# 100 Data and Analytics Predictions Through 2021

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Over the next few years, data and analytics programs will become even more mission-critical throughout the business and across industries. This research rounds up Gartner's top 100 predictions that are relevant to CIOs, CDOs, and data and analytics leaders to enhance their strategic plans.

## Analysis

The digital business future confronts you with almost unlimited possibilities to create business value through data and analytics. This transition to digital business requires CIOs, chief data officers (CDOs) and data and analytics leaders to make a leap toward a new view of data and analytics. They need to move past the old mindset of keeping siloed data, business applications and analytics applications grounded in data warehousing and business intelligence (BI) systems, primarily for enterprise reporting and basic analytical purposes. Instead, they need to look at data as the raw material for any decision, and consider that data comes from both within and outside the enterprise. It exists everywhere: at rest, in motion, on-premises and in the cloud. Big data (high-volume, -variety and -velocity information) continues to increase rapidly in all three dimensions. To capitalize on opportunities that can be identified, data and analytics need to be thought of as an enterprise layer of the digital business fabric, taking on a more active and dynamic role in powering the activities of the entire organization, not just reflecting where it's been (see Figure 1).

Figure 1. Data and Analytics Enable Everything in the Enterprise
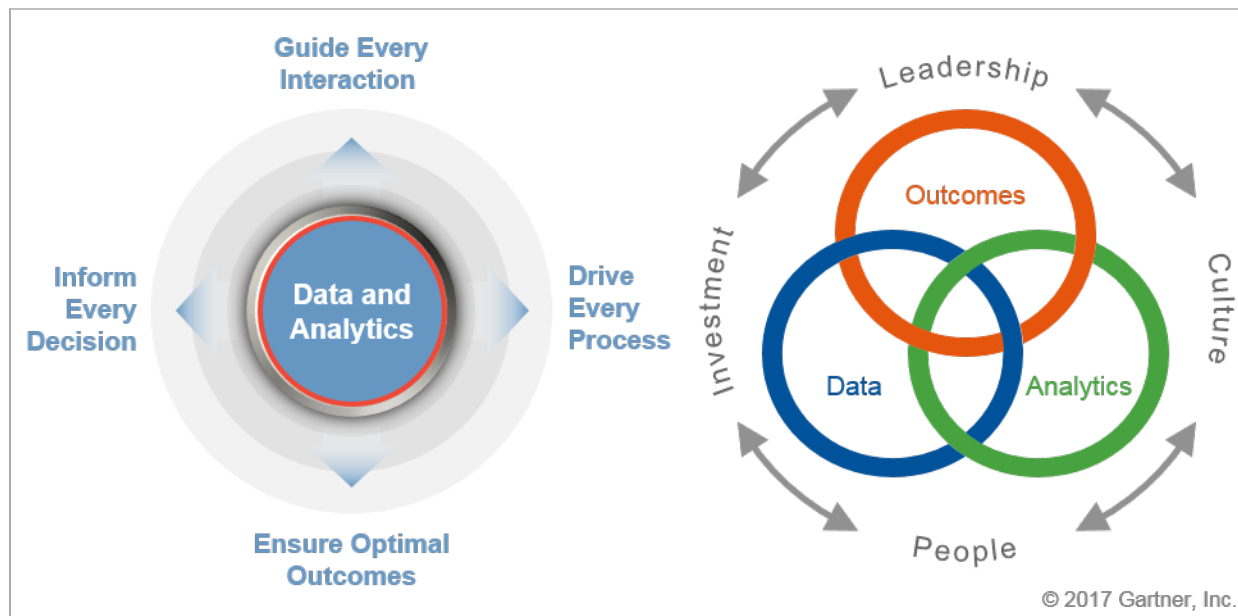


Source: Gartner (June 2017)

As evidenced by its pervasiveness within our vast array of recently published Predicts 2017 research, it is clear that data and analytics are increasingly critical elements across most industries, business functions and IT disciplines. Most significantly, data and analytics are key to a successful digital business. This collection of more than 100 data-and-analytics-related Strategic Planning Assumptions (SPAs) or predictions through 2021, heralds several transformations and challenges ahead that CIOs and data and analytics leaders should embrace and include in their planning for successful strategies. Common themes across the discipline in general, and within particular business functions and industries, include:

- Artificial intelligence (AI) is emerging as a core business and analytic competency. Beyond yesteryear's hard-coded algorithms and manual data science activities, machine learning (ML) promises to transform business processes, reconfigure workforces, optimize infrastructure behavior and blend industries through rapidly improved decision making and process optimization.

- Natural language is beginning to play a dual role in many organizations and applications as a source of input for analytic and other applications, and a variety of output, in addition to traditional analytic visualizations.

- Information itself is being recognized as a corporate asset (albeit not yet a balance sheet asset), prompting organizations to become more disciplined about monetizing, managing and measuring it as they do with other assets. This includes "spending" it like cash, selling/licensing it to others, participating in emerging data marketplaces, applying asset management principles to improve its quality and availability, and quantifying its value and risks in a variety of ways.

- Smart devices that both produce and consume Internet of Things (IoT) data will also move intelligent computing to the edge of business functions, enabling devices in almost every industry to operate and interact with humans and each other without a centralized command and control. The resulting opportunities for innovation are unbounded.

- Trust becomes the watchword for businesses, devices and information, leading to the creation of digital ethics frameworks, accreditation and assessments. Most attempts at leveraging blockchain as a trust mechanism fail until technical limitations, particularly performance, are solved.

# Research Highlights

## Core Data and Analytics Predictions

### Advanced Analytics and Data Science

Advanced analytics and data science are fast becoming mainstream solutions and competencies in most organizations, even supplanting traditional BI and analytics resources and budgets. They allow more types of knowledge and insights to be extracted from data. To become and remain competitive, enterprises must seek to adopt advanced analytics, and adapt their business models, establish specialist data science teams and rethink their overall strategies to keep pace with the competition. "Predicts 2017: Analytics Strategy and Technology" offers advice on overall strategy, approach and operational transformation to algorithmic business that leadership needs to build to reap the benefits.

- By 2018, deep learning (deep neural networks [DNNs]) will be a standard component in 80% of data scientists' tool boxes.

- By 2020, more than 40% of data science tasks will be automated, resulting in increased productivity and broader usage by citizen data scientists.

- By 2019, natural-language generation will be a standard feature of 90% of modern BI and analytics platforms.

- By 2019, 50% of analytics queries will be generated using search, natural-language query or voice, or will be autogenerated.

- By 2019, citizen data scientists will surpass data scientists in the amount of advanced analysis produced.

### Artificial Intelligence

Business and IT leaders are stepping up to a broad range of opportunities enabled by AI, including autonomous vehicles, smart vision systems, virtual customer assistants, smart (personal) agents and natural-language processing. Gartner believes that this new general-purpose technology is just

beginning a 75-year technology cycle that will have far-reaching implications for every industry. In "Predicts 2017: Artificial Intelligence," we reflect on the near-term opportunities, and the potential burdens and risks that organizations face in exploiting AI. AI is changing the way in which organizations innovate and communicate their processes, products and services. Practical strategies for employing AI and choosing the right vendors are available to data and analytics leaders right now.

- By 2019, more than 10% of IT hires in customer service will mostly write scripts for bot interactions.

- Through 2020, organizations using cognitive ergonomics and system design in new AI projects will achieve long-term success four times more often than others.

- By 2020, 20% of companies will dedicate workers to monitor and guide neural networks.

- By 2019, startups will overtake Amazon, Google, IBM and Microsoft in driving the AI economy with disruptive business solutions.

- By 2019, AI platform services will cannibalize revenues for 30% of market-leading companies.

"Predicts 2017: Drones"

- By 2020, the top seven commercial drone manufacturers will all offer analytical software packages.

"Predicts 2017: The Reinvention of Buying Behavior in Vertical-Industry Markets"

- By 2021, 30% of net new revenue growth from industry-specific solutions will include AI technology.

## Information Management Predictions

### Information Management Strategy

Information strategy is not a technology (or stack of technologies) that an enterprise can easily acquire. It is a long-term commitment to the exploitation of information for improved business outcomes. In fact, its importance has risen to the executive level. The increasing prominence of the role of the CDO is the most obvious indication of this. Information management and analytics are now about much more than architecting, integrating, cleansing, storing and analyzing data — they're central to most organizations' business strategies and demand significant attention. For enterprises to realize the benefits of treating information as an actual enterprise asset, the following SPAs from "Predicts 2017: Licensing, Legal and Language Lessons for Data and Analytics Leaders" should be considered as an important part of an overall enterprise information management (EIM) and business strategy development:

- By 2020, 50% of organizations will reject solutions from new vendors that contractually inhibit their ability to extract their own data.

- By 2019, 250,000 patent applications will be filed, including claims for algorithms — a tenfold increase from five years ago.

- By 2020, 25% of large organizations will be either sellers or buyers of data via formal online data marketplaces.

- By 2020, 80% of organizations will initiate deliberate competency development in the field of information literacy, acknowledging their extreme deficiency.

- By 2021, the prevalence of equity analysts valuing organizations' information portfolios in valuing businesses themselves will spark formal internal information valuation and auditing practices.

## Information Infrastructure

Modern information infrastructure will include data virtualization, the separation of storage and compute, and cloud-based data persistence. Data and analytics leaders must evolve their technology capabilities for digital transformation. An increasing pressure to manage data in multiple deployment models, while also optimizing its access and retrieval, is mounting. Our five key predictions for information infrastructure modernization in "Predicts 2017: Data Distribution and Complexity Drive Information Infrastructure Modernization" highlight specific key trends and action items that will impact data and analytics leaders as they attempt to deliver on the modern requirements. Use them to guide your modernization efforts in a way that will deliver optimal long-term value.

- By 2018, organizations with data virtualization capabilities will spend 40% less on building and managing data integration processes for connecting distributed data assets.

- Through 2021, 95% of data management projects using blockchain will fail due to either performance challenges or misapplication of the technology.

- By 2020, 50% of new data transformation flows will integrate one or more ML algorithms — resulting in erroneous interpretations of data.

- By 2019, 30% of organizations will use object storage as a data repository on-premises, bringing cloud architecture to the data center.

- By 2019, 90% of cloud DBMS architectures will support the separation of compute and storage, rendering those that do not as irrelevant in the overall market.

## Data Security, Privacy and Identity Predictions

In 2017 and beyond, achieving three important goals — privacy, safety and reliability — will require strong planning and execution in the areas of security, privacy and identity management, as predicted by Gartner's application and data security analysts. IT leaders should consider these forward-looking predictions when allocating resources and selecting products and services.

"Predicts 2017: Application and Data Security"

- By 2020, more than 70% of enterprises will continuously monitor for sensitive data incidents.

- Through 2020, 75% of organizations implementing data classification policies will report limited deployments and see no tangible benefits.

- By 2020, more than 20% of organizational business plans will use infonomics to provide a financial analysis of data assets and liabilities.

"Predicts 2017: Business Continuity Management and IT Service Continuity Management"

- By 2020, 30% of large enterprises will leverage snapshots and backups for more than just recovery, up from less than 10% in 2015.

- By 2020, investment in AI/ML-based tools for IT resilience orchestration automation will more than triple, helping reduce business outages from cascading IT failures.

"Predicts 2017: Privacy Becomes a Necessity With Opportunity"

- By 2020, large global-enterprise use of data masking or similar pseudonymization techniques will increase to 40%, from 10% in 2016.

- By 2019, half the world's larger companies processing personal data will perform privacy impact assessments (PIAs); only 10% will have a defined automated PIA process.

- By 2020, 30% of all data protection officers will be hired "as a service."

"Predicts 2017: Information Security Management"

- By 2020, IT-sponsored information security programs will suffer three times as many significant breaches as those sponsored by business leaders.

"Predicts 2017: Endpoint and Mobile Security"

- By 2020, 60% of current portable physical flash data carriers will be replaced by cloud-based business data sharing.

"Predicts 2017: Threat and Vulnerability Management"

- By 2020, 10% of penetration tests will be conducted by ML-based smart machines, up from 0% in 2016.

## Enterprise Content Predictions

Enterprises are modernizing their content management infrastructures and applications to better support digital workplace initiatives. At the same time, emerging content management technologies and capabilities provide enterprises with the opportunity to leverage the trends associated with cloud, mobile and social. In "Predicts 2017: Automating and Improving Workers' Content Interactions and Experiences," we assist IT leaders responsible for the enterprise content strategy with addressing not only how to manage content, but also how to use content in ways that promote productivity, efficiency and business opportunities.

- By 2020, 95% of video/image content will never be viewed by humans; instead, it will be vetted by machines that provide some degree of automated analysis.

- By YE20, the top 20 web content management (WCM) vendors will provide natural-language-generation capabilities as part of their overall offering.

## Information Technology Infrastructure Predictions

### Internet of Things

The IoT is emerging as a key enabler of our digital future, and global spending on IoT — including all hardware, software and services — will increase in the next five years. However, the path to capturing benefits from IoT will not be a straight line. It will have many twists and turns as companies pursue big plans, hit roadblocks, learn and adjust. Some will give up, while others will follow through and realize the transformational potential the IoT can have in helping them become a successful digital business.

"Predicts 2017: IoT Proliferation Will Drive Investment in New Approaches to Implementation"

- Through 2020, lack of data science professionals will inhibit 75% of organizations from achieving the full potential of IoT.

### Smart Cities

Smart city applications and solutions have become important in citizens' user experience, and can leverage IoT technologies to improve the quality of life. Strategists in smart city projects should consider the user experiences and how the solutions are being accepted by the citizens. The following SPAs from "Predicts 2017: Smart Cities Must Create the Right Data Orchestration for Sustainable Citizen and Business Services" should be considered as an important part of an overall business strategy development:

- By 2020, 30% of smart cities' ambient care applications — related to, for example, medical/healthcare/nursing care, including proactive care — will have introduced smart machines and robotics in nursing care and medical facilities.

- By 2020, 10% of smart cities will use streetlamps as the backbone for a smart city WAN.

- By 2020, half of all the smart city objectives will include climate change, resilience and sustainability key performance indicators (KPIs).

### Mobile, Web and Personal Devices

Mobile devices and applications are being used more frequently to support business-critical applications, requiring more stringent manageability to ensure secure user access and system availability. The following research provides insight for CIOs, IT leaders, application leaders and mobile app development managers into what Gartner perceives as some key developments over the next few years for mobile devices and apps.

"Predicts 2017: Mobile Apps and Their Development"

- By 2020, over 50% of consumer mobile interactions will be in contextualized, "hyperpersonal" experiences based on past behavior and current, real-time behavior.

- By 2021, 50% of apps will trigger events for users, thereby making them more efficient.

The personal device market represents connected devices used by people during the day, at work, at home, to play or on the go. The personal device market is expanding with new types of products, such as wearables, linking with IoT endpoints and using immersive technologies. Product management and business leaders must consider the following predictions offered in "Predicts 2017: Personal Devices" to monitor the future trends of personal devices:

- By 2019, 20% of users' interactions with the smartphone will be via virtual personal assistants (VPAs).

- By 2020, 50% of employees who are working alone or are operating vehicles/heavy equipment will be monitored by biometric-assisted technology.

- In 2019, 99% of multinational corporations will sponsor the use of wearable fitness tracking devices to improve corporate performance.

## Personal Technologies

The personal technology market has never changed as fast as it is changing today. This prediction will help technology product management leaders identify key trends regarding what and where the growth opportunities are in this vast and lucrative market.

"Predicts 2017: Identify Your Buyers to Seize Their Personal Technologies Purchases"

- By 2020, 5% of adults 65 years of age and older will have a personal healthcare robot.

## Application Development and Integration

Application development technologies and disciplines continue to evolve as the need to deliver business outcomes and accelerate application delivery with high quality intensifies. As digital business remains dynamic, and business teams become more engaged in the solution delivery process, we expect this will result in a more-complex collection of technologies, disciplines and practices to support the varying needs of users. Organizations must plan for the adoption, or replacement, of key technologies and practices, as well as the development of people and skill sets.

"Predicts 2017: Application Development"

- By 2020, 50% of IT organizations will apply advanced analytics in application development to improve application quality and speed of delivery.

"Predicts 2017: Pervasive Integration Is Getting Ready for Prime Time"

- By 2020, 70% of new integration technology deployed will have unified application and data integration capabilities within a single platform.

- By 2020, 75% of integration platforms will leverage ML to automate integration between application APIs, thus reducing the need for skilled integration specialists.

"Predicts 2017: PaaS Innovation Leads Applications to Digital Business"

- By 2020, 90% of DBMS vendors will offer a database platform as a service (dbPaaS); those that do not will become irrelevant.

## Software Adoption

Software vendors are increasingly compelled to respond to new demands from customer bases that are expanding beyond the traditional IT buying center. Initial drivers of this demand chain are end users or constituents, who are expecting quicker responses to their demands in order to stay competitive, but it's being increasingly driven by senior executives wanting to digitize their business models.

"Predicts 2017: Software Adoption"

- Between 2016 and 2019, spending on real-time analytics will grow three times faster than spending on non-real-time analytics.

"Predicts 2017: Cloud Computing Enters Its Second Decade"

- By 2021, more than half of global enterprises already using cloud today will adopt an all-in cloud strategy.

## Semiconductors and Electronics

New semiconductor technologies continuously drive new market opportunities for semiconductor vendors. While some technologies open up completely new markets, others may offer opportunities to penetrate deeper into existing markets. Some of these technologies also impact the way semiconductor vendors manage their operations, and their ability to quickly adapt to market needs and emerging market opportunities. This situation is reflected in our set of predictions for 2017.

"Predicts 2017: Changing Dynamics for Semiconductors and Electronics"

- By 2020, DNNs and ML applications will represent a $10 billion market opportunity for semiconductor vendors.

- By 2020, one-third of camera-enabled IoT devices will embed some form of computer vision capability.

- By 2020, leading chip vendors will have reduced their design project delays by over 80% through the use of advanced-analytics tools.

## Digital Business and Business Function Predictions

### Digital Business

"Digital business" is the creation of new business designs by blurring the digital and physical worlds. The following predictions will help CIOs and IT leaders responsible for digital business move from "digital dreams" to "digital reality," and take a leadership position within a new world of value delivered by integrating people, business and things.

"Predicts 2017: Architect the Digital Business Platform"

- By 2018, enterprise architects (EA) with business ecosystem modeling expertise will see their value inside the organization increase by 40%.

- By 2020, 40% of EA practitioners will use leading indicators to plan, track and manage digital business investments.

"Predicts 2017: Digital Business Elevates the Customer Experience Well Beyond Current Retail Multichannel Capabilities"

- By 2020, at least three large multichannel retailers will have strategic partnerships with companies operating "sharing economy" business models for multichannel fulfillment.

Industrie 4.0 addresses the digitalization of complex value chains. It is not a market; it's a vision for CIOs of future cross-industry models with a high degree of digital technologies. Successful Industrie 4.0 initiatives require efficient collaboration between enterprises, IoT technology and service providers (TSPs) and consumers. Digital business — especially in the context of Industrie 4.0 — is focused specifically on peer exchange, and communication between business (including process and information), people and physical things, as equal entities. This means that different parties need to collaborate efficiently across the whole life cycle of Industrie 4.0 initiatives.

"Predicts 2017: Industrie 4.0"

- By 2020, at least 30% of Industrie 4.0 projects will source their algorithms from leading algorithm marketplaces, up from less than 5% in 2016.

### Digital Commerce

Spending on digital commerce initiatives continues to grow, and vendors are trying to keep up with demand by utilizing more apps and analytics, investing in commerce innovation, and expanding digital commerce to business buyers. Our "Predicts 2017: Trustworthiness and 'Commerce That Comes to You' Present New Opportunities for Digital Commerce" suggests that competition between digital commerce sellers will intensify, which will increase the urgency of the need for advanced uses of data, along with the search for viable new sales channels.

- By 2020, companies that are digitally trustworthy will generate 20% more online profit than those that are not.

- By 2020, there will be one major data breach of thing commerce, leading to the leakage of at least 100 million customers' data and the loss of $1 billion.

## CRM and Customer Experience

Improving the customer experience tops the list of many organizations' desired digital business outcomes. CRM and customer experience are business strategies that optimize profitability, operational efficiency, customer satisfaction and loyalty by implementing customer-centric processes. Business leaders (CEOs, CMOs, sales and customer service directors and CIOs) can utilize the following Predicts notes to go beyond foundational requirements and differentiate the company and its brand.

"Predicts 2017: CRM Will Reach Critical Tipping Points for Integration, Analytics and Customer Experience"

- By 2020, more than 40% of all data analytics projects will relate to an aspect of customer experience.

"Predicts 2017: Enhance the TSP Customer Experience"

- By 2020, 80% of consumers will use only half the number of apps they currently use today.
- In 2018, half a billion users will save two hours a day, thanks to AI-powered tools.
- By 2018, 20% of users will disable intelligent listening and video capabilities on their devices to safeguard their privacy.

## CRM Sales

"Predicts 2017: CRM Sales" envisages how sales organizations will be using data and analytics to become smarter and better — much faster. IT leaders supporting sales should focus on improving user experience for salespeople and partners to boost adoption and data quality. Better data will lead to better use of predictive analytics for sales organizations. IT leaders will also discover how smart machines will become the next-generation salespeople.

- By 2020, 30% of all B2B companies will employ AI to augment at least one of their primary sales processes.
- By 2020, 25% of organizations using a sales performance management (SPM) solution will optimize the design and maintenance of their sales compensation plans using advanced analytics solutions provided by their SPM vendor.

## Customer Service

Expectations are high for the customer service and support business applications that are now maturing from CRM software vendors. Yet, enormous gaps exist within enterprises between what IT leaders are able to deliver, and what the customer service and customer experience leaders are approved to receive. "Predicts 2017: CRM Customer Service and Support" sheds light on how the

future customer service organization will use and respond to technology innovation to improve customer processes.

- By 2020, AI will disrupt the jobs of 1,000,000 phone-based customer support agents.

- In 2020, 10% of emergency field service work will be both triaged and scheduled by AI.

- By 2018, 50% of agent interactions will be influenced by real-time analytics.

## Workforce and Human Capital Management

The digital workplace is a business strategy used to promote employee agility and engagement through a more consumerized work environment. In "Predicts 2017: Boosting Business Results Through Personal Choice in the Digital Workplace," Gartner emphasizes the suggestion that the ability to promote digital dexterity in the workforce will be a critical source of competitive advantage, based on the simple notion that an engaged, digitally literate workforce capable of seizing technological advantage will drive better business outcomes.

- By 2020, insights from AI-connected media, places and things will transform collaboration strategy focus from groups to networks of individuals in 10% of organizations.

- By 2020, algorithms will positively alter the behavior of over 1 billion global workers.

Human capital management (HCM) applications enable enterprise people management processes, including core HR data management, payroll, talent management, workforce management, integrated HR service delivery and workforce analytics. The SPAs from "Predicts 2017: HCM Technologies Focus on the Worker (Human and Digital)" highlight the changes to HCM that are being driven by the emerging digital workplace, and by a workforce investment strategy that enables new, more effective ways of working, raises employee engagement and agility, and exploits consumer-oriented styles and technologies.

- By 2020, more than 20 million job seekers will seek automated advice on how to improve their ranking in job-matching algorithms.

- By 2018, nearly 50% of learning providers will look to streamline the learner's experience by providing context-aware capability.

## Supply Chain Planning

In "Predicts 2017: Supply Chain Trends and Innovations," we provide supply chain and IT leaders with targeted advice on how they must reimagine what supply chain planning technology they will need to support their organizations over the next four years.

- By 2020, 10% of large enterprises in supply-chain-dependent industries will have established a chief robotics officer (CRO) role.

## Business Process Services and Outsourcing

Business process services and outsourcing are rapidly evolving due to increasing functional and process complexity; innovation that is delivered via scalable, cost-effective methods; automation; and new delivery channels, such as digital services. The following predictions are targeted at business process services (BPS) providers and executive-level roles, to provide them with a glimpse of the future state of the market, while helping them steer their strategies and investments to achieve the optimum outcome.

"Predicts 2017: The Future State of Business Process Services and Outsourcing"

- By 2020, digital services, automation and AI will convert 60% of BPS providers' current "people-process-centric" business models to a "business-services-centric" model.

- By 2020, automation and smart machines will reduce employee requirements in business shared-service centers by 65%.

## Emerging Markets

Increased demand for business-oriented technologies, digital adoption, positive and enhanced links between CEOs and CIOs who impact IT demand, and the expansion of technology buyer influences from business units in user organizations, are showing that emerging markets are at a crossroad. As it is becoming more evident, these markets will increase their role as technology and process innovators.

"Predicts 2017: Emerging Markets at a Crossroad Where Innovation Is Monetization"

- By 2019, 20% more enterprises outside traditional banking will adopt blockchain in emerging markets.

## Audit, Compliance and Legal Management

The evolution of analytics and advanced automation has improved process efficiencies in compliance management, legal management and DevOps. Security and risk management leaders need to review their practices for potential cost savings, and work with CIOs to identify their time and cost investments. Gartner's audit, compliance and legal analysts predict that advanced automation will drive the future of audit, compliance and legal initiatives.

"Predicts 2017: Audit, Compliance and Legal Management"

- By 2021, 20% of large and midsize companies will realize savings on administrative compliance costs resulting from robotic process automation (RPA).

- By 2020, 15% of low-tier, billable legal work will be replaced by smart machines powered by data analytics platforms.

## IT Operations, Procurement and Asset Management

The procurement and sourcing technology market is evolving rapidly. Application leaders should use Gartner's Predicts research notes to gauge the impact of adoption, digital business, ML, cloud delivery and the consumer experience on the ROI of solutions in this domain.

"Predicts 2017: Procurement and Sourcing Technology"

- In 2020, modest adoption of procurement and sourcing technology will limit smart machine technology's penetration to 10% of the total available market.

## IT Services, Providers and Vendors

IT services and vendor management has achieved a level of maturity that enables the optimization of future spending while gaining control over vendor performance and vendor negotiating leverage. The set of Predicts notes below will help sourcing and vendor management leaders advance to the next step by moving beyond the management of cost and quality, toward driving greater value from an ecosystem of supply.

"Predicts 2017: Critical Investments in IT Vendor Management Will Enable Growth and Control Risk"

- By 2019, 50% of IT vendor management organizations will use advanced analytics to manage critical vendor risks.

"Predicts 2017: IT Services Market Opportunities Expand in the Digital Era"

- By 2020, 30% of new solutions implemented by IT services providers will include AI technologies.

"Predicts 2017: Automation Is the Heart of IT Service Providers' Drive to Improve Operational Effectiveness"

- Through 2019, application outsourcing (AO) providers that do not leverage automation to guarantee annual savings of 5% to 10% will see a 25% drop in customer retention.

## Industry Predictions

### Banking and Investment Services

Limited innovation, despite investment in R&D and fintechs, has resulted in an industrywide failure to develop and implement new business models, and to deliver new products and services that reflect true digital transformation. That's why this year's predictions focus on the failure of both banks and fintechs to support digital transformation.

"Predicts 2017: Digital Initiatives Must Focus on Long-Term Transformation to Avoid Failure"

- By YE21, wealth management firms that fail to deploy advisor-curated roboadvisors will face a 30% decline in investment management fee revenue.

- By YE19, blockchain-enabled innovations will deliver 0% of banks' digital profits.

## Education

Significant changes to the global education landscape have taken shape in 2016, and spotlight new and interesting trends for 2017 and beyond. "Predicts 2017: Education Gets Personal" is focused on several SPAs, each uniquely contributing to the foundation needed to create the digitalized education environments of the future. Organizations and institutions will require new strategies to leverage existing and new technologies to maximize benefits to the organization in fresh and innovative ways.

- By 2021, more than 30% of institutions will be forced to execute on a personalization strategy to maintain student enrollment.
- By 2021, the top 100 higher education institutions will have to adopt AI technologies to stay competitive in research.

## Energy and Utilities

Gartner's predictions for energy and utilities enterprises in 2017 are all a consequence of the emergence of digital business. This will have a major impact, not only on the IT extensions and application portfolios managed by companies in these sectors, but also on the core business processes within the energy and utilities industries, and the emergence of new ecosystems in the sector.

"Predicts 2017: Energy and Utilities Get Ready for Digital Disruption"

- By 2020, 25% of new monitoring and control systems in the utility sector will use IoT to enhance algorithmic business capabilities.

"Predicts 2017: The Coming Era of Connected and Integrated Oil and Gas Companies"

- By 2019, 60% of global oil and gas CIOs will have created an analytics center of excellence (COE) within IT.

## Government

"Predicts 2017: Government CIOs Are Caught Between Adversity and Opportunity" centers on IT management practices that are adapting to the accelerated rate of societal and technological changes associated with digital transformation. Expectations for performance and value for government will rise to offer more data and interactions digitally.

- By 2020, more than 30% of government agencies with "cloud first" strategies will adopt "public cloud only" strategies for all new initiatives.
- By 2020, more than 20% of all local government agencies will generate revenue from value-added open data through data marketplaces.

- By 2019, 50% of citizens in million-people cities will benefit from smart city programs by voluntarily sharing their personal data.

## Healthcare

Gartner's 2017 projections underscore the growing influence of digital, genomics and biometrics, but also spotlight the shortcomings of core healthcare provider systems. This presents real opportunities for CIOs to identify the innovations of today that will be mainstream tomorrow and prepare for this change.

"Predicts 2017: Healthcare Providers Take a Step Toward Digital Business"

- By 2021, 25% of healthcare delivery organizations (HDOs) with greater than $1 billion in net revenue will be providing real-time, genomics-based, clinical decision support at the time of prescription writing.

## Insurance

New business models, such as platforms and ecosystems, pose significant risks for the competitiveness of insurance organizations. Business and IT leaders will have to respond quickly to these challenges if they don't want to jeopardize the market position of their companies.

"Predicts 2017: Insurance CIOs Must Balance Emerging Technology Opportunities and Risks to Drive Innovation"

- By YE19, 30% of online insurance sales and service will be supported by AI and cognitive computing.

## Life Sciences

Industry fluidity is impacting the life science industry, and new approaches to delivering patient-centric and outcome-focused solutions enabled by digital technology are rapidly occurring. The following predictions and recommendations guide companies in the industry on how to be a leader during these turbulent times.

"Predicts 2017: Life Science R&D — Digital R&D Gets Smart"

- By 2020, 20% of today's AI proofs of concept (POCs) in the top 50 life science R&D organizations will successfully move into production.

- By 2021, 75% of the top life science R&D IT organizations will create data connections and business partnerships with nontraditional ecosystems.

- By 2022, precompetitive, shared and open research IT platforms will support at least 25% of life science distributed innovation environments to connect an ever-growing R&D ecosystem.

"Predicts 2017: Digital Increases Pressure on CIOs in Life Science"

- By 2020, a major technology provider will begin to provide digital health services independently, directly to patients.

- By 2020, life science business-function-led ML initiatives will be at least twice as successful as enterprise-IT-led projects.

## Logistics

Global logistics organizations persist under constant pressure to adapt to changing business conditions to ensure their companies remain competitive, in terms of business capabilities, as well as cost-effectiveness. Today's increasingly complex and volatile business climate is forcing supply chain leaders in logistics organizations to become more proactive, forward-looking and clever in managing their operations.

"Predicts 2017: Global Logistics Are Embracing New Business Models to Remain Competitively Relevant"

- By 2021, less than 1% of long-haul, over-the-road freight will be carried by autonomous trucks.

## Manufacturing

Manufacturers are increasingly adopting digital business, including the digital thread among design, manufacturing and service, and software as part of manufactured products. The impact of this on processes, practices, organizations and supporting technologies is pervasive. The following predictions anticipate the digital business disruptions that pose the most significant challenges to manufacturers and their supply chains.

"Predicts 2017: Digital Business Will Pervasively Transform Product Design and PLM Across Manufacturing"

- By 2020, 50% of motor vehicle manufacturers will apply advanced analytics to connected-vehicle data to identify and correct product defects.

"Predicts 2017: Exploit Disruption Through Collaboration and Technology in Consumer Goods Manufacturing"

- By 2020, weekly store-level shelf metrics collected through image recognition will be routinely used by 20% of CPGs.

"Predicts 2017: 3D Printing Accelerates"

- By 2020, 10% of industrial operations will incorporate robotic 3D printers in their manufacturing processes.

## Gartner Recommended Reading

*Some documents may not be available as part of your current Gartner subscription.*

"Predicts 2017: Analytics Strategy and Technology"

"Predicts 2017: Licensing, Legal and Language Lessons for Data and Analytics Leaders"

"Predicts 2017: Data Distribution and Complexity Drive Information Infrastructure Modernization"

"Predicts 2017: Artificial Intelligence"

## Evidence

Gartner's SPAs, or predictions, are conceived throughout the year by Gartner analysts based on hundreds of client and vendor interactions, primary and secondary research, and in collaboration with analysts within their own areas and across research agendas. Gartner's year-end collection of Predicts research notes gathers and elaborates further on these predictions.

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