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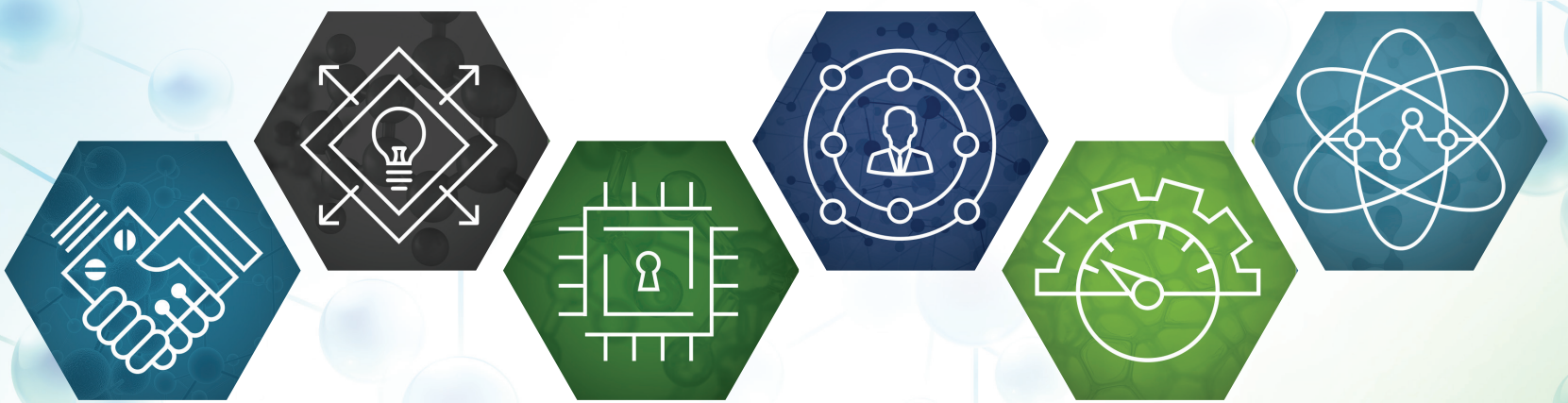
Analytics Trends 2016

The Next Evolution

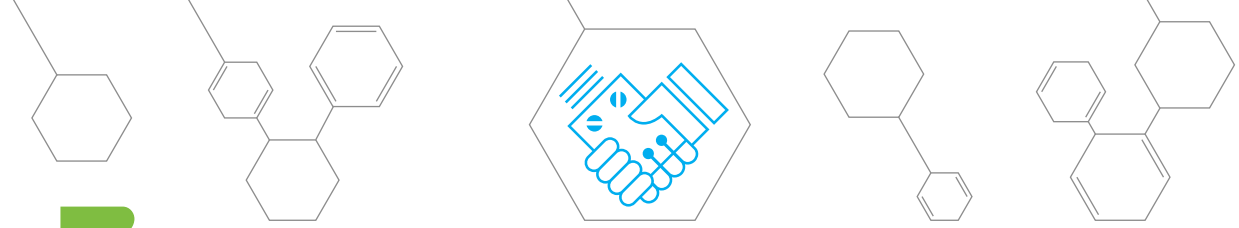


As we enter our third year of identifying the analytics trends that are likely to influence the trajectory of the business world in coming years, it's clear that some trends aren't going away. Instead, they are evolving at a rapid pace. In the world of science, such rapid evolution demands closer analysis—and the same is true with these analytics trends. They deserve a fresh look.

Meanwhile, others have a short half-life. They enter the conversation quickly and converge just as fast, and soon they are assimilated. By that time, they're not trends—they're reality. Take the topic of big data, for example. A few years ago, it was treated as an up-and-coming trend. Now it's just the air we breathe in analytics, influencing business strategy and commanding substantial investment every day. Perhaps that's why Google Trends search analysis shows that the term, which had strong growth beginning in late 2010, is experiencing decline.

This year, we're taking stock of a mix of both new and familiar topics that are shaping an "everywhere analytics" world—where analytics, science, data, and reasoning are embedded into the decision-making process, every day, everywhere in the organization.

Six significant trends are in play.



The man-machine dichotomy blurs

Are machines coming for us?

The newsstand rhetoric posits that smart machines will soon take over our jobs. Fear not—there's still a place for us. Humans have always added value to machines as processes become automated, and this is likely to continue.

Still, the cognitive age is clearly upon us, as indicated by more than $1 billion in venture capital funding for cognitive technologies in 2014 and 2015. Analysts project that overall market revenue for cognitive solutions will exceed $60 billion by 2025.[1] As cognitive technology evolves, it is likely to become just another tool in the toolbox—very useful for the right application but not replacing traditional analytics capabilities that also complement the human thought process. The man-machine dichotomy is not "either-or." It is unequivocally "both-and."

Complementing one another

There are likely to be a variety of ways in which smart people and smart machines will work alongside each other. Some humans will have to build and implement cognitive technologies, of course. Others will ensure that those technologies fit into a work process and monitor their performance. And some humans will complement computers in roles machines can't perform well, such as those involving high levels of creativity, caring, or empathy.

Paving the way to a collaborative future

Of course, these combinations of technology and people won't happen seamlessly or automatically. Organizations will need to examine knowledge-intensive processes and determine which tasks can best be performed by machines and which by humans. Some degree of retraining may be necessary. And—let's face it—there may be some job loss as well. Smart companies will think about these issues early in the game and help employees prepare for a collaborative future with smart machines.

1 Source: International Data Corporation

Case Study: LifeLearn Sofie

In North America, most veterinarians are general practitioners, and while specialists may be available by referral, veterinarians are often required to have expertise across many disciplines, species, and breeds. That's where cognitive computing comes in.

LifeLearn, a Canadian veterinary technology company, is developing a cognitive computing system called Sofie (running on IBM Watson) that would give veterinarians access to extensive, up-to-date knowledge on animal diseases, their specific treatments, and develop individualized patient care plans. Sofie will allow veterinarians to pose freeform questions about animal diseases, their specific treatment, and insights to inform individual patient care plans. All of which are updated frequently with the latest scientific literature. In addition, Sofie will help veterinarians create personalized patient care plans based on a pet's own hereditary susceptibilities, lifestyle characteristics, and geography-specific risk factors.

Like many cognitive computing systems, Sofie extends the reach of humans—it doesn't replace them.

Impact

Impact on society

High

Impact on business

High

Expected peak

5 years

Industries most impacted

Health Care, Online, Professional Services, and Retail

Business domains that will lead the charge

HR, IT, and Marketing

Analytics expands across the enterprise

So soon?

As little as a year ago, you would be hard-pressed to find an organization that was making enterprise-level analytics investments. Instead, most were just working to implement or improve targeted analytics capabilities in a few key areas—which seemed to be enough of a challenge.

How quickly things change

Today, building on analytics successes in discrete disciplines, leaders are beginning to take serious steps toward connecting these successes to create something bigger—something we call the insight-driven organization (IDO). The IDO goes beyond the selective use of insights to fuel decision-making in individual parts of the business. It deploys a tightly knitted combination of strategy, people, processes, and data—in addition to technology—to deliver insights at the point of action every day, everywhere in the organization.

Laying the groundwork

What does this look like in practice? Some leaders are beginning to talk about "analytics transformation" or "industrialized analytics." Short of that, many are already making decisions predicated on an IDO future—weighing the decision to build more data warehouses versus building on a big data infrastructure, for example. In both scenarios, what has changed is the scope of expectations. Notching small analytics victories in targeted parts of the business may not be enough for much longer. For leaders with their eyes on the prize, it's all about connecting analytics capabilities across the enterprise.

Case Study: UPMC Health Plan

UPMC is a Pittsburgh-based health plan organization that, like many, uses analytics insights throughout its care provision and payment processes. But the depth of its deployment of analytics across the organization is extraordinary. For example, UPMC has created a "learning engine" to institutionalize the generation and application of analytical insights. The engine consists of an analytical platform that augments traditional modeling tools with machine learning capabilities and has a "groomed data layer" designed to offer a single point of truth throughout the organization.

The result? Big insights—throughout the organization. For example, UPMC has identified which customers are more likely to engage successfully with disease management offerings. It predicts and manages readmission risk for patients at the point of discharge. And it has also been able to identify children at increased risk of lead poisoning who haven't yet been screened.

All of this is powered by a deep, coordinated team of analytics talent—nearly 100 analysts and data scientists led by a chief analytics officer and deployed in a hub-and-spoke model that uses both centralized and embedded analysts.

Impact

Impact on society

Medium

Impact on business

High

Expected peak

3 years

Industries most impacted

Financial Services, Retail, and Telecommunications

Business domains that will lead the charge

IT, Marketing, and Production

Cybersecurity: A good defense isn't enough

The plot thickens

Last year's supertrend, still front and center, continues to grow in importance as more and more organizations experience the losses in value and reputation that can result from a security gap. And we're not just talking about protecting data. Product design and other IP are also vulnerable to theft and sabotage. The problem is likely to grow as cybercriminals become more skilled in infiltrating technology architectures and systems that weren't designed from the ground up through a security lens. Ironically, concerns about cybersecurity could—and perhaps in some cases should—slow the adoption of other trends that drive innovation.

Organizations with a sophisticated approach to cybersecurity are no longer satisfied with locking the doors after the robbery has been committed. International Data Corporation (IDC) estimates that US federal government agencies alone would spend more than $14.5 billion on IT security in 2015. And the worldwide financial services industry would spend $27.4 billion on information security and fraud prevention.[2]

Going on the offensive

Organizations such as these are beginning to employ more predictive approaches to threat intelligence and monitoring—in short, going on the offensive. This may mean automated scanning of Internet "chatter" by far-flung groups and individuals who may intend cyberharm. It may involve analyzing past hacks and breaches to create predictive models of which threats are likely to surface next. In many firms, it also means systematic and continuous probing of the organization's own defenses to make sure that others don't find a security hole first.

A moving target creates new demands

Companies adopting these types of offensive steps will no doubt find that they need new capabilities. Many cyber professionals don't have the skills to do predictive threat intelligence or predictive analysis of past breaches. At the very least, extensive collaboration between analytics and cyber professionals may be required. And cybersecurity projects will need to rapidly move up the priority list for analytics groups.

2 Source: International Data Corporation, "Big Data and Predictive Analytics: On the Cybersecurity Front Line," February 2015.

Case Study: Financial Data and Technology Firm

For a leading data and technology firm that supports the financial services industry, cybersecurity is of paramount importance.

"We're really moving toward anticipating and predicting threats," says the firm's head of cybersecurity. "We're also trying to understand the threat landscape in different parts of the world—which is where external data and analytics come in." Today, this company is using rule-based technologies to identify and pursue anomalies within its key systems. It's also using advanced math to preprogram potential threats.

Externally, this group is analyzing huge swaths of human behavior data, in channels such as social media and IRC, to understand the most likely sources of threats and to know when employees may be traveling in global hot spots of threatening activity. These models are not currently fully automated but instead are "incredibly helpful in focusing our human analysts," says this cybersecurity leader.

Impact

Impact on society

High

Impact on business

High

Expected peak

3 years

Industries most impacted

Federal and State Government, Financial Services, and Retail

Business domains that will lead the charge

IT and Security

The Internet of Things—and people, too

A new source of innovation

Innovation has always been a key force in transforming business and society. Increasingly, innovation is occurring as the result of aggregating and analyzing data to create new products and services. The Internet of Things (IoT) is rapidly evolving from the realm of interesting gadgets to include tracking people as "things" to form new business models—think Uber—and influence people's behaviors.

Real investment

This innovation is taking place in both consumer-focused and business-to-business (B2B) industries. International Data Corporation (IDC) estimates that the worldwide IoT market will grow from $655.8 billion in 2014 to $1.7 trillion in 2020. Devices, connectivity, and IT services will likely make up two-thirds of the IoT market in 2020, with devices (modules/sensors) alone representing more than 30 percent of the total.[3]

Building on existing infrastructure

Many businesses are finding that much of the infrastructure they need for IoT applications is already in place. Auto insurance firms, for example, are now using customer smartphone data to power "pay as you drive" applications. Some health insurance firms are monitoring—and giving discounts for—customer fitness activities as revealed by wearable tracking devices. In B2B industries like shipping, long-distance trucks and locomotives equipped with GPS and other sensor devices enable companies to offer services to optimize routes, analyze driving, and make recommendations on the cheapest places to fuel up.

IoT-based innovations are also likely to benefit the broader society. Transportation will likely become more energy- and time-efficient. Partnerships between cities and businesses could lead to more transparent and economical government services. Garbage trucks, for example, could be equipped with devices that recognize potholes in streets and alert cities about them. Parking apps could reduce the time and energy that drivers waste while looking for open spaces.

It's difficult to think of an industry that can't be transformed or improved by the IoT. While considerable effort remains to develop IoT standards and link up sensor-based data, there are already many possible applications that can provide value today—including helping people improve fitness, enhance efficiency, and save money.

3 Sources: International Data Corporation, "IDC's Worldwide Internet of Things Taxonomy, 2015," "Worldwide Internet of Things Forecast, 2015-2020," "Worldwide IoT Spending Guide by Vertical"

Case Study: City of Boston

Some of the earliest adopters of the IoT have been municipal governments. Boston, with a number of high-profile university labs and tech startups, has been one of the most aggressive adopters. In traffic and parking applications, the city has partnered with ride-sharing startups to monitor real-time data on traffic backups while also supplying information on road closures and parade routes to these companies' online maps. Meanwhile, citizens can find empty parking spots using their smartphones—then use the phones to pay for parking. They are also using apps to rate and report on street conditions.

Boston was also one of the first cities to adopt BigBelly trash cans, which continuously report on how full they are so that they can be emptied more efficiently. Elsewhere, "smart benches" can be used for charging smartphones and reporting on noise and pollution levels.

While the application of the IoT to city administration has really only just begun, Boston, along with cities such as Singapore, Amsterdam, Toronto, and others, is part of the vanguard of addressing how smart, connected devices can transform urban living.

Impact

Impact on society

High

Impact on business

High

Expected peak

5 years

Industries most impacted

Consumer Products, Insurance, Oil and Gas, and State and Local Government

Business domains that will lead the charge

Customer Service, IT, and Product Development

Companies bridge the talent gap

A deepening shortage

By now it's obvious that universities and colleges can't crank out data scientists fast enough to keep up with business demands. And they certainly can't produce *experienced* analysts from a two- or four-year program. Forty percent of respondents to a 2015 MIT Sloan Management Review survey say they have difficulty hiring analytical talent. Only 17 percent of "analytically challenged" firms say they have the talent they need. Among companies reported to be "analytics innovators," 74 percent said they had the analytics talent needed.

Getting creative

International Data Corporation (IDC) predicts a need for 181,000 people with deep analytical skills in the US by 2018 and a requirement for five times that number of positions with data management and interpretation capabilities.[1] To complicate matters, there is no clear set of capabilities that define a "data scientist," because different problems require different skill sets. Some organizations are taking a multipronged approach by supplementing campus recruiting with alternatives—from turning to managed analytics to cultivating in-house talent.

With a rising number of analytics and data science programs at universities—more than 100 in the US alone—recruitment efforts in analytics are red hot today. Organizations recruiting at these campuses will likely find more success if they work closely with the programs on internships and student projects. Once recruited, these graduates are more likely to stay and do productive work if they have meaningful career paths and have the ability to work with others with similar skills and backgrounds.

Tapping the talent ecosystem

Of course, analytics talent doesn't have to be directly employed by the organization. Some companies are consciously developing ecosystems of external providers. One, for example, has selected multiple services partners in the areas of business intelligence, predictive analytics, data science, and cognitive technology. The company continually monitors the efforts of these partners to recruit and develop qualified people and to keep up with new technologies and methods.

These are by no means extreme steps. Smart companies are realizing that analytical talent is critical to their success and in short supply. They know they must get serious about preparing or partnering with this strategic workforce if they hope to successfully execute their strategies.

1 Source: International Data Corporation

Case study: Cisco Systems

Having decided that analytics and data science skills are key competencies for its organization, Cisco Systems has created an aggressive program for cultivating data scientists and data-savvy managers. The company has launched a five-month training program in partnership with two universities to teach employees from all functions the fundamentals of data science. To date, more than 200 employees have been trained. And for those who acquire the necessary skills, Cisco has created a well-defined career path in data science, with several roles that offer increased responsibilities and compensation over time.

Cisco's Data Science office has also maintained a laser focus on improving awareness and understanding among managers on data and analytics issues—including a two-day program for executives. The company has created a number of physical Data Labs that serve as platforms for helping different parts of the company act on the opportunities identified through analytics.

Impact

Impact on society

Medium

Impact on business

High

Expected peak

1 year

Industries most impacted

Consumer Products, Federal and State Government, and Health Care

Business domains that will lead the charge

HR and IT

Business borrows from the sciences

Scientists were into analytics before it was cool

Any conversation about the new world of business analytics should come with a caveat: It's not really new. Businesses have been engaging in analytics for years—decades, even. It may be more accurate to say that analytics is experiencing a major renaissance, ushered in by big advances and investments in technological and data capabilities. As a result, business analytics has reached a next level of maturity.

Business isn't the only field notable for major advances in analytics through the years. If anything, there may be a stronger case for the sciences leading the vanguard of analytics. Universities, research labs, and other science-focused organizations have been applying and refining analytics approaches to solve some incredibly complex problems through the years, in everything from molecular biology and astrophysics to the social sciences and beyond. In many cases, they don't even use the word "analytics." For them, it's all science.

Cross-pollination between science and business

This environment—marked by a reinvigorated interest in business analytics combined with separate-but-related advances in analytics in the sciences—is one that is ripe for cross-pollination. Already we are beginning to see techniques borrowed from the world of science and applied to business challenges. In one example, an organization leveraged tools used by DNA researchers as the keys to unlocking insights buried in tens of thousands of emails. These developments are in their nascent stages now, but there are plenty of signs of a coming explosion in shared analytics tools, techniques, and processes between the sciences and the business world.

It's already happening

Looking for evidence? Some signs of the inevitable merging of science and business capabilities have already been widely observed. In one high-profile example, a prominent private company lured dozens of scientists from a major research university—a coup for the company and a tough loss for the university. Look for more ripple effects—good and bad—as the worlds of business and science continue intermingling. From major airlines and insurers to oil and gas and beyond, the business community is actively hunting for science-based approaches that can give them the edge.

Case study: Financial Services

Imagine being on the receiving end of half a million consumer messages a year—and any single one of them could contain information that causes serious trouble for your organization if not handled quickly. If the wrong message falls through the cracks, you could be exposed to a ton of risk immediately. Now imagine that you have only a few hundred employees responsible for making sense of all those messages.

That was the problem facing a financial services organization—and the reason it turned to text analytics. With text analytics, it's possible to parse individual messages for key phrases and terms that would allow them to be automatically directed to the right handler. But when this organization needed to take its text analytics capabilities to the next level, it turned to the world of science—specifically bioinformatics, in which scientists are working to match sequences of DNA. After all, DNA is represented by a series of letters that occur in non-random patterns, not unlike the words and phrases in emails and feedback forms.

Using algorithms originally developed to compare DNA sequences, this organization cracked the code on thousands of messages received every day. This approach was deployed in the organization's workflow to tag, route, and prioritize messages, allowing the company to get its customer interactions back under control.

Impact

Impact on society

High

Impact on business

High

Expected peak

5 years

Industries most impacted

Consumer, Financial Services, Health Care, Retail, Telecommunications, and Travel

Business domains that will lead the charge

Customer Service, Finance, Marketing, and Supply Chain

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