels of abstractions. Through supervised classification and unsupervised pattern analysis, these systems learn from the data and iterations. This advanced component of AI supports machine understanding of unstructured information, including text, digitally captured voice interactions and still and video images. Deep learning is changing how humans interact with computers, supporting natural voice interaction and language translation and changing the nature of user interfaces. Deep learning will also enable computers to interpret and react to fast-changing conditions in the real world through advances such as machine vision.

• **Insight services.** Cutting-edge organizations are analyzing information in all its forms and are delivering descriptive, predictive and prescriptive insights as cloud-based services. Credit card companies, for example, are mining transactions and delivering predictions and recommendations to retailers on high-value prospects and customer buying patterns. Insight services are bleeding edge because they’re hard to create: Insights must be actionable and delivered in a timely way as services. Streaming analytical capabilities are a prerequisite.
Transformational-Early Adopter

- **Augmented analytics.** The use of AI techniques such as machine learning, natural language and insight automation to derive a next-best action. The goals include actionable insights, improved precision and more holistic views of the data landscape.

- **Data lakes.** Data lakes provide a storage repository that holds enormous amounts of raw data in a flat architecture. The successful early adopters of Hadoop have moved on from data warehouse optimization and are finding value in deep data history and previously untapped data sources. Some firms are redefining the data lake, relying on multiple stores, including cloud-based object stores like Amazon S3. Whatever the platform or combination of platforms, the data lake concept, supporting extreme scale, data variety and schema-on-read flexibility, is here to stay, but for now it remains in the early-adopter phase.

- **Embedded analytics.** Embedded analytics weaves descriptive and predictive analytics directly into transactional applications at the point of decision. The idea is to offer an agile edge over stand-alone reports and dashboards that require users to switch between interfaces to support their decisions. Taking advantage of microservices and granular APIs, leading vendors and practitioners are exposing focused insights—in the form of key performance indicators or even recommendations—directly at decision points. It’s harder to achieve than building a stand-alone dashboard, but using embedded analytics is a surer route to putting insights into action.

- **Internet of Things/Internet of Everything.** The Internet of Things is a network of internet-connected devices. Because everything in business is about to be digitally connected and companies will move from building products to providing services, the strategic implications are just starting to be understood as IoT becomes a primary enabler of digital business. Digital connectedness and control, exerted over every object in the world, has nearly boundless potential and will transform most industries, even in the short to medium term. New C-suite organizations will map out the possibilities and opportunities, as well as the disruptive potential, to ensure their organizations
are competitively positioned to take on what is becoming one of the most important
technology revolutions in history.

- **Machine learning (ML).** Machine learning is a decades-old subfield of computer
  science whereby machines gain the ability to learn from data without being explicitly
  programmed. Algorithms are used to identify patterns and make predictions on
  data. Today, ML powers more than recommendation engines. It’s a building block
  underpinning a variety of software- and cloud-based services, including data catalogs,
  self-service data-prep tools, data-integration suites and various prebuilt and bespoke
  predictive applications. Cloud-based services are democratizing access to ML without
  requiring deep data-science expertise. In short, ML is being used in many powerful
  ways, and we’re on the brink of mainstream adoption.

- **Microservices architecture.** Microservices is a modern variant of services-oriented
  architecture that favors fine-grained services and lightweight protocols. Microservices
  are cloud-friendly, enabling applications to be decomposed into smaller services,
  improving modularity and simplicity. The approach is quickly being adopted by cloud
  vendors and software-as-a-service providers, but it’s cutting edge inside enterprise
  firewalls. Microservices are not a game-changing disruption on their own, but they
  serve as an essential next step for businesses hoping to build out data services, insight
  services and IoT apps.

- **Operational performance management.** Performance management systems are
  commonplace within the office of finance. Operational performance management
  brings reporting, analysis, forecasting and planning capabilities to business users in
  operational areas including sales, human resources, marketing, demand planning and
  supply chain optimization. A business that can plan and forecast well will find it easier
  to be an agile, responsive and profitable business, so expect operational performance
  management offerings to move toward mainstream adoption.

- **Predictive analytics.** Predictive analytics tells you what will happen and why, using
  data and statistical algorithms to predict trends and behaviors. Leading companies
in banking, insurance, retail, manufacturing and many other industries have long used predictive analytics in high-value pockets of the business—think risk analysis in banking or pricing and fraud analysis in insurance. Prediction is going mainstream. Early adopters are pursuing machine learning and deep learning as well as more agile, scalable deployment methods. Fast followers are wading in with both feet, some through emerging low-code/no-code tools and cloud-based services.

- **Robotic process automation (RPA).** RPA is software that records and then emulates human input. This technology is typically used for repetitive tasks, thereby enabling organizations to process applications faster, improve the accuracy and consistency of data, increase employee productivity and reduce the costs of data entry. Thus, RPA helps companies optimize critical business workflows, enabling them to compete more effectively. When RPA leverage AI, not only can existing business processes be modeled but new workflows can be created automatically by the software using patterns that humans may not have interpreted.

- **Streaming analytics.** Streaming analytics, also known as real-time decision support, analyzes in-motion data, also known as event streams. These streams capture a series of events, such as sensor readings from a network of devices, transactional data sets in high-speed trading or any large-volume, time-based data stream. Streaming analytics has long been practiced in niche areas such as algorithmic trading, national security intelligence and advanced security and threat detection. The cost of real-time analysis is coming down, thanks to the emergence of cheap and scalable cloud resources and next-generation data management software and platforms. Pioneers are now disrupting advertising, retail, logistics and supply chain, and streaming analytic capabilities are poised to move from the bleeding edge to early-adopter status.

**Transformational-Mainstream**

- **Cloud computing.** Rather than managing data centers, services and administration staff, cloud computing allows organizations to buy their computing infrastructure and applications from third-party providers.
• **Self-service BI/analytics.** Self-service BI and analytics enable non-technical users to perform data analysis, visualization and reporting tasks that previously required the support of IT. Self-service tools and interfaces for data exploration and descriptive data visualization and reporting (business intelligence) are now commonplace. The next step, now in the early-adopter phase, is self-service advanced analytics, which brings the basics of forecasting and prediction to routine data analysis.

**Incremental-Early Adopter**

• **Data cataloging.** Data catalogs create an inventory of available data assets. The catalog might inventory data assets within a data lake or data warehouse or it might span the enterprise, including databases, point analytical systems and even cloud-based object stores. Business-user-oriented data catalogs are an important advance for any organization that wants to make the most of its increasingly complex and abundant data.

• **Graph analysis.** Graph analysis is used to uncover networked relationships among people, places, things and entities. Retailers and telecommunications companies are using graph analysis to reveal customer relationships and spot influencers. Financial services use graph analysis to spot insider trading, money laundering and other risks. Healthcare organizations use graph analysis to spot readmission risks while insurers might use it to spot claims fraud.

• **Sentiment analysis.** Sentiment analysis uses a computational process to identify and categorize opinions in text to understand attitudes toward a topic, product, person, brand or other entity. Sentiment analysis is not new, and it’s widely available as a cloud-based service. But there’s a difference between monitoring your Net Promoter Score on public social networks and building a capability to explore and blend external and internal content and develop a nuanced understanding of customer-specific sentiments. It’s a building-block capability that supports mass personalization.
Incremental-Mainstream

- **API orchestration.** API orchestration handles how applications and/or services sync data, automate processes, model resources, format payloads and address security. Orchestration helps by decoupling applications from each other and allowing the stitching together of microservices. A microservices architecture (see previous definition) won’t change your business on its own, but it’s essential to delivering value-added services and supporting emerging cloud integration scenarios.

- **Data warehousing.** Data warehousing refers to a system used for the large-scale storage of integrated data from multiple sources for use in reporting and data analysis. Those starting from scratch today are more likely to blend focused data marts with modern data lakes. Companies with incumbent data warehouses are optimizing these environments while adding big data management capabilities for handling unstructured information and data at scale.

- **Financial performance management.** Financial performance management systems introduce powerful budgeting, planning and forecasting capabilities that bring consistency, traceability and more reliable data to budgeting, planning and forecasting. Cloud-based performance management systems have taken these capabilities mainstream, with broad adoption even among small and midsized organizations—at least for use within the office of finance. Early adopters are driving an even bigger business impact by applying financial performance management in operational areas.

**Analysis & Recommendations**

Constellation observes the following:

1. **Mainstream technologies.** Organizations must make adoption and implementation of these technologies an enterprise-wide standard. Invest in market-leading suites. Organizations should invest in best-of-breed players or custom-built solutions only for exponential categories.
2. **Early-adopter technologies.** Implementation decision should be tied back to a business model. Expect five to 10 vendors in each category.

3. **Bleeding-edge technologies.** Implementation decision should be tied to proof-of-concept projects. Expect offerings to come from early-stage startups willing to co-innovate and co-create.

**FREQUENCY OF EVALUATION**

Trends in Constellation's AstroChart will be updated every year as needed.

**EVALUATION SERVICES**

Constellation clients may work with the analyst and research team to conduct a more thorough discussion of the AstroChart. Constellation provides guidance about mainstream, early-adopter and bleeding-edge technology providers associated with the coverage area of the AstroChart.
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.

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ABOUT CONSTELLATION RESEARCH

Constellation Research is an award-winning, Silicon Valley-based research and advisory firm that helps organizations navigate the challenges of digital disruption through business models transformation and the judicious application of disruptive technologies. Unlike the legacy analyst firms, Constellation Research is disrupting how research is accessed, what topics are covered and how clients can partner with a research firm to achieve success. Over 350 clients have joined from an ecosystem of buyers, partners, solution providers, C-suite, boards of directors and vendor clients. Our mission is to identify, validate and share insights with our clients.

Organizational Highlights

- Experienced research team with an average of 25 years of practitioner, management and industry experience.
- Organizers of the Constellation Connected Enterprise—an innovation summit and best practices knowledge-sharing retreat for business leaders.
- Founders of Constellation Executive Network, a membership organization for digital leaders seeking to learn from market leaders and fast followers.

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