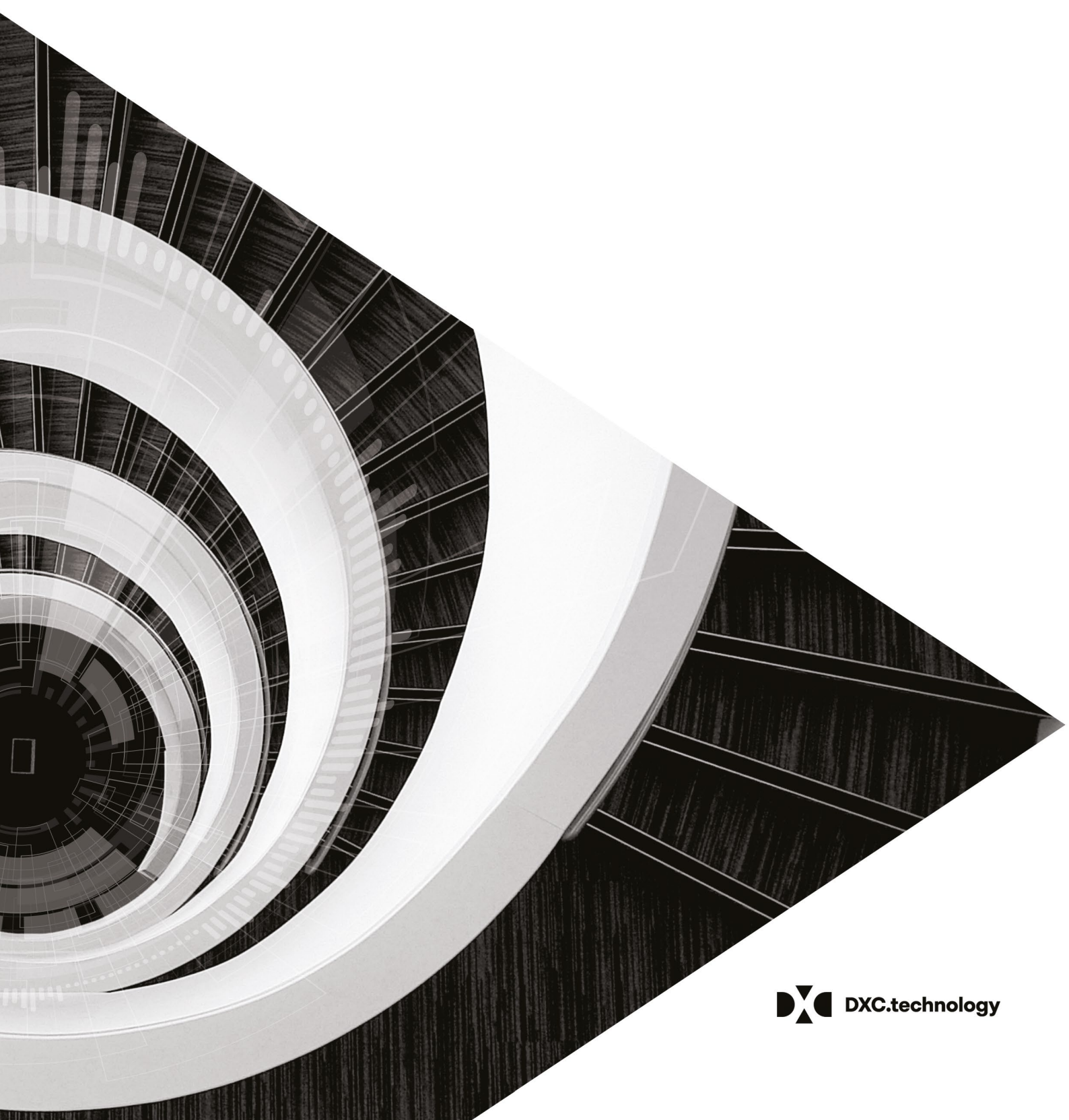
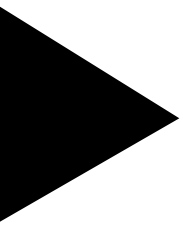


Embed advanced analytics into every aspect of your digital business





Surviving and prospering in the age of analytics-enabled disruption is the most pressing issue organizations will address in the coming years. Those that put analytics at the core of their strategy and operations will benefit from an accelerated pace of change.

The way to drive the next wave of productivity is to think about business processes, interactions and transactions as information flows. The goal is to embed advanced analytics in each process, interaction and transaction, effectively enabling frictionless integration of information and analytic models directly into process flows. Advanced analytics takes advantage of a wealth of unstructured data and sensor data to complete the feedback loop between business processes and information, creating an analytics capability that is so central to the operation of the enterprise, it actually becomes the business model.

Advanced analytics, a boundless supply of data and new machine-augmented capabilities are creating entirely new opportunities for organizations to compete in an age of transformation.

Gone are old-style IT reports and dashboards, replaced with agile business processes and artificial intelligence (AI)-driven systems that can deliver business insights in context, with speed, to everyone in the organization. Leveraging intelligent analytics accelerates the fusion of minds and machines and, as work becomes more automated, the information worker becomes a creative worker — one who will drive the new economy forward.

Surviving and prospering in this age of analytics-enabled disruption is the most pressing issue organizations will address in the coming years. Those that put analytics at the core of their strategy and operations will benefit from an accelerated pace of change.

Analytics-enabled business models

Enterprises need to think of their business in terms of information flows. For example, APIs unlock information and deliver it with low friction to enrich and enhance business processes. APIs can further be interlinked into information flows to improve their relevancy. Often these flows are disconnected in enterprise business processes that have manual steps (i.e., people providing information) that could be automated. Further, analytics can be applied on the information flows to enhance outcomes of business processes or activate alerts when additional attention is required.

So, the way to drive the next wave of productivity and growth is to think about business processes, interactions and transactions as information flows. The goal is to embed advanced analytics in each process, interaction and transaction, effectively enabling frictionless integration of information and analytic models directly into process flows. Advanced analytics takes advantage of a wealth of unstructured data and sensor data to complete the feedback loop between business processes and information, creating an analytics capability that is so central to the operation of the enterprise, it actually becomes the business model.

Augmenting business process flows with relevant information and outputs of analytic models not only makes business processes more flexible, but also enhances decision-making power at each process step by adding visualization of the process flow status and decision-making recommendations produced by the analytic models. Here are several examples:

- As an early adopter of advanced analytics, the securities industry is now defined by automated, algorithm-centric trading and AI-based advisors that outperform professional money managers.
- Insurance carriers, which famously clung to decades-old legacy hardware and software, are wholeheartedly embracing analytics-driven systems to target profitable market segments, speed up claims processing, reduce fraud and increase the number and degree of fully automated processes.
- Analytics derived from data generated by a wide variety of sensors in all aspects of manufacturing operations are helping to optimize manufacturing processes, enabling organizations to manufacture more efficiently, with reduced asset maintenance costs and reduced working capital.
- In healthcare, advanced analytics are poised to bring benefits to providers, payers and patients by improving fraud detection, population health, asset tracking and the overall patient experience.

How AI and analytics will transform the auto industry

The race to build fully autonomous cars has gone into hyperdrive, with major carmakers promising fully autonomous driving in 2021. The only way the car companies can meet their ambitious goals is by leveraging the power of analytics and artificial intelligence (AI) to learn on real-world roads and accelerate development using simulations.

Here's what's required to manage the data and make autonomous vehicles a reality:

1. **Meet the data challenge.** Tests for autonomous cars generate 6 to 8 gigabytes of data per second per car.
2. **Bridge the automotive research and development (R&D) world and the data science worlds.** Bringing these disciplines together would expose carmakers to innovative technologies that could help contend with the data generated by R&D cars, such as globally distributed data lakes.

3. **Make data usable and connect it.** By using big data analytics, it's possible to get a several-hundred-gigabyte file into the hands of engineers in minutes rather than days. Fast access and analysis at the sensor level is desirable. But only bringing data into the autonomous driving data model, capturing metadata of the sensor data streams, brings complete value.
4. **Reduce the data volume by being selective.** Engineers can use AI to determine which elements of the data are valuable. Engineers don't want hours of video of the car in cruise control; they want to see how the autonomous vehicle behaved when it came to a crossing or had some interaction with the environment.
5. **Optimize autonomous data.** During a test drive, if the autonomous shadow driver makes a different decision than the human driver, that should be recorded. Similarly, when semiautonomous cars are corrected by human drivers, this must be noted. The goal: Create a culture of continuous improvement.

Autonomous driving has become more of a computer and data science problem than a car manufacturing issue, which explains why companies such as Alphabet's Waymo are leading the way. However, if the carmakers act decisively, the tech groups may not maintain that leadership. Carmakers must team with leading computer and data science companies to catch up.

Advanced analytics take advantage of a wealth of unstructured data and sensor data to provide predictive and prescriptive analytics and business models, as well as rules to drive optimal behaviors across complex enterprise ecosystems. Astute organizations are harnessing advanced analytics to profitably upsell and cross-sell, optimize operations, and run their own information systems and processes more efficiently.

Be the disruptor, not the disrupted

The race is on, and successful organizations are already using data and advanced analytics as competitive assets. Those that successfully harvest vast troves of data can improve productivity, make faster and more accurate decisions, reduce costs, increase competitive advantage, discover new business models and innovations, and better engage customers, employees and partners.

They will adapt quickly and predict trends by continuously discovering value from data and turning it into insights to drive value. These organizations will be recognized as disruptors in the digital revolution, capable of driving exponential organizational value and continuous improvement. They will be branded as high Analytics IQ organizations.

Organizations that do not have a high Analytics IQ will not be able to scale and industrialize their analytics and AI efforts; instead, they will remain stuck in the realm of ad hoc analytics characterized by many repeated proof-of-concept exercises and pilot projects, with no visible business outcomes.

LEF Perspective

The power of sensing engines

To anticipate market changes and customer desires, smart companies use sensing engines as part of an outside-in strategy to listen to the market, figure out what the market wants and responding accordingly. A sensing engine analyzes consumption data to reveal activities that are in high demand, on the rise, or falling. Such data can show where subtle changes in the market might indicate trends.

A good example — though controversial for its privacy implications — is Facebook's VPN app. Facebook established a sensing engine by using the VPN app to route users' mobile traffic through Facebook servers. Applying analytics, Facebook could discover which competitors were becoming popular and either clone their functionality or acquire them. Although well-intentioned, the approach turned out to be controversial, and the company had to remove the app over privacy concerns.¹

However, there is much less controversy when a company mines its own data. Consider Amazon Web Services. AWS can monitor the third-party products and functionality customers use and then build those capabilities into its software stack. In essence, others innovate and test the market, and Amazon uses its consumption data to make decisions on what features to build next.

Identifying effective sensing engines is not always easy. Depending on the nature of the business, it might be as simple as monitoring consumption (Amazon) or as complicated as finding new functionality in another business that could be cloned (Facebook). Either way, good sensing cannot be done without analytics-oriented solutions, as the sensing engine will be useless if its data cannot be mined.

Leading Edge Forum (LEF) is DXC Technology's independent cross-industry think tank.

By comparison, high Analytics IQ organizations will have strategy, culture and continuous-improvement processes in place to enable them to identify and develop new digital business models to better serve their customers and remain competitive. They will have moved from ad hoc to operationalized analytics.

Raising your organization's Analytics IQ

The journey to a higher Analytics IQ comprises three steps: accelerate the digital transformation agenda, build a data-centric foundation, and operationalize analytics and AI across the organization.

1. Accelerate the digital transformation agenda

Rapid innovation and productivity breakthroughs require an accelerated digital transformation strategy that melds people, business processes, advanced analytics, and new human/machine interaction technologies.

Today, it is the supervised machine learning segment of AI that is generating the most economic value. But as digital transformation accelerates, the abundance of data that AI can consume will drive the speed of AI adoption even faster, including its unsupervised learning segment.

We need only look at how quickly conversational AI (CAI) has become part of our everyday lives as we query Alexa, Siri or Cortana. But in the enterprise the

interactions can be extremely complex, such as “Hey <CAI>, summarize the minutes and action items from the recording of the last board meeting.” We are limited by only our imagination and — significantly — access to high-quality, well-organized data.

The accelerated AI adoption will in turn drive better understanding of how to customize AI for the relevant business context and drive digital transformation to new levels. It will provide instant measures of business performance down to the smallest task, leading to more predictive business outcomes, as well as enhance productivity and 24x7 business operations through automation of business processes and algorithmic work.

As AI permeates every facet of the organization, organizations will need industrialized AI with strong governance and data quality. They will need to manage analytics models as assets to avoid algorithmic bias, retrain analytics models in a timely manner and ensure proper use of private data.

As we become better at blending advanced analytics technologies with how we think and work, there will be massive implications for how we run our companies and live our lives. It will be up to all of us to make sure that advanced analytics are used for ethical purposes.

2. Build a data-centric foundation

The next step is to build a data-centric foundation that can scale with growing organizational needs, enable innovation, increase predictability, improve forecasting accuracy, detect new behavior patterns, and deliver information insights in the context of processes and applications. Companies such as Apple, Amazon, Google, Netflix, Uber and Airbnb have shown how to build such data-centric foundations and disrupt traditional markets.

To build a data-centric foundation, adopt a hybrid data management (HDM) approach and reference architecture, and implement the industrialized analytics and AI platforms based on it:

- **Hybrid data management.** HDM is the foundation of a modern approach to advanced analytics and involves optimizing traditional business intelligence (BI) and data warehousing, blending in big data analytics, creating analytics and data solutions across the spectrum of edge/cloud/on-premises resources, and embedding prescriptive analytics models into operations and business processes. HDM provides a comprehensive data strategy for instituting industrial-scale analytics integrated into organizational processes and systems that leverage any type of data wherever it resides and enables organizations to become analytics-driven and agile.
- **Hybrid data management reference architecture.** The HDM-RA is the foundation for building technical design blueprints for analytics and AI solutions. HDM-RA is an end-to-end architecture, a selection of recommended technologies and implementation blueprints for each functional domain, and use case-based design patterns to deliver HDM solutions in cloud, on-premises and edge deployment models with security and information governance that meets compliance and regulatory requirements. HDM-RA addresses distributed aspects of data, such as which data should reside where, so it fully supports the data and analytics needs of a modern, predictive organization.
- **Industrialized analytics and AI platform.** An industrialized analytics and AI platform is an integrated infrastructure, software and services solution based on HDM-RA — often with a managed data lake at the center. It manages data and



**By 2020, 50%
of customers
will have
experienced
a customer
support
interaction that
is AI based.**

Source: IDC FutureScape: Worldwide Customer Experience 2018 Predictions (Doc # US43155317 / Oct 2017)



By 2021, 50% of enterprise infrastructure will employ some form of cognitive and artificial intelligence to improve enterprise productivity, manage risks and drive overall cost reduction.

Source: IDC FutureScape: Worldwide IT Industry 2018 Predictions (Doc #US43171317 / Oct 30, 2017)

analytics model life cycles and enables business insights in context of the work being performed, to augment the decision making of creative workers who need timely information to do their jobs. It analyzes all organization-relevant data from any source, in any format, and from any location — with extreme speed, security and scale. As the data generated by devices explodes, the internet of things (IoT) will not deliver the benefits promised without the ability to analyze and handle data at scale. An industrialized analytics and AI platform also gives organizations the flexibility to move seamlessly between cloud and on-premises deployments to meet organizations' dynamic data and analytics requirements. As technological complexity increases, new technological components can be rapidly integrated into the platform, thanks to HDM-RA.

3. Operationalize analytics and AI across the organization

Operationalized analytics are the interoperation of multiple disciplines to support the seamless flow of data, from initial analytic discovery to embedding predictive and prescriptive analytics into organizational operations, applications and machines. It is a key element for delivering value from IoT. The impact of the embedded analytics is then measured, monitored and further analyzed to circle back to new analytics discoveries in a continuous improvement loop, much like a fully matured industrial process.

An example of operationalized analytics is the industrialized AI utility depicted on the next page. It enables automatic access and collection of data, ingesting and cleaning of the data, agile experimentation through automated execution of algorithms, and generation of insights.

Operationalized analytics build on HDM, HDM-RA and the industrialized analytics and AI platform to enable organizations to implement industrial-strength analytics as a foundation of their digital transformation. Operationalized analytics encompass the following:

- **Data discovery** includes the data discovery environment, methods, technologies and processes to support rapid self-service data sharing, analytics experimentation, model building, and generation of information insights.
- **Analytics production and management** focuses on the processes required to support rigorous treatment and ongoing management of analytics models and analytics intellectual property as competitive assets.
- **Decision management** provides a clear understanding of, and access to, the information needed to augment decision making at the right time, in the right place and in the right format.

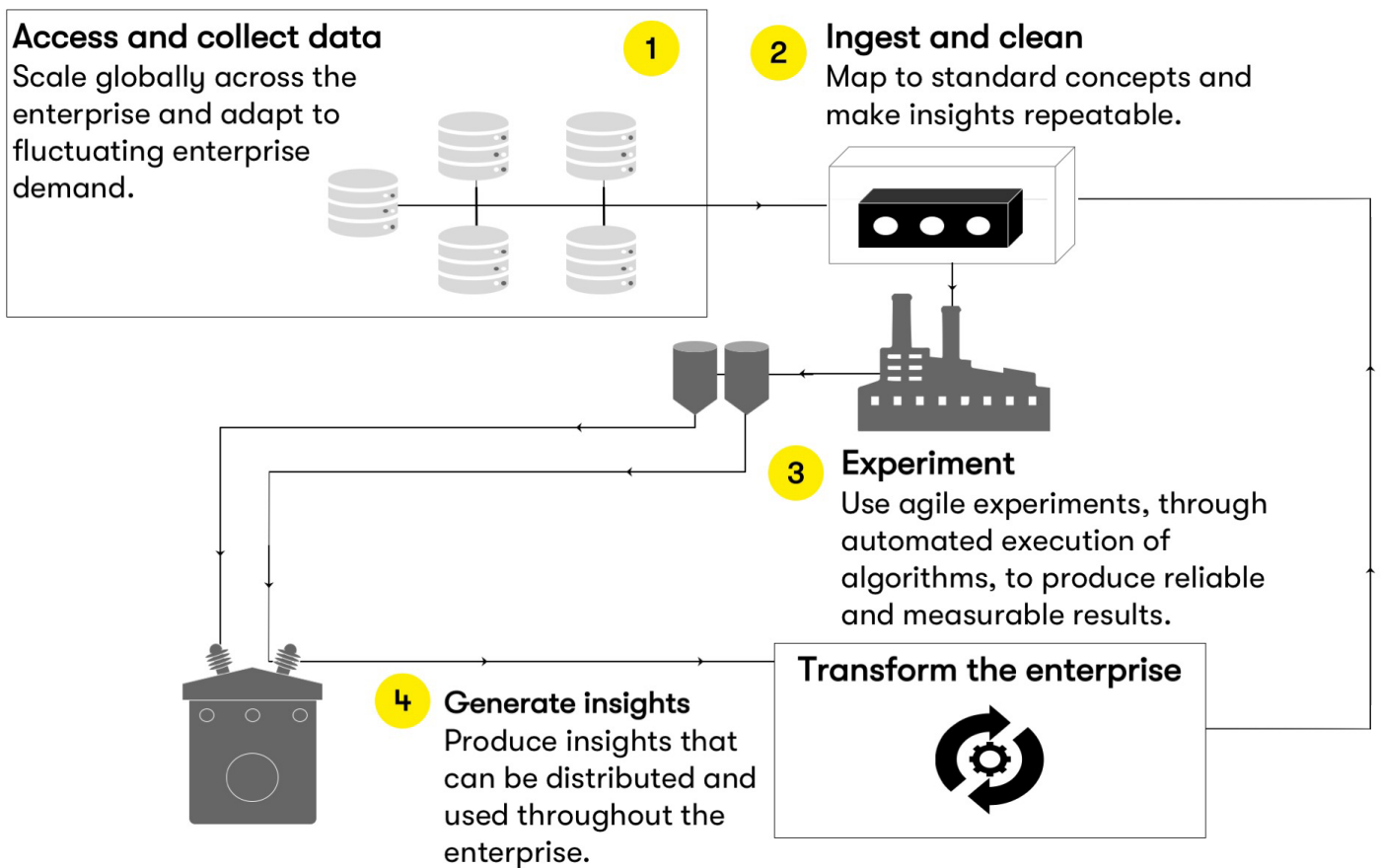


Figure 1. Four functions of an industrialized AI utility

- **Application integration** incorporates analytics models into enterprise applications, including customer relationship management (CRM), enterprise resource planning (ERP), marketing automation, financial systems and more.
- **Information delivery** of relevant and timely analytics information to the right users, at the right time and in the right format is enabled by self-service analytics and data preparation. This improves the ease and speed with which organizations can visualize and uncover insights for better decision making.
- **Analytics governance** is the set of multidisciplinary structures, policies, procedures, processes and controls for managing information and analytics models at an enterprise level to support an organization’s regulatory, legal, risk, environmental and operational requirements.
- **Analytics culture** is key, as crossing the chasm from ad hoc analytics projects to analytics models integrated into front-line operations requires a cultural shift. Merely having a strong team of data scientists and a great technology platform will not make an impact unless the overall organization also understands the benefits of analytics and embraces the change management required to implement analytically driven decisions.
- **DataOps** enables organizations to evolve their approach and improve their ability to work with data at scale and to respond to business events as they happen. The emerging practice of DataOps brings together specialists in data science, data engineering software development, and operations to align development of data-

The simplest route to an AI-driven enterprise

The simplest way to discover your artificial intelligence (AI) potential is to analyze areas of the business with the largest intelligence gaps. Prioritize areas by their potential to improve the company. Then, begin filling the gaps with AI.

The simplest way to build an AI application is to follow the scientific method: Form a hypothesis; model the problem domain; build, train and test the algorithm; predict the business impact; and monitor the results. Decide on the minimum functionality you need to deliver business value. Gather just enough data to model the business domain and run an experiment.

Treat AI platforms as commodities. Design the AI applications so that platform components can be plugged into and swapped out of the existing legacy infrastructure. Choose technologies capable of running AI as widely available, reliable services.

Bias, ethics and fairness are big risk factors in AI. The simplest way of protecting against these risks is to check the results. Part of a standard checklist for protecting against ethical violations with AI is to build AI forensics tools, use those tools to profile the algorithm, use the profile to anticipate behavior, and discuss the anticipated behavior with a diverse risk-mitigation team.

Remember that the nature of applying AI is experimental. You won't know ahead of time which technologies and applications will be the most useful. Avoid biting off large AI projects all at once. Instead, run small experiments that make it easy for you to learn from mistakes. Create a portfolio of hypotheses about what you think might make a real difference. Test those hypotheses using small experiments. Learn and adjust as you go.

intensive applications with business objectives and to shorten development cycles. Simply put, DataOps is a new people, process, and tools paradigm that promotes repeatability, productivity, agility, and self-service while achieving continuous analytics model and solutions deployments. DataOps improves the speed and accuracy of the analytics pipeline from desired business outcome, analytics model goals, data access, quality control, automation and integration, to model development, deployment and ongoing model improvement. DataOps further raises Analytics IQ by enabling faster delivery of analytics solutions with predictable business outcomes.

Test your [Analytics IQ](#) here to determine your organization's maturity level and analytics needs, and see if you're ready for the analytics-driven future.

Raising an organization's Analytics IQ enables it to thrive on change. It allows the organization to use data and analytics as competitive assets, adapt quickly and predict trends by continuously discovering value from data and turning it into insight. Ultimately, it helps the organization become a disruptor in the digital revolution.

The time to act is now. Those that choose to wait are far more likely to find themselves with a very different fate.

How DXC and its partners can help

DXC Technology is a trusted partner helping organizations to realize their highest Analytics IQ.

DXC Analytics offers a comprehensive portfolio of proven analytics services to rapidly provide insights and accelerate the digital transformation journey. We offer a full suite of services — from advisory services to technology and industry solutions — automated through our DXC Bionix™ digital generation services delivery model, which is underpinned by Platform DXC, our digital-generation delivery platform. Platform DXC allows DXC to quickly build and deliver partner-engineered, at-scale, repeatable offerings and solutions that help drive digital transformation.

DXC's unmatched **Partner Network** plays an integral role, enabling organizations to build and leverage the advanced analytics solutions that drive desired outcomes.

DXC Analytics consultants advise, support and manage our clients' digital transformations based on their technical and financial goals, current readiness (Analytics IQ), IT culture, operational practices and compliance requirements. Let DXC help you unlock the insights needed to successfully implement and operationalize analytics.

Now is the time to act. Don't be disrupted — be the disruptor. Let us help you innovate and transform to differentiate with speed and quality. That's DXC. That's Digital Delivered.



Learn more at
www.dxc.technology/analytics

About the authors



Dragan Rakovich, DXC Technology's chief technology officer for analytics and Distinguished Technologist, leads the company's analytics technology and innovation strategy. Dragan brings strategic advice and thought leadership to customers in actionable analytics, machine learning (ML) and AI, business intelligence, internet of things (IoT) and analytics platform domains to create advanced analytics solutions. Prior to this role, he served as Hewlett Packard Enterprise Services chief technology officer for analytics and data management. Dragan has more than 20 years of experience in analytics, ML/AI, business intelligence, management consulting, solution delivery, enterprise architectures and software engineering.



Srini Kompella is head of Analytics Americas and acting vice president and general manager of Analytics at DXC Technology. He is responsible for leading the company's analytics offerings that create value for customers through advanced solutions and services that combine industry, technology and partner expertise. Srini creates a culture that promotes an evolving analytics journey focused on industrialized artificial intelligence and machine learning, analytics platforms, actionable analytics and business intelligence, and internet of things (IoT).

Contributors

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1. "Facebook will pull its data-collecting VPN app from the App Store over privacy concerns," The Verge, August 22, 2018. <https://www.theverge.com/2018/8/22/17771298/facebook-onavo-protect-apple-app-store-pulled-privacy-concerns>



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