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ENTERPRISE ANALYTICS TRENDS TO WATCH IN 2020

MicroStrategy
Analytics and Mobility

A new decade offers a natural yet pivotal inflection point around business transformation and advancement. With innovation and related disruption accelerating, organizations can no longer sit back and wait to see what change brings. Instead they must embrace it, and invest in it.

As businesses face a 2020 reality check and use this year to hone their strategy for the next decade, MicroStrategy has compiled insights on the top enterprise analytics trends to watch from leading BI, analytics and digital transformation influencers including analysts from Forrester, IDC, Constellation Research, Ventana Research and more.

From artificial intelligence and mobile intelligence, to the explosion of data and data sources, to some very human factors, we hope you'll find this gathering of insights (plus the patterns and themes that have emerged here) a valuable resource for taking action now, but also looking and planning ahead to become an Intelligent Enterprise.

TREND 1

DEEP LEARNING DELIVERS A COMPETITIVE ADVANTAGE

Frank J. Bernhard

Chief Data Officer and Author,

"SHAPE—Digital Strategy by Data and Analytics"

Much has been hyped of the virtues behind implementing artificial intelligence (AI) and machine learning (ML) in recent years—citing use cases that tap into the power of unsupervised learning being done at scale with a host of data sources. But the tangible results of these cases have been markedly enhanced through a subset of machine learning with expansive neural networks that learn from unstructured data.

This function of AI called deep learning relies on training through data representations, rather than the classical ML variant of task-specific algorithms. In simplest terms, deploying a deep learning technique enables the network to perform largely unsupervised learning against swaths of data that return hidden signals.

This trend is gaining rapid adoption within the enterprise analytics world due to improving cloud architecture and fascicle networks of big data that are readily accessible.

Making sense of these signal returns poses another challenge for the data science world—interpretation of meaning. Never before has there been a more connected and rapidly expanding universe of unstructured data to exploit for business purposes, yet very few enterprise analytics organizations delve into the potential to disrupt their current progress with these maturing capabilities.

Scarce data scientists are already stretched to capacity with exploratory work, made worse by the growing focus on short-term results that demand priority. And here is why automation comes into play—freeing up human involvement to connect insights to production.

In 2020, the spotlight on deep learning will be the nexus between knowing and doing as this technique becomes widely experimented and used to provide autonomous functions within finance, marketing, operations, and supply chains at the speed of computing power. No longer just a buzzword, the pragmatic advent of deep learning to predict and understand human behavior is a tempest disruptor in how companies will perform with intelligence against their competitors. Data is arguably a strategic asset, and now the enterprise can begin to drive a wedge in how insights translate to business performance—without much more human capital being added.

Frank J. Bernhard *is a chief data officer and executive advisor with more than 25 years of consulting and research excellence. As one of today's prominent data science and digital business strategists focusing on transformation, he works with organizations to architect their futures by connecting analytic insights to outcomes. His forthcoming book,* SHAPE—Digital Strategy by Data & Analytics, *chronicles the journey of firms seeking competitive advantage through disruptive use cases in data exploitation and lessons applied toward achieving analytic excellence.*

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Those enterprise organizations seeking to differentiate themselves through active intelligence need to rethink how AI and Machine Learning may be leveraged to capture hidden awareness of customers, competitors, suppliers, and market behavior that impact performance. Blindness and opacity to human factors is not an option when dealing with changing demands, constraints, and preferences that drive outcomes.

The broader trend to watch in 2020 is how the mature enterprise connects itself in a discovery-to-improvement autonomous way."

–Frank J. Bernhard

TREND 2

AUTOMATED MACHINE LEARNING IMPROVES THE ROI OF DATA SCIENCE INITIATIVES

Marcus Borba

Founder and Principal Consultant, Borba Consulting

Machine learning is one of the fastest evolving technologies in recent years, and the demand for development in machine learning has increased exponentially. This rapid growth of machine learning solutions has created a demand for ready-to-use machine learning models that can be used easily and without expert knowledge.

Automated machine learning (AutoML) is the ability to automate the entire process of developing and managing machine learning models, offering the advantage of producing simpler and faster solutions that often outperform manually developed models. There are several advantages to using AutoML.

It enables increased productivity. As a result, data scientists (one of the most sought-after roles right now) are able to focus more on problem solving rather than the development of models.

Automating the machine learning pipeline also prevents errors, a major benefit for enterprise organizations. And equally important to large organizations, AutoML helps democratize the use of machine learning by making its capabilities accessible to everyone.

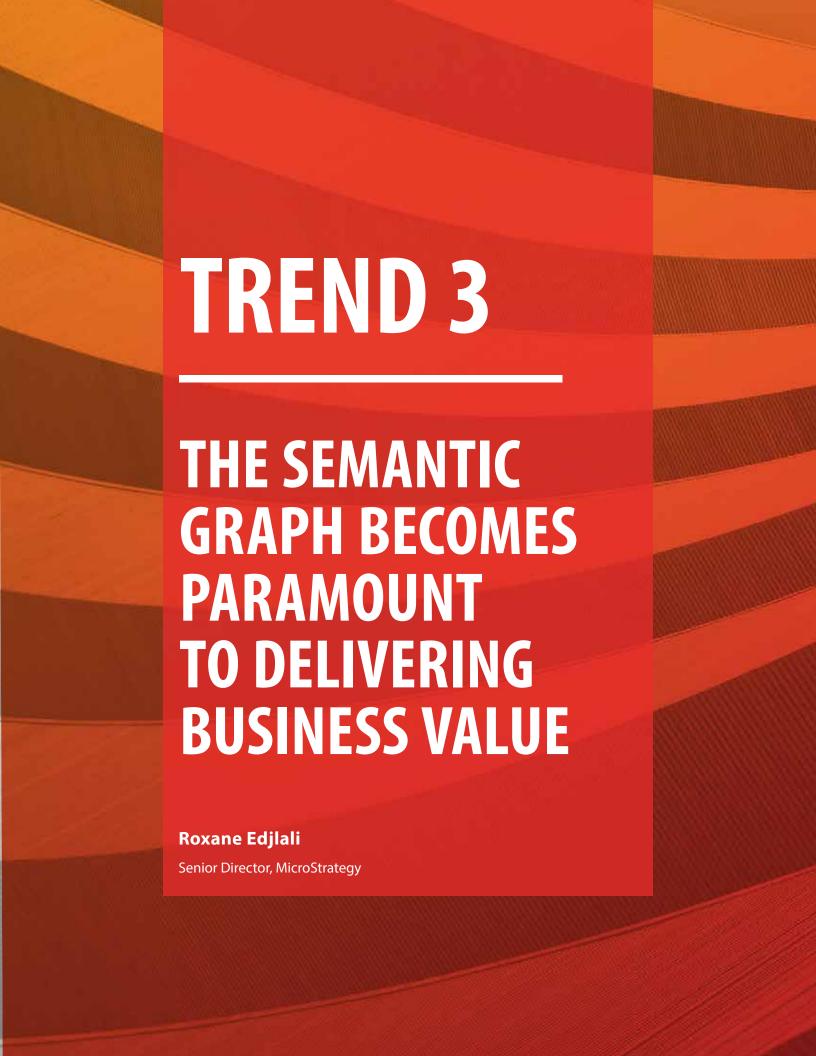> *By 2025, nearly 60% of the 175 zettabytes of existing data will be created and managed by enterprises versus consumers (compared to just 30% created and managed by enterprises in 2015)."*
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> **–IDC Data Age 2025**

Marcus Borba *is the founder of Borba Consulting, an advisory, management, and research firm that helps organizations solve complex challenges with data, developing strategies to plan and implement solutions using analytics, big data, business intelligence, machine learning, artificial intelligence, the Internet of Things, and data science. Marcus is also a member of the Boulder BI Brain Trust (BBBT), a gathering of leading consultants and analysts in big data, analytics and business intelligence. Marcus is considered a top global influencer in data science, analytics, machine learning, AI, IoT, and digital transformation, and has been recognized by Onalytica on several of its top influencers, brands, and publications lists.*

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TREND 3

THE SEMANTIC GRAPH BECOMES PARAMOUNT TO DELIVERING BUSINESS VALUE

Roxane Edjlali

Senior Director, MicroStrategy

MicroStrategy's 2020 Global State of Enterprise Analytics Report, which surveyed BI and analytics professionals from around the world, outlines three top challenges to the more effective use of analytics: (1) data and privacy concerns, (2) limited access to analytics, and (3) a lack of talent in training. Moreover, 58% of the organizations have now appointed a Chief Data Officer to drive a data and analytics strategy responsible for delivering value with data and analytics and leading organizations down the data-driven excellence path. At the same time, the data deluge continues. IDC predicts that our global datasphere—the digital data we create, capture, replicate, and consume—will grow from approximately 40 zettabytes of data in 2019 to a staggering 175 zettabytes in 2025.

As a result, it becomes obvious that with increasingly complex data landscapes, organizations can rapidly feel overwhelmed and not be able to deliver on the desired business outcomes. Delivering business value with analytics will be pressed between the complexity of the data landscape, data governance and the resulting higher costs of analysis. While increasing data literacy across the organizations will certainly help, it will not be enough, as the complexity of the data landscape will rapidly outgrow what even sophisticated users can learn.

With the growing demand for self-service, traditional approaches for structuring, organizing and modeling the data prior to using it for analytics have become too cumbersome and unable to adapt to the flexibility and the agility demanded by users. With big data, we have seen the emergence of new approaches such as data lakes where data of all formats and types can be collected in the raw form.

While access to raw data has been simplified, this has pushed more work to the users analyzing the data. The lack of data and analytics skills have become the bottleneck. Data governance considerations are also further challenging the uses of data for analytics, forcing organizations to have more traceability and transparency in analytics.

Clearly neither the traditional approach, nor the modern approaches of collecting raw data can scale to address the challenges that organizations will face moving forward. Instead users regardless of their level of proficiency need to easily find, understand, **evaluate, trust and analyze data.** This is what semantic graphs promise to deliver.

A semantic graph stores passive metadata describing the data in business terms, along with usage data about how often the data is accessed, by whom, and relationship data about where the data is coming from or how objects are used together in analysis scenarios. But a semantic graph also turns this passive metadata into active metadata. Active metadata is what allows queries and calculations over these business terms to be performed in a consistent and repeatable manner,. But active metadata also extends traditional semantic layer capabilities by supporting new use cases such as recommendations on what data to use, or guides the user by exposing a trust score for the data based on usage patterns.

A semantic graph captures, organizes and enriches metadata in a graph representation and uses graph analytics techniques to derive insights. Gartner identified graph as one of the top ten trends in data and analytics for 2019. A semantic graph combines graph capabilities and metadata representation in order to provide an augmented semantic representation of the data landscape in support of analytical workflows. It is participative in nature: it leverages the work performed by the users when building analytics or simply visualizing data, and augments it by leveraging AI and ML techniques to contribute back to the community by providing trust and relevance scores, or discovering relationships with other data sets.

The semantic graph will become the backbone supporting data and analytics over a constantly changing data landscape. It will help overcome the challenges of lack of skills and increased data governance pressures by leveraging **AI and ML,** the knowledge of the community and providing transparency in the uses of the data. Organizations not using a semantic graph are at risk of seeing the ROI for analytics plummet due to growing complexity and resulting organizational costs.

Roxane Edjlali *is the Senior Director of Product Management at MicroStrategy. Prior to joining MicroStrategy, Ms. Edjlali was a Senior Research Director at Gartner and supported clients in the evolution of their data management strategy. With two decades of experience in data and analytics, Ms. Edjlali is a seasoned data management expert. She has also held product management and strategy positions at Business Objects and SAP.*

TREND 4

HUMAN INSIGHT BECOMES EVEN MORE IMPORTANT AS DATA VOLUMES INCREASE

Chandana Gopal

Research Director, IDC

Everyone understands that in order to be successful in the digital age, enterprises have to become more data-driven in their decision making. However, bigger isn't always enough when it comes to data. It is important to understand the importance of human intellect and experience in contextualizing data and related decision making.

There is no doubt that big data is here to stay. In fact, the human mind is incapable of analyzing and processing the volumes of data that exist today, and data volumes will continue to exponentially grow. But it is easy to get carried away with the idea that big data and artificial intelligence is the future of all decision making and human insight will become irrelevant. In fact, as volumes of data increase, it becomes vitally important to ensure that decision makers understand the context and trust the data and the insights that are being generated by AI/ML, sometimes referred to as thick data (thick data is a term coined by ethnographer Tricia Wang).

In an AI automation framework published by IDC, we state that it is important to evaluate the interaction of humans and machines by asking the following three questions:

1. Who analyzes the data?

2. Who decides based on the results of the analysis?

3. Who acts based on the decision?

The answers to the three questions above will guide businesses towards their goal of maximizing the use of data and augmenting the capabilities of the human in effective decision making. There is no doubt that machines are better suited to finding

patterns and correlations in vast quantities of data. However, as it is famously said correlation does not imply causation, and it is up to the human (augmented with ML) to determine why a certain pattern might occur.

> *As volumes of data increase, it becomes vitally important to ensure that decision makers understand the context and trust the data and the insights that are being generated by AI/ML."*

Enterprises understand that it is imperative that they invest in data and analytics and train their employees to become data literate, and that big data has become the standard catchphrase as a data strategy. However, as more and more knowledge workers become comfortable working with data, they should also become conversant with data ethnography, or the study of what the data relates to, the context in which it was collected, and the understanding that data alone might not give them a complete picture. Big data analytics works by anonymizing records and detecting mathematical patterns that are most effectively detected on large volumes of data, while thick data provides contextualized insights.

There are five primary characteristics of decision types that take place within organizations: scope, latency, variability, ambiguity, and risk. For decisions that have a broad scope, high variability, ambiguity, and/or risk, decision makers have to use both big data and thick data to get a complete picture before making a decision.

A personal anecdote on the need for both types of data involved a visit to my optometrist. During a consultation, he mentioned that he has access to eye measurements of thousands of patients and that using that data, he can get to a diagnosis quickly by comparing my metrics to those of the large data set.

Being an analyst, my next question was, why do I need to visit a doctor if a machine could provide a diagnosis? It turns out that the machine was mostly accurate in creating my prescription, except for a big difference in the astigmatism in my right eye. My optometrist told me that my brain had learned to compensate for the defect in my eye, and he knew that from his experience and my decades-long history with him.

The machine was able to augment his ability to treat his patient by reducing the amount the time it took to get baseline measurements without the manual trial and error process, and his expertise

made sure that I had the correct prescription. The bottom line is that the combination of big data and human expertise gives us a much more complete picture than just big data alone, and enterprises should consider both as part of their data and analytics strategies.

> *IDC predicts that our global datasphere—the digital data we create, capture, replicate, and consume—will grow from approximately 40 zettabytes of data in 2019 to 175 zettabytes in 2025."*

–IDC Data Age 2025

Chandana Gopal is the Research Director for IDC Business Analytics Solutions' market research and advisory practice. Her core research coverage includes demand and supply trends in business intelligence, advanced and predictive analytics, and enterprise performance management markets. Based on her background in integration and analytics, Chandana's research includes a particular emphasis on how analytics is being embedded into software applications, how artificial intelligence is being embedded into business analytics software, and how end users' requirements are driving technology design. She is a frequent speaker, presenter, and moderator at industry conferences and women in technology events, and is a regular contributor to media outlets such as CNBC.

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TREND 5

NEXT-GENERATION EMBEDDED ANALYTICS SPEEDS TIME TO INSIGHTS

Doug Henschen

VP & Principal Analyst, Constellation Research

Embedded analytics will be a trend to watch in 2020, but not the type of embedding that many people associate with this term. For many years, embedded analytics has been associated with licensing the core of well-known BI and analytics products to independent software vendors (ISVs) to enable them to deliver reporting, dashboarding, and ad hoc analysis capabilities within their products. With the move of most software-based offerings into the cloud in recent years, providers of embedded BI and analytics capabilities have had to modernize to microservices-based architectures and RESTful APIs to meet the demands of the market.

There are two shifts now happening that are changing the nature of embedding and broadening demand. For starters, the push toward digital transformation and innovation is driving innovative organizations to explore the embedding of analytics within data-driven products and services. I'm not talking about ISVs here; I'm talking about "end user" organizations that are not in the business of selling software.

There's a popular saying these days that every company is becoming a software company, but that's a bit of an overstatement. Constellation observes that it's the pioneers and fast followers who are leading the way on developing data-driven services and business models. They're taking advantage of modern embedded analytics capabilities that are exposed through granular microservices.

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The latest technologies are enabling developers to expose precise analytics—KPIs, micro charts, stats and alerts—within the applications where business people do their work and in the context of decision points. This style of concise embedding doesn't force users to toggle between separate analytical interfaces—such as full-page reports and dashboards—and the transactional and productivity applications where people do their work. The approach brings data-driven insight to more users because the analytics are right there in the context of transactions, and it's a better option for supporting specific business decisions.

The second shift that is fueling the next generation of embedded analytics is time pressure. With today's speed of business change and with decision-making only accelerating, users of analytics have less time. People increasingly want and expect near-real-time or even real-time insight, and they have less time to go off to separate analytical interfaces, scan them for desired insights, and interpret collections of visualizations.

Concise analytics delivered in the context of specific applications and interfaces speed decision making. This style of embedding and the curation of concise, in-context analytics can take more time, but with advances including no-code and low-code development methods, we're seeing rising adoption of next-generation embedding.

Doug Henschen focuses on data-driven decision making. His Data-to-Decisions research examines how organizations employ data analysis to reimagine business models and gain a deeper understanding of their operations and customers. His research acknowledges the fact that innovative, data-driven applications require a multi-disciplinary approach, starting with integration and orchestration technologies, including next-generation data platforms, continuing through business intelligence and advanced analytics, and increasingly harnessing machine learning and cutting-edge data science.

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Most organizations and certainly all leading organizations have invested a lot of money in harnessing data to drive better decision making. The first wave of BI reporting and the second wave of self-service analytics did a great deal to help organizations make decisions based on facts rather than gut feel. Nonetheless, a gap persists between analysts and general business users.

Adoption of BI and analytics platforms remains constrained by cost and complexity. Constellation sees next-generation embedded analytics, along with low-code and no-code development methods and mobile and natural-language interfaces, as developments that will bring in-context insight and, therefore, better, action-driving decision support to more business people."

–Doug Henschen, Constellation Research

TREND 6

THE NEED TO COMBINE DATA SOURCES CONTINUES TO GROW

David Menninger

SVP & Research Director, Ventana Research

With the next decade, we expect to see a continued focus on data diversity. Organizations rarely have a single standard platform for their data and analytics. It exists on-premise and in the cloud, in relational and non-relational formats. Multiple tools are used to access the data.

The need to combine these data sources will continue to grow. Many organizations are applying data virtualization or federation techniques to combine data sources without making a copy of the data.

Our research shows that more than a quarter (27%) of organizations provide virtualized data access today and nearly three quarters (73%) will eventually provide such capabilities.

Those organizations that adopt a shared fabric among their data and analytics technologies will have an advantage over those that retain a siloed approach.

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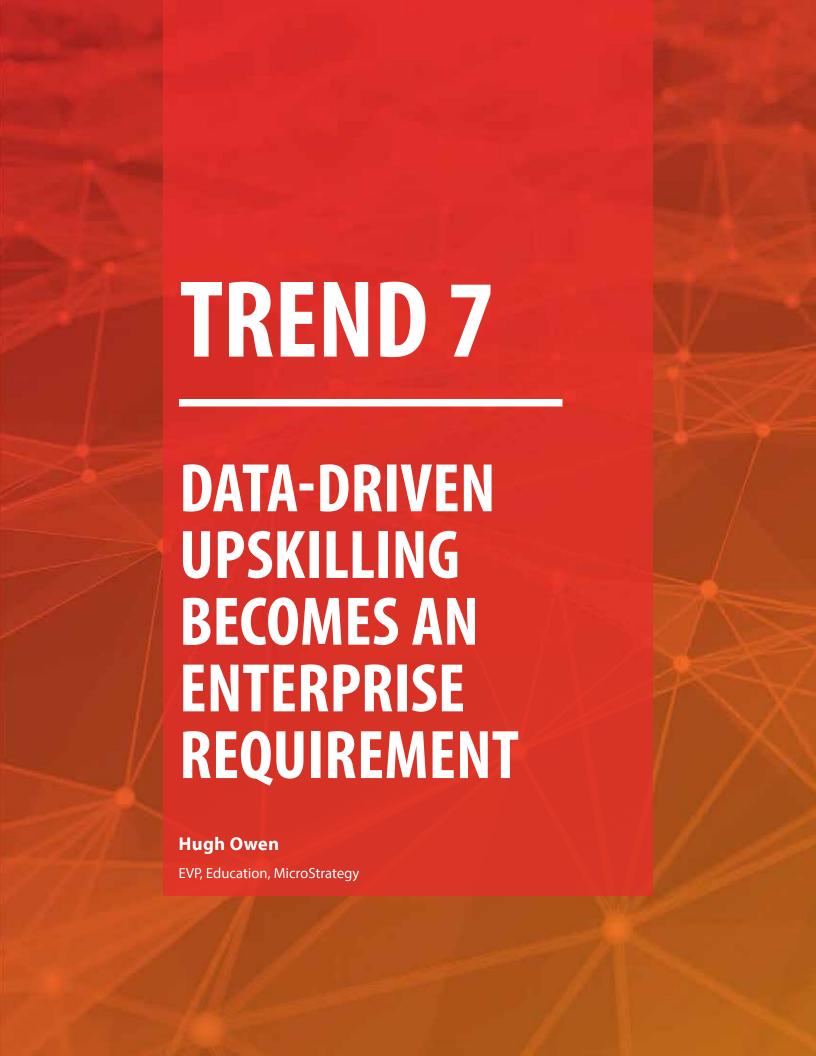*Our research shows that more than a quarter (27%) of organizations provide virtualized data access today and nearly three quarters (73%) will eventually provide such capabilities.*

__David Menninger__ is responsible for the overall research direction of data, information, and analytics technologies at Ventana Research, covering major areas including analytics, big data, business intelligence, and information management, along with the additional specific research categories including IT performance management and IoT. He has more than 25 years of experience bringing leading-edge data and analytics technologies to market. David served as the Head of Business Development Strategy at Pivotal (Dell/EMC) and VP of Marketing and Product Management at Vertica Systems, Oracle, Applix, InforSense, and IRI Software.

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TREND 7

DATA-DRIVEN UPSKILLING BECOMES AN ENTERPRISE REQUIREMENT

Hugh Owen

EVP, Education, MicroStrategy

In 2020 and beyond, enterprise organizations will need to focus their attention not just on recruiting efforts for top analytics talent, but also on education, reskilling, and upskilling for current employees as the need for data-driven decision making increases— and the shortage of talent grows.

In a Business Higher Education Forum (BHEF) and Gallup survey, 59% of employers said that this year, data science and analytics skills will be required of all their finance and accounting managers; 51% said they will be required of all marketing and sales managers; 49% said they will be required of all executive leaders; and 48% said they will be required of all operations managers.

In addition, a BHEF and PwC report notes that this year, there will be approximately three million new job postings for data science and analytics roles. The World Economic Foundation (WEF) confirms this analytics talent demand in its Future of Jobs report, putting data analysts and scientists at the top of its list of 20-plus in-demand roles.

The WEF report also predicts that as many as 133 million new roles may emerge related to a new division of labor between humans, machines, and algorithms. These include AI and machine learning specialists, big data specialists, information security specialists, and process automation specialists. These roles will require significant reskilling and upskilling, says the World Economic Foundation, which predicts that by 2022, more than half of all employees will need new skills and training to adapt to the future of work.

While it's a great time to be studying these skills at university, tomorrow's future supply of talent isn't on track to meet enterprise organizations' needs. Educators say only 23% of all graduates in 2021 are on course to hold data and analytics-related skills.

That means, for organizations to have the talent they want and need tomorrow, they need to put in place now the strategy and investments to grow their own talent in house through education.

__Hugh Owen__ is the Executive Vice President in charge of Education for MicroStrategy. Previously, he was the SVP of Product Marketing, responsible for the product marketing of MicroStrategy's enterprise analytics and mobility platforms. Prior to running Product Marketing, Hugh launched and ran MicroStrategy's Mobile Product business (launch in 2010). From 2006-2010, he worked as a Senior Product Manager, during which he launched multiple new MicroStrategy Business Intelligence products. From 2000-2006, he cut his BI teeth in MicroStrategy Technology Services as a Technical Support Engineer and Premium Support Engineer.

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–America's Data Science and Analytics Talent: The Case for Action

TREND 8

AI IS REAL AND READY

Srividya Sridharan

VP & Research Director, Forrester Research

Mike Gualtieri

VP & Principal Analyst, Forrester Research

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Craig Le Clair

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Principal Analyst, Forrester

Andrew Hogan

Principal Analyst, Forrester

The following is an excerpt from the Forrester report, *Predictions 2020: Artificial Intelligence—It's Time to Turn the Artificial Into Reality (Checks):*

In 2019, 53% of global data and analytics decision makers say they have implemented, are in the process of implementing, or are expanding or upgrading their implementation of some form of artificial intelligence. Twenty-nine percent of global developers (manager level or higher) have worked on AI/machine learning (ML) software in the past year. Fifty-four percent of global mobility decision makers whose firms are implementing edge computing tell us that the flexibility to handle present and future AI demands is one of the biggest benefits they anticipate with edge computing. And 16% of global B2C marketing decision makers plan to increase spend on data and analytics technologies, including AI, by 10% or more this year.

It's clear that many groups across the enterprise have tiptoed into AI. But to take full advantage of it, they must overcome challenges in how to prioritize use cases, acquire the right talent, design a governance framework, and choose relevant technologies. While external market events in 2020 may tempt companies to play it safe with AI, the courageous ones will continue to invest.

In 2020, Forrester predicts that:

Confident CDAOs and CIOs will come to the rescue to break data logjams. It's a common refrain: data scientists spend 70%, 80%—do I hear 90%?—of their time prepping data before they can even begin to build ML models or gain any AI value.

It's true. Data scientists often struggle to acquire, transform, and prepare the data they need to start an ML project. Data lakes, data engineers, and data prep tools have helped, but the real problem is sourcing data from a complex portfolio of applications and convincing various data gatekeepers to say yes.

In 2020, senior executives like chief data and analytics officers (CDAOs) and CIOs who are serious about AI will come to the rescue, with a top-down mandate to get around the data problem. Firms with chief data officers (CDOs) are already about 1.5 times more likely to use AI, ML, and/or deep learning for their insights initiatives than those without CDOs. Leadership matters. Next year, more of these confident CDAOs and CIOs will see to it that data science teams have what they need in terms of data so that they can spend 70%, 80%, or 90% of their time actually modeling for AI use cases.

Source: Srividya Sridharan, Mike Gualteri, J.P. Gownder, Craig Le Clair, Ian Jacobs, Andrew Hogan, <u>Predictions 2020: Artificial Intelligence—It's Time to Turn the Artificial Into Reality (Checks)</u>, Forrester, October 30, 2019.

Srividya (Sri) Sridharan serves customer insights professionals. She leads a team of analysts focusing on helping businesses collect, manage, analyze, and apply customer data to win, serve, and retain customers. Specifically, her team focuses on advanced analytics, predictive analytics, customer analytics, business intelligence, and artificial intelligence.

Mike Gualtieri's research focuses on artificial intelligence (AI) technologies, platforms, and practices that enable technology professionals to deliver digital transformations that lead to prescient digital experiences and breakthrough operational efficiency. His key technology coverage areas are AI and emerging technologies that make software faster, smarter, and transformative for global enterprises and organizations.

J. P. Gownder is a vice president and principal analyst serving CIOs, CTOs, and other technology and business leaders. He leads Forrester's research into the impact that automation technologies like artificial intelligence, smart software, robotics, and customer self-service have on the future of work, the future of jobs, and the economy.

Craig Le Clair serves enterprise architecture and business process professionals. He is an internationally recognized expert in automation, AI, and the future of work. His technology coverage areas include robotic process automation, AI solutions in financial services, and the potential workforce disruption due to these technologies.

Ian Jacobs serves Application Development and Delivery Professionals. With a focus on the digital transformation of customer service, he is an expert in contact centers. His research keeps a sharp focus on customer experience and agent experience issues.

Andrew Hogan is a principal analyst serving customer experience professionals. He focuses on experience design—specifically user interface (UI) and user experience (UX) design for websites, apps, messaging, and digital-physical interactions.

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> *Firms with chief data officers (CDOs) are already about 1.5 times more likely to use AI, ML, and/or deep learning for their insights initiatives than those without CDOs.*"

–Predictions 2020: Artificial Intelligence— It's Time to Turn the Artificial Into Reality (Checks), Forrester

TREND 9

MOBILE INTELLIGENCE EVOLVES FOR 2020 AND BEYOND

Mark Smith

CEO & Chief Research Officer, Ventana Research

Mobile devices are part of nearly everything we do in life, and they should be in business. Two-thirds of the world's population is connected via a mobile device and the global 5G network will raise expectations for immediate and real-time conversational access to contextual and personalized information. In the next decade, the use of mobile devices to gain a new level of intelligence on any situation will be expected.

As mobile devices finally become an established platform for conducting business, organizations and the workforce will expect applications and information to be simple and sophisticated using the technology of the mobile device. No matter if it is taking action or making decisions, the insights that are provided to workers needs to be intelligent and immediately actionable.

Our Ventana Research finds virtually every organization (96%) reporting that the use of mobile technology has improved access to and use of data and analytics in the cloud. To provide the best possible work experience will require effective use of mobile technology for everything that is done in business.

Mobile computing will re-emerge as one of the most significant technology opportunities in the next decade as the technology has become more powerful and adopted than ever before. We at Ventana Research assert that by 2022, half of organizations will re-examine their use of mobile devices and conclude that their technology does not adequately address the needs of their workers, leading them to examine a new generation of mobile applications that enable a better work experience and far more effective connectivity to the rest of the organization and to customers. Using the speech and conversational power or the camera on mobile devices to augment what is seen with contextual information and actionable insights can lead to a higher level of organizational intelligence.

Embrace information technology that exploits the potential of mobile devices to enable simpler and smarter ways to work. Ensure that you use the intelligence of the devices and your information to deliver personalized and intelligent information. Now is the time to move beyond the clumsy information technology of the past. Those businesses that reassess and guide their investments to exploit mobile devices will increase their worker effectiveness and employee experience.

Mark Smith is responsible for the overall business and research direction of Ventana Research and drives the global research agenda covering both business and technology areas. He is an expert in enterprise software and business technology innovations, including business analytics, big data, cloud computing, business collaboration, mobile technology, and social media. Mark has held CMO, research, and product development roles at a variety of research and software companies. Mark started Ventana Research more than a decade ago and has worked in the software industry for 25 years leading innovations in research and technology. Mark was rated the 2011 software industry analyst of the year by The Institute of Industry Analyst Relations (IIAR).

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By 2022, one-half of organizations will re-examine the use of mobile devices and conclude the technology being used does not adequately address the needs of their workers, leading them to examine a new generation of mobile applications."

–Ventana Research

TREND 10

THE FUTURE
OF EXPERIENCE
MANAGEMENT IS
POWERED BY AI

R "Ray" Wang

Founder & Principal Analyst, Constellation Research

Experience management today is powered by manual and hard-coded rules, policies, and conditions. As apps get decomposed by business process to headless microservices, automation and intelligence will play a big role in creating mass personalization and mass efficiencies at scale. The Intelligent Enterprise will take context and data to power next best actions.

The transformation in journey design moves from agile and flexible to intention-driven and AI powered. This means ambient experiences that naturally happen in the background based on context, choices, and anticipatory analytics. Intention-driven design deliberately and explicitly empowers customers to move from contextual scale to individual scale and craft their own highly personalized and sentient user experiences. In fact, these experiences must be natural, intelligent, adaptive, and automatic.

Powering these ambient experiences is a combination of smart services that rely on artificial intelligence (AI); apply journey orchestration; pull context from the Internet of Things (IoT) and other sources; and deliver experiences in mixed reality and physical reality. AI-driven smart services not only deliver on customer experiences but also create digital feedback loops for employees, suppliers, partners, and machines.

Because AI-driven smart services require offloading the decision-making responsibility to atomic-driven smart services, the foundation of any AI-driven smart service is trust. Here's how the five key components of AI-driven smart services orchestrate trust:

Digital footprints and data exhaust use AI to build anonymous and explicit profiles. Every individual, device, or network generates information, digital footprints, or "exhaust" that can come from such disparate sources as a network IP address, facial analysis, or even one's walking gait. Using AI and cognitive reckoning, smart services can analyze patterns and correlate identity, recognizing and knowing individuals across contexts.

> "AI-driven smart services play a key role in crafting and addressing the never-ending battle to meet customer expectations by reducing errors, improving decision-making speed, identifying demand signals, and predicting outcomes."

Immersive experiences enable a natural interaction. AI-driven smart services employ context, content, collaboration, and multiple channels to deliver immersive and unique experiences to each individual. The services will use context attributes such as geospatial location, time of day, weather, heart rate, and even sentiment—combined with

what the service knows of our identity and preferences—to improve relevancy and deliver the appropriate content. Sense-and-respond mechanisms will enable collaboration among participants and machines through conversations and text dialogues. Channels include all interaction points—mobile, social, kiosks, and in-person. The goal is natural user experiences based on identity.

Mass personalization at scale delivers digital services. Anticipatory analytics, catalysts, and choices interact to power mass personalization at scale. With anticipatory analytics, customers will "skate where the puck will be." Catalysts provide offers or triggers for responses. Choices allow customers to make their own decisions. Each individual or machine will have unique experiences in context depending on identity, historical preferences, and needs at the time. From choose-your-own-adventure journeys, context-driven offers, and multi-variable testing on available options, the AI systems offer statistically driven choices to incite action.

Value exchange completes the orchestration of trust. Once an action is taken, a value exchange cements the transaction. Monetary, non-monetary, and consensus are three common forms of value exchange. While monetary value exchange might be the most obvious, non-monetary value exchange (including recognition, access, and

influence) often provides a compelling form of value. Meanwhile, a simple consensus or agreement can also deliver value exchange—e.g., the validity of a land title, or agreement on a patient treatment protocol.

Cadence and feedback continues an AI-powered learning cycle. Powered by machine learning and other AI tools, smart services consider the cadence of delivery: one time, ad-hoc, repetitive, subscription-based, and threshold-driven. Using machine learning techniques, the system studies how the smart services are delivered and applies this to future interactions and facilitates the digital feedback loop.

Successful AI-driven smart services will augment human intelligence just as machines augmented physical capabilities. AI-driven smart services play a key role in crafting and addressing the never-ending battle to meet customer expectations by reducing errors, improving decision-making speed, identifying demand signals, and predicting outcomes.

Organizations need to build a foundation from data, context, journey design, and recommendation engines.

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