100 Data and Analytics Predictions Through 2020

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Over the next few years, analytics will be pervasive and mission-critical for decisions and actions across the business. This research rounds up Gartner's top 100 predictions that are relevant to CIOs, CDOs and analytics leaders, and will help them to build their future strategic plans.

Analysis

Data and analytics are central to the success of any business function or industry. They help to provide the much sought-after competitive differentiation, operational effectiveness and any early-mover advantage that are essential in the digital business age. The number of data sources and users is growing. With the transition to a digital business, algorithms are shifting the gears, and smart autonomous machines and the Internet of Things (IoT) are becoming key drivers. This will lead to a newly emerging information ecosystem, or mesh, that is offering enterprises an opportunity to evolve and lead. But with increased entry points and opportunities to this ecosystem comes complexity. Enterprises will need a new financial discipline such as infonomics to manage and exploit information as an asset, and to improve the yield or return on those information investments (see "Introducing Infonomics: Valuing Information as a Corporate Asset" and "Measure Your Information Yield to Maximize Return on Information and Analytics Investments").

As a result, for at least the last five years, CIOs have been reporting that one of their hottest priorities for IT investments has been business intelligence (BI) and analytics (see "Building the Digital Platform: The 2016 CIO Agenda"). This priority is logical and important as CEOs and boards focus on growth, and understand more about how improving decision making — across all facets of the business, spanning customers, operations, and performance — is critical. With the new digital transformation underway, and the shift to "algorithmic business," this top priority is not likely to change.

As evidenced by the pervasiveness within our vast array of recently published Predicts 2016 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 exhaustive collection of over 100 data and analytics-related Strategic Planning Assumptions (SPAs), or predictions, through 2020 heralds several transformations and challenges ahead that CIOs and IT leaders should embrace and include in their planning to formulate successful strategies.

Figure 1. Word Cloud of 2016 Data and Analytics Predictions

Source: Gartner (March 2016)

Research Highlights

Core Information Predictions

Information 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, the emergence of the chief data officer (CDO) role in many organizations, and across all industries, indicates a growing recognition of information as a strategic business asset. For enterprises to realize the benefits of treating information as an actual enterprise asset, the following Strategic Planning Assumptions from "Predicts 2016: Information Strategy" should be considered as an important part of an overall enterprise information management and business strategy development.

- By 2020, 10% of organizations will have a highly profitable business unit specifically for productizing and commercializing their information assets.

- Through 2019, 90% of large organizations will have hired a CDO; of these, only 50% will be hailed a success.

- By 2020, 50% of information governance initiatives will be enacted with policies based on metadata alone.

- By 2020, the IoT and digital business will drive requirements in 25% of new information governance and master data management implementations.

- Through 2019, 10% of organizations will have established operational information stewardship in line-of-business functions.

Information Infrastructure

Information infrastructure is moving toward a complementary environment that encourages simultaneous deployment on-premises and across multiple cloud environments. 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 in "Predicts 2016: Evolving Information Infrastructure Technologies and Approaches Bring New Challenges" highlight the barriers to success and the steps to avoid them. Use them as guideposts to maximize return from your information infrastructure modernization efforts.

- By 2018, 30% of organizations managing their information infrastructure in the public cloud will be subject to cloud lock-in, making migration to another provider difficult.

- Through 2018, 80% of data lakes will not include effective metadata management capabilities, making them inefficient.

- By 2020, at least 75% of master data management vendors will support or require lower-cost database technology, reducing selling price by 30%.

- Through 2019, one-third of IoT solutions will be abandoned before deployment due to information capabilities (security, privacy, integration, metadata) built on traditional design and implementation methodologies.

- Through 2018, 70% of Hadoop deployments will fail to meet cost savings and revenue generation objectives due to skills and integration challenges.

Core Analytics Predictions

Advanced Analytics and Data Science

Advanced analytics solutions are becoming increasingly popular in driving business innovation and experimentation, and creating competitive advantage. Enterprises now 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 2016: Advanced Analytics Are at the

Beating Heart of Algorithmic Business" offers advice on overall strategy, approach and operational transformation to algorithmic business that leadership needs to build to reap the benefits.

- By 2018, algorithm marketplaces will be combined with PaaS to boost advanced analytics and enable secure sharing and monetization of raw data.

- By 2018, single-node analytics with Spark will predominate over multinode Hadoop-based architectures.

- Through 2018, a minority of organizations will have a rigorous approach to demonstrating the trustworthiness of their analytics algorithms.

- By 2018, decision optimization will no longer be a niche discipline; it will become a best practice in leading organizations to address a wide range of complex business decisions.

- By 2018, over half of large organizations globally will compete using advanced analytics and proprietary algorithms, causing the disruption of entire industries.

Business Intelligence

In "Predicts 2016: Changes Coming in How We Buy Business Analytics Technology," we offer advice with a specific focus on the broader, more general-purpose business analytics market meant for widespread consumption and usage by mainstream users. The following predictions suggest changes to the business intelligence and analytics platform market that will include further bundling of next-generation capabilities along with a major emphasis on product trials in the vendor selection process.

- By 2018, most of the stand-alone self-service data preparation vendor offerings either will have expanded into end-to-end analytical platforms, or will have been integrated as features of existing analytics platforms.

- By 2018, smart, governed, Hadoop-based, search-based and visual-based data discovery will converge into a single set of next-generation data discovery capabilities as components of a modern BI and analytics platform.

- By 2017, virtually all new analytic software purchases will begin as a free or low-cost proof of concept, enabling buyers to try the software before they buy.

- By 2019, 80% of new applications using IoT or machine data will analyze data in motion as well as collect this information for analysis of data at rest.

Finally, "Predicts 2016: Analytics Strategy" has deeper focus on the role of senior leadership, such as the chief analytics officer, where they will make investments, and the increasing role of new data service provider products.

- By 2020, only 50% of chief analytics officers will have successfully created a narrative that links financial objectives to business intelligence and analytics initiatives and investments.

- By 2020, predictive and prescriptive analytics will attract 40% of enterprises' net-new investment in business intelligence and analytics.

- By 2018, 75% of technology-oriented business intelligence competency centers will have evolved into strategy-oriented analytics centers of excellence to focus on information value generation.

- By 2019, 75% of analytics solutions will incorporate 10 or more exogenous data sources from second-party partners or third-party providers.

- Through 2020, over 95% of business leaders will continue to make decisions using intuition, instead of probability distributions, and will significantly underestimate risks as a result.

Information Technology Infrastructure Predictions

Smart Machines

Business and IT leaders are stepping up to a broad range of opportunities enabled by smart machines, 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 2016: Smart Machines," we reflect on the near-term opportunities, and the potential burdens and risks that organizations face in exploiting smart machines.

- By 2020, smart machines will be a top five investment priority for more than 30% of CIOs.

- By 2020, CFOs will need to address the valuations derived by smart machine data and "algorithmic business."

- By year-end 2018, 25% of durable goods manufacturers will utilize data generated by smart machines in their customer-facing sales, billing and service workflows.

- By year-end 2018, R&D-based end-user approaches to smart machine deployment will be three times more likely to produce business value than IT project-based approaches.

- By 2018, more than 3 million workers globally will be supervised by a "roboboss."

- By 2020, Microsoft's strategy will be centered around Cortana, rather than Windows.

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 benefits captured 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 their becoming a successful digital business.

"Predicts 2016: Charting the Path to IoT Business Value"

- Through 2018, 80% of IoT implementations will squander transformational opportunities by focusing on narrow use cases and analytics.

- By 2018, direct monetization of IoT algorithms will reach $15 billion.

"Predicts 2016: Unexpected Implications Arising From the Internet of Things"

- By 2020, more than half of major new business processes and systems will incorporate some element, large or small, of the IoT.

- Through 2018, 75% of IoT projects will take up to twice as long as planned.

Mobile, Web and Portal

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 2016: Mobile and Wireless"

- By 2018, 5 million people will have enterprise-confidential information on their smartwatches.

"Predicts 2016: Mobile Apps and Development"

- By 2018, 65% of enterprise apps will include direct access to documents and content from enterprise content management systems, up from 20% today.

- By 2018, 25% of new mobile apps will talk to IoT devices.

Security, Privacy and Identity Predictions

In 2016 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 2016: Application and Data Security"

- By 2018, the need to prevent data breaches from public clouds will drive 20% of organizations to develop data security governance programs.

- By 2018, 40% of enterprises will manage data loss by leveraging cloud gateways and enterprise mobility management, bypassing legacy data loss prevention infrastructure.

"Predicts 2016: Business Continuity Management and IT Service Continuity Management"

- By 2020, 30% of organizations targeted by major cyberattacks will spend more than two months cleansing backup, resulting in delayed recoveries.

"Predicts 2016: Identity and Access Management"

- By 2018, 25% of organizations — up from less than 5% today — will reduce data leakage incidents by 33% by reviewing privileged session activity.

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 2016: Have Content Your Way," we assist IT leaders responsible for the enterprise content strategy to address not only how to manage content, but also how to use content in ways that promote productivity, efficiency and business opportunities.

- By 2018, at least 50% of the leading enterprise content management vendors will rearchitect their offerings into new cloud-based platforms.

- By 2018, 15% of workers will rely on proactive services to discover, organize and contextualize information.

- By 2018, machine-generated, dynamic metadata will be integral to discovering 50% of new digital business revenue streams.

- By 2018, federation, governance and back-end integration with multiple content repositories will be required for 70% of business enterprise file synchronization and sharing deployments.

- By 2018, 20% of all business content will be authored by machines.

Digital Business/Commerce 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 offer to help CIOs, digital business leaders and IT leaders 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 2016: The Opportunities for Integration in Digital Business Are Expanding"

- By 2019, two-thirds of enterprises will include both data and application integration capabilities when selecting a new integration technology provider.

"Predicts 2016: IT Services Innovations for Digital Services"

- By 2020, contextual predictive data streams — and the proprietary algorithms behind them — will be a top three service provider differentiator.

"Predicts 2016: Digital Business Uproots Traditional Retail Revenue Generation"

- By 2018, retailers engaged in IoT partnerships with major manufacturers will take significant market share from competitors due to direct connections with consumer lives.

- By 2018, large Tier 1 multichannel retailers that have not made at least one significant "techquisition" will lose their leading market share position due to digital business disruption.

- By 2018, CIOs of at least two of the world's largest multichannel retailers will be sued for data breaches.

- By 2020, merchant leaders will be algorithms, prompting the top 10 retailers to cut up to one-third of headquarters merchandising staff.

Digital Commerce

Spending on digital commerce initiatives continues to grow and vendors are struggling to keep up with demand by utilizing more apps and analytics, investing in commerce innovation, and expanding digital commerce to business buyers. Our "Predicts 2016: Predictive Technologies and New Sales Channels Will Escalate Growth" suggests intense competition between digital commerce sellers, which will increase the urgency of the need for advanced uses of data, along with the search for viable new sales channels.

- By 2020, smart personalization engines used to recognize customer intent will enable digital businesses to increase their profits by up to 15%.

- By 2018, 40% of B2B digital commerce sites will use price optimization algorithms and configure/price/quote tools to dynamically calculate and deliver product pricing.

Digital Marketing

Marketing technologies are getting smarter and promise to fundamentally improve core marketing activities. Technology will soon become so intelligent that it will perform tasks that have always required direct human involvement. Intelligent technologies will do more than automate repetitive operations. They will investigate, evaluate and make decisions on behalf of both marketers and consumers. In "Predicts 2016: Intelligent Marketing Technology Will Bring Generational Change," we advise digital marketers how to seize the opportunities a new generation of marketing technology will create.

- By 2018, machines will author 20% of business content.

- By 2018, customer digital assistants will recognize individuals by face and voice across channels and partners.

- By 2018, 60% of surveys will be replaced by algorithms.

CRM Sales

"Predicts 2016: 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 2018, manual data entry by salespeople for sales force automation systems will be reduced by 50% due to adoption of mobile sales productivity tools.

- By 2018, smart machines will have contacted and initiated a sale with more than 5 million consumers in North America and Western Europe.

Customer Service

There are great expectations from the emerging customer service and support business applications 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 2016: CRM Customer Service and Support" is forward-looking research meant to shed light on how the future customer service organization will use and respond to technology innovation to improve customer processes.

- By year-end 2018, at least one large CRM software vendor will offer a "customer engagement hub" solution to its clients.

- By year-end 2018, use of an "intent arbitration system" that weighs enterprise goals against customer expectations will be a central technology component for 4% of innovative enterprises.

- By 2018, 6 billion "things" will request support.

- By year-end 2018, 25% of customer service and support operations will integrate virtual customer assistant technology across engagement channels.

Workforce and Human Capital Management

The digital workplace is a business strategy to promote employee agility and engagement through a more consumerized work environment. In "Predicts 2016: Digital Dexterity Drives Competitive Advantage 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, 15% of large enterprises will regularly assess and develop the digital dexterity of their workforce.

- By 2020, the greatest source of competitive advantage for 30% of organizations will come from the workforce's ability to creatively exploit digital technologies.

- By 2018, 15% of enterprises will promote an entrepreneurial culture by interconnecting innovation, hackathon and citizen development efforts.

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 Strategic Planning Assumptions from "Predicts 2016: HCM Applications Transform to Support the Emerging Digital Workplace" highlight the changes to HCM being driven by the emerging digital workplace, and 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 2018, the first virtual career coach will emerge, providing just-in-time advice to employees to improve performance.

- By 2018, more than 80% of organizations will leverage user-generated content as part of their corporate learning strategy.

IT Operations, Procurement and Asset Management

In "Predicts 2016: IT Procurement Will Transform Into Technology Procurement for Digital Success," we highlight that IT procurement must evolve beyond its focus on cost and risk to seek out and acquire greater value from technologies that support business growth and innovation.

- By 2018, 25% of technology procurement teams will prioritize risk reduction, innovation and business growth above cost savings metrics.

- Analyzing and communicating commercial alternatives will override negotiating contract terms as the top technology procurement skill by 2020.

- As "things" start to purchase, procurement automation will eliminate human intervention in 15% of digital technology spending by 2019.

- By 2019, annual maintenance pricing for perpetual software licenses will become more expensive than the subscription price for equivalent functionality.

"Predicts 2016: IT Operations Management" research provides guidance for infrastructure and operations leaders that are under pressure to quickly evolve their people, processes and technologies to meet future business requirements and end-user expectations.

- By 2018, IT service support management tools will eliminate the need for ITIL Foundation training.

- By 2020, eight of the top 12 publicly traded IT operations management vendors will respond to pressure from activist investors to sell all or parts of their businesses.

- By 2020, 20% of clients will be using DevOps to support traditional IT initiatives, up from fewer than 5% today.

- By 2018, 50% of large-enterprise infrastructure and operations organizations will offer walk-up service support, up from 30% today.

Supply Chain Planning

In "Predicts 2016: Reimagine SCP Capabilities to Survive," 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 2018, 80% of organizations will conclude that their current descriptive analytics solutions will not support their supply chain realities.

- By 2018, 25% of companies will have deployed demand-sensing and short-term response planning technologies to enable responsive supply chains.

Industry Predictions

Government

"Predicts 2016: Government Continues to Adapt to the Digital Era" 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 2018, more than 50% of the Tier 1 support services at government contact centers will be provided by virtual personal assistants.

- By 2018, more than 25% of government agencies will adopt "bring your own algorithm" policies to integrate multiple layers of knowledge to boost workforce-led innovation.

Energy and Utilities

Gartner's predictions for energy and utilities enterprises in 2016 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 2016: Upstream Oil and Gas"

- By 2020, 40% of field assets will be monitored and managed by interactions with virtual 3D models.

- By 2020, more than 50% of wellbore drilling activities on electric rigs will be controlled primarily by algorithms and secondarily by human expertise.

- By 2020, 50% of upstream oil and gas CIOs will be accountable for integrating information management across IT, operational technology and upstream-modeling domains.

"Predicts 2016: Utilities Get Ready to Transform While Performing"

- By 2019, more than 40% of utility CIOs will manage bimodal IT organizations.

Manufacturing

Manufacturers increasingly adopt digital business —including the digital thread among design, manufacturing and service, and software as part of manufactured products — the impact 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 2016: Digital Business Unlocks Innovation and Operational Effectiveness for Consumer Goods Manufacturers"

- By 2018, expert use of big data/analytics will result in a 10% increase in consumer goods manufacturer new product success rate.

- By 2019, 1% of consumable products will be manufactured in the home via low-cost 3D printers and other food-fabrication machines.

"Predicts 2016: Digital Business Will Disrupt Product Design, Manufacturing and PLM"

- By 2018, 50% of all durable goods will be remotely configurable using embedded IoT (this does not include primary metals or fabricated metal parts).

- By 2019, 80% of durable goods manufacturers investing in IoT ecosystems as an integral part of their businesses will employ data scientists or contract third-party services with integral roles in new product development.

"Predicts 2016: Opportunities Abound for the Factory of the Future to Reach Its Potential"

- Through 2019, 15% of manufacturers will use smart advisors to orchestrate continuous improvement programs and curtail future program hiring.

"Predicts 2016: The Rise of Digital R&D Without Borders"

- By 2018, 15% of manufacturers will use turnkey solutions to translate scientific information into engineering-based actions for new product development.

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 2016: Digital Generates Business Value Opportunities in Life Science"

- By 2019, 50% of the top 100 life science companies will have initiated at least one clinical trial involving wearable devices.

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- By 2019, 30% of the top 100 life science R&D IT organizations will have successfully moved big data projects from proof of concept and pilots into production.

- By 2019, only 25% of life science organizations selling into Europe will be truly compliant with the identification of medicinal product (IDMP) standard, although investments in turnkey regulatory information management system (RIMS) solutions will have been made.

Education

Significant changes to the global education landscape have taken shape in 2015, and spotlight new and interesting trends for 2016 and beyond. "Predicts 2016: Building the Foundation for the Digitalization of Education" is focused on several Strategic Planning Assumptions, 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 2020, at least 10% of higher education institutions will use smart machines to improve student success.

- By 2020, one-third of institutions will support university admission with a combination of point solutions, CRM and business process outsourcing, rather than the student information system.

- By 2020, at least 50% of K-12 organizations will be using some type of digital content management.

- By 2018, at least 30% of higher education institutions globally will have a learning analytics strategy to improve student outcomes.

Gartner Recommended Reading

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

"Strategic Roadmap for Enterprise Information Management"

"The Chief Data Officer's First 100 Days"

"Forecast: Internet of Things — Endpoints and Associated Services, Worldwide, 2015"

"Forecast: IoT Endpoints — Sensing, Processing and Communications Semiconductors, Worldwide, 2013-2020, 2015 Update"

"Three Best Practices for Internet of Things Analytics"

"Hype Cycle for Smart Machines, 2015"

"Top 10 Strategic Technology Trends for 2016: The Device Mesh"

Evidence

Gartner's Strategic Planning Assumptions (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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