

The Chief Data Scientist Role Is Key to Evolving Advanced Analytics and AI

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Initiatives: [Analytics, BI and Data Science Solutions](#); [Artificial Intelligence](#)

The role of the chief data scientist is increasingly prevalent. Use this research to orient and guide the chief data scientist to strategically support, manage and scale the use and adoption of advanced analytics and AI within the organization.

Overview

Opportunities and Challenges

- Organizations are not taking full advantage of advanced data science, machine learning and AI initiatives, nor are they aligning them to their strategic priorities.
- Siloed approaches to advanced analytics increase risk and minimize return on investment while also minimizing overall trust in those techniques.
- Data and analytic leaders and their IT and business partners lack effective leadership, organization, process and practice to deliver, operationalize and scale data science and machine learning solutions.
- The chief data scientist is an evolving role that is key to applying advanced analytics and AI techniques beyond focusing on operational delivery to ensuring strategic alignment to drive organizational imperatives.

What You Need to Know

- The chief data scientist role is a complement to, rather than a substitute for, the chief data officer role, and their alignment is critical, especially around security and ethical issues.
- The chief data scientist role becomes a requirement as the complexity, pervasiveness and criticality of advanced analytics and AI grows and requires dedicated, specialized attention.
- Chief data scientists must balance both application and exploration of advanced analytics methods and techniques to real, prioritized business problems.

Insight From the Experts

Increasingly Prevalent Chief Data Scientists Capitalize on Opportunity for Advanced Analytics to Drive Consistent Value



Carlie Idoine, Vice President Analyst

The past year's economic disruption has profoundly changed how we do business. The way we use data and analytics (D&A) to support and guide the business requires a fundamental shift in response. Gartner's research into "Reengineering the Decision" illustrates how D&A leaders can use D&A to change how organizations make business decisions. Focus on minimizing costs raises the importance of D&A-driven optimization. This in turn demands that D&A leaders understand how their organizations can work better, responding quickly to change and better orchestrating the use of advanced analytics. The increased complexity, pervasiveness and criticality of advanced analytics and AI requires dedicated attention. The role of chief data scientist is a leadership role dedicated to coordinating and supporting data science, ML, and AI in support of businesses' top priorities. Chief data scientists must think tactically to assess the current situation and deliver value today while planning strategically, in parallel, to coordinate and maximize the use of advanced analytics for the future.

Data and analytics leaders have been presented with a ripe opportunity to leverage the chief data scientist role to propel use of advanced analytics forward, penetrating consistently across the organization while increasing overall analytic maturity and value to the organization. Having a deliberate approach to executing in the role is now paramount. This research presents data and analytics leaders in the chief data scientist role with practical, actionable advice. This will help them to diagnose the current state; develop a plan for moving forward; and, finally, execute and drive the accessibility, availability and use of advanced analytics consistently throughout the organization.

Kind regards,

Carlie Idoine

Executive Overview

The chief data scientist is a leadership role responsible for ensuring strategy is translated into tactical execution and measurable operational performance. Although executive-level in theory, the role is most often senior in practice. The chief data scientist leads execution, implementation and communication of data science strategy. The role is typically the most senior data science position within an organization and has a specific focus on applied data science approaches.

The chief data scientist is often referred to using various titles. Relevant similar titles include:

- Chief data scientist
- Head of artificial intelligence

- Director of artificial intelligence
- Vice president of data science
- Head of data science

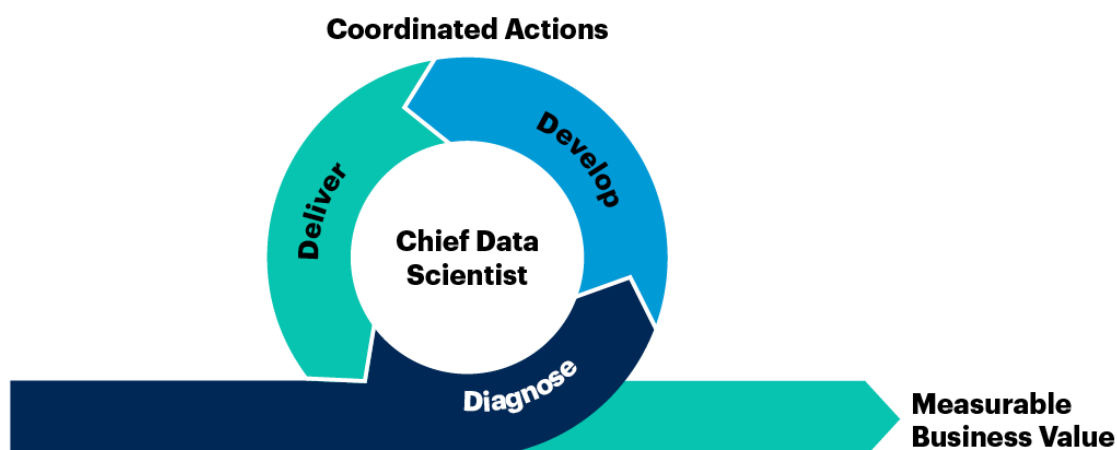
The chief data scientist role is not one-size-fits all. Although the titles vary, the responsibilities consistently include a combination of both business and technical responsibilities. Some in the role are focused more specifically on business responsibilities. Some have heavily weighted the technical responsibilities. Still others have a more consistent mix of both business and technical expertise. Gartner's [The Current State of Demand for the Chief Data Scientist Role: Q1 2021 Report](#) further defines the scope, responsibilities and competencies of each of these three “flavors” of the chief data scientist role.

As chief data scientists begin their journeys, there are three primary steps to consider. Aligning to the three steps will position the chief data scientist using a structured approach focused on maximizing value to the business. The three steps are:

- Diagnose your current state to determine where to begin
- Develop your plan for building and supporting an end-to-end (holistic) data science and machine learning process
- Deliver on the plan with a relentless focus on driving business value

Figure 1: Chief Data Scientist's Approach to Driving Business Value

Chief Data Scientist's Approach to Driving Business Value



Source: Gartner
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Research Highlights

Diagnose Your Current State to Determine Where to Begin

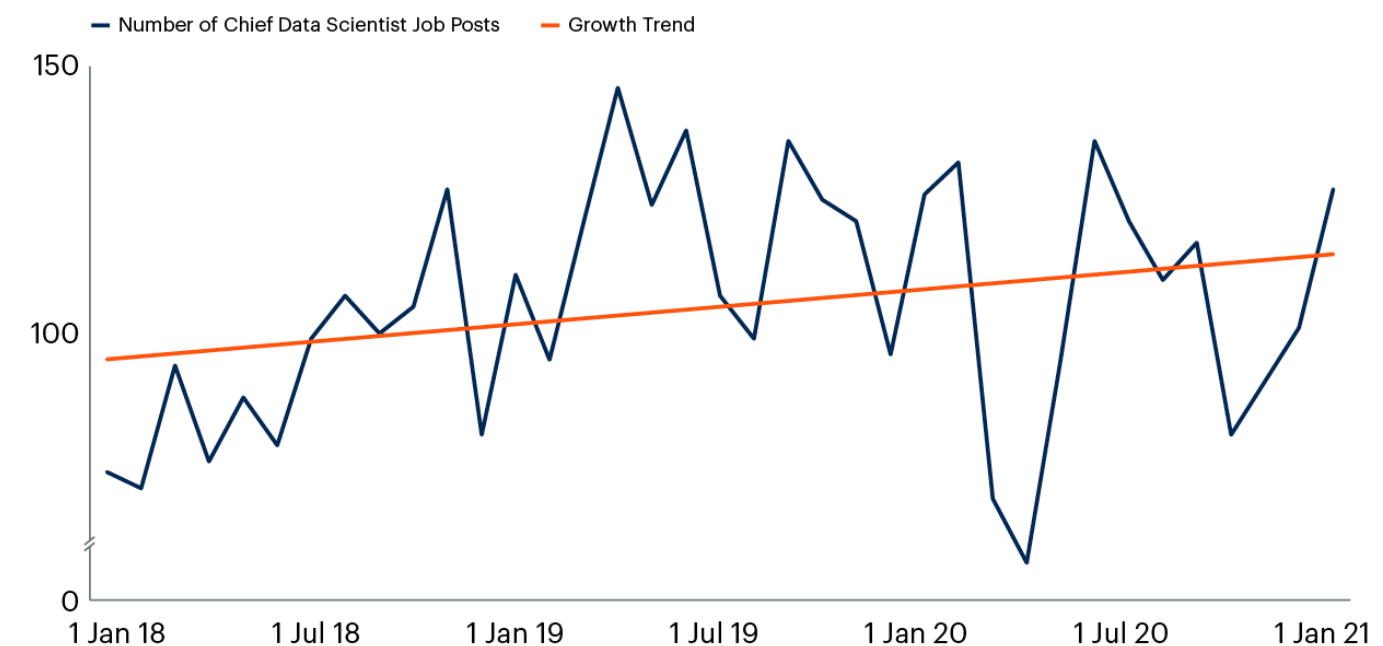
Chief data scientists must look both within and outside their own organizations to orient themselves within the broader community. This context is important both with respect to the internal IT team and more broadly in the context of their organization.

As shown in Figure 2, the demand for the role of the chief data scientist increased significantly in 2020 relative to previous years.

Figure 2: Growth in Demand for Chief Data Scientist Role

Growth in Demand for Chief Data Scientist Role

Monthly Number of Chief Data Scientist Job Posts



Source: Gartner

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Monitoring how the role is evolving outside their own organizations and keeping a pulse on topics that are top of mind for chief data scientists gives additional context for how to position the role for success. [CDO Agenda 2021: Influence and Impact of Successful CDOs in the Sixth Annual CDO Survey](#) provides additional evidence that focus on how business value and stakeholder engagement are correlated with success.

Context begins by realizing that the chief data scientist role is not just about technology. In fact, technology is especially not where we begin. The chief data scientist can lead the charge for using a human-centric approach to developing advanced analytics and AI solutions with a deliberate focus on empathizing with the consumers. They can start on day one by adopting a responsible approach to AI development. Using frameworks and methods that capture user value and expose ethical risks is key to gaining buy-in, support and adoption. Those who do not adopt transparent development processes and work closely with business stakeholders are at risk of having their systems boycotted or sabotaged, along with sustaining significant reputational damage.

A responsible approach must also consider the end-to-end model development process. Chief data scientists must assess the current approach to model development and identify areas for improvement. Historically, models are developed but often not deployed, compromising the delivery of real business value. Understanding and leveraging approaches that drive to operationalization — deploying within the business processes and monitoring and measuring accuracy, relevance and value over time are critical.

A key focus for chief data scientists is to align with key business decisions, but increasing complexity of the business environment and digital disruption have made traditional decision-making practices ineffective. Chief data scientists have an opportunity to take a leadership role in reengineering decisions to execute favorable and outcome-driven results. In this way, the chief data scientist role becomes a key contributor to establishing a resilient, flexible organization that is better positioned to respond to the changing forces that impact it.

Gartner has developed two frameworks to help the chief data scientist to understand and guide operationalization and align development efforts on reengineering decisions for greater business impact:

- The Decision Intelligence Model
- The Guidance Framework for Operationalizing Machine Learning

At the individual project level, scoping projects is critical to delivering not only in a timely way, but also in a way that focuses on delivering real, measurable value. Chief data scientists must understand the foundational principles of machine learning (ML) and explain them clearly to partners within both IT and the business. Identifying and selecting the right business problems to tackle with ML and AI techniques will target efforts where success is most achievable and measurable.

Gartner provides resources, frameworks and tools to assist with understanding the growing chief data science role as well as guidance for defining and positioning a data science and AI practice and the value they bring.

Related Research

[The Current State of Demand for the Chief Data Scientist Role: Q1 2021 Report](#)

Use this quarterly research to understand market demand for data science leader roles in and outside of IT. The report includes information about talent availability, location, diversity, education and experience levels along with most-common personas and job titles for the chief data scientist role.

[Leverage Gartner's Artificial Intelligence Maturity Model to Scale Your AI Projects](#)

An organization's current maturity with advanced analytics, and its understanding of AI's capabilities, are critical determinants of its ability to scale AI. Application leaders should apply the Gartner AI maturity model across different areas of their business to actualize AI projects at scale.

[A Guidance Framework for Operationalizing Machine Learning](#)

Operationalizing the ML pipeline remains a significant challenge for early adopters and organizations with multiple ML and AI projects. This document provides data and analytics technical professionals with guidance on establishing a continuous delivery and management life cycle to grow AI initiatives.

[Improve Decision Making Using Decision Intelligence Models](#)

Increasing complexity of the business environment and digital disruption have made traditional decision-making practices ineffective. To execute favorable and outcome-driven decisions, executive leaders should leverage the decision intelligence model.

[Ignition Guide to Scoping a Machine Learning Project](#)

The success of a machine learning project depends on identifying the right opportunity before any code is written or data analyzed. Data and analytics leaders should ignore the technological hype and set themselves up for success by selecting the right project.

Develop Your Plan for Building and Supporting an End-to-End (Holistic) Data Science and Machine Learning Process

Chief data scientists are the conductors responsible for steering the definition and execution of data science and machine learning projects to follow a consistent process from data to deployment.

Best practices for building, deploying and managing data science and AI initiatives must be established from the beginning. Gartner evidence shows that, although operationalization of models has increased, there is still much work to be done. The chief data scientist should work with data and digital engineers, data scientists and software engineers to define a comprehensive process for deploying and managing models end-to-end. This approach must include both the data pipelines accessed by the models and the applications in which they are ultimately embedded or leveraged.

Gartner defines “XOps” as a high-level framework for multipersona collaboration of data engineers, data scientists, ML engineering and applications teams to deliver and manage AI-based systems while defining a common operating model that is secure, compliant and cost-effective.

As use of AI matures within an organization, having the ability to operationalize and scale AI initiatives becomes paramount. Organizations, however, often underestimate the complexity of integrating solutions within existing infrastructure and processes. On average, organizations take close to nine months to move AI-based system prototypes into production.

Refer to Gartner research resources for guidance on how to understand the end-to-end operationalization process, why it is important and how it is defined.

Related Research

[AI Development Must Embrace Empathy or Face a Human Uprising](#)

Data and analytics leaders need to change from a technology-centric to a human-centric approach to developing AI solutions. This requires a deliberate focus on empathizing with users. Designing and developing AI systems without empathy leads to user distrust, culminating in active opposition.

[Demystifying XOps: From DataOps to ModelOps and Platform Ops for AI](#)

The offspring of DevOps best practices have caused significant confusion in the marketplace. This document demystifies the ops family and helps data and analytics leaders understand how to leverage DevOps as part of operationalizing their data analytics and AI architectures.

[Use 3 MLOps Organizational Practices to Successfully Deliver Machine Learning Results](#)

Data and analytics leaders can help ensure machine learning models will be successful in production by structurally aligning machine learning operationalization functions. This alignment includes identifying skills, defining roles and early collaboration points in the development cycle.

[Case Study: Monitoring the Business Value of AI Models in Production \(Georgia Pacific\)](#)

D&A leaders responsible for advanced analytics and AI struggle to prevent their predictive models from leaking value in production. Georgia Pacific has an effective business value framework for monitoring AI models in production to detect and mitigate model performance drifts and value leaks.

[Artificial Intelligence Under Attack: How to Identify and Mitigate Threats to Machine Learning](#)

Artificial intelligence — in particular machine learning — is becoming a standard technology that is introducing new risks. Security and risk management technical professionals focused on applications can use this assessment to understand attacks on ML applications and plan for enhanced security.

Deliver on the Plan With a Relentless Focus on Driving Business Value

[CDO Agenda 2021: Influence and Impact of Successful CDOs in the Sixth Annual CDO Survey](#) indicates that data and analytics leaders who successfully demonstrate ROI from their D&A investments are 1.7 times more likely to be effective at consistently producing clear business value for the organization. Those that successfully reduced time to market were 2.3 times more likely to bring value, and those that succeeded in monetizing data were 3.5 times more likely to create clear business value.

Delivering on business-focused objectives is not just a matter of building useful models using a siloed approach. Data science is a team sport. It requires specialized expertise across the end-to-end process from accessing data to building the models and embedding in the business in a way that leverages a full spectrum of skills and roles.

Once the overarching frameworks and processes are in place, attention to detail for execution of project work becomes the focus. Staffing data science teams appropriately to align projects according to process steps acknowledges the diversity of thought and skill required to align and deliver data science projects consistently to key organizational objectives.

Data science and advanced analytics solutions and their dependency on algorithms for decision making with impact to core business processes has surfaced certain risks and regulatory implications, requiring organizations to establish a framework to govern machine-learning-based solutions. In addition, consumers of the models are not always quick to trust and use models and new ways of working.

Chief data scientists need to explicitly develop trust into the equation of delivering value-added approaches. Although technology is not the complete answer to establishing trust, it does play a significant role in changing the culture to value data-driven decisions. Addressing privacy and security concerns and establishing strong explainability approaches are areas where technology must be leveraged to build a trusted ecosystem for data science and advanced analytics.

Using a diverse team to deliver models in a way that builds trust while tracking the impact on key business questions and value generated is key.

Related Research

[Staffing Data Science Teams: Mapping Capabilities to Key Roles](#)

Organizations struggle with managing talent and mapping capabilities to key roles in data science projects. To overcome this challenge, data and analytics leaders should embrace a full spectrum of skills in order to sustain and scale data science capabilities.

[Use Gartner's 3-Stage MLOps Framework to Successfully Operationalize Machine Learning Projects](#)

Organizations struggle to integrate AI solutions with existing production applications, wasting time and money on data science projects that are never put into production. Data and analytics leaders can greatly reduce the risk of such failures with three stages that create a framework for MLOps.

[AI Security: How to Make AI Trustworthy](#)

Security and privacy concerns are the top barriers to adoption of AI, and for good reason. Both benign and malicious actors can threaten the performance, fairness, security and privacy of AI models and data. This research outlines the four security pillars that CIOs can use to mitigate these risks.

[Improve the Machine Learning Trust Equation by Using Explainable AI Frameworks](#)

Organizations looking to harness the power of machine learning models are exposed to regulatory scrutiny and algorithm risk as they adopt ML-driven AI solutions for key business functions. This research provides data and analytics technical professionals with crucial elements of ML explainability.

[Case Study: Answering Critical Business Questions With Graph Analytics \(Jaguar Land Rover\)](#)

Data and analytics leaders struggle to advance a shared understanding of data across business verticals and functions. Jaguar Land Rover demonstrates how graph analytics can give the business a connected view of supply and demand, enabling efficient answers to critical business questions.

Gartner Associates Supporting This Trend

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Erick Brethenoux, VP Analyst

Mike Rollings, Distinguished VP Analyst

Carlton Sapp, Managing VP

Jitendra Subramanyam, Managing VP

Related Resources

[Panel Discussion: Use ModelOps for an Effective AI Strategy](#)

Acronym Key and Glossary Terms

AI	artificial intelligence
D&A	data and analytics
ML	machine learning

Evidence

Gartner's 2020 Chief Data Officer study was conducted to explore the business impact of the CDO role and/or the office of the CDO. The research was conducted online from September through November 2020 among 469 respondents from across the world.

Respondents were required to be the highest level data and analytics leader, the chief data officer, the chief digital officer, or the leader with data and analytics responsibilities in IT or in a business unit outside of the IT organization. The survey sample was gleaned from a variety of sources (including LinkedIn), with the greatest number coming from a Gartner-curated list of over 3450 CDOs and other high-level data and analytics leaders.

Recommended by the Authors

[Demystifying XOps: DataOps, MLOps, ModelOps, AIOps and Platform Ops for AI](#)

[Solution Path for Building an Effective Technical AI Strategy](#)

[A Guidance Framework for Operationalizing Machine Learning](#)

[Top Trends in Data and Analytics for 2021: XOps](#)

[The State of D&A Organizations and Roles Is in Flux: A Gartner Trend Insight Report](#)

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