



Minority Reports

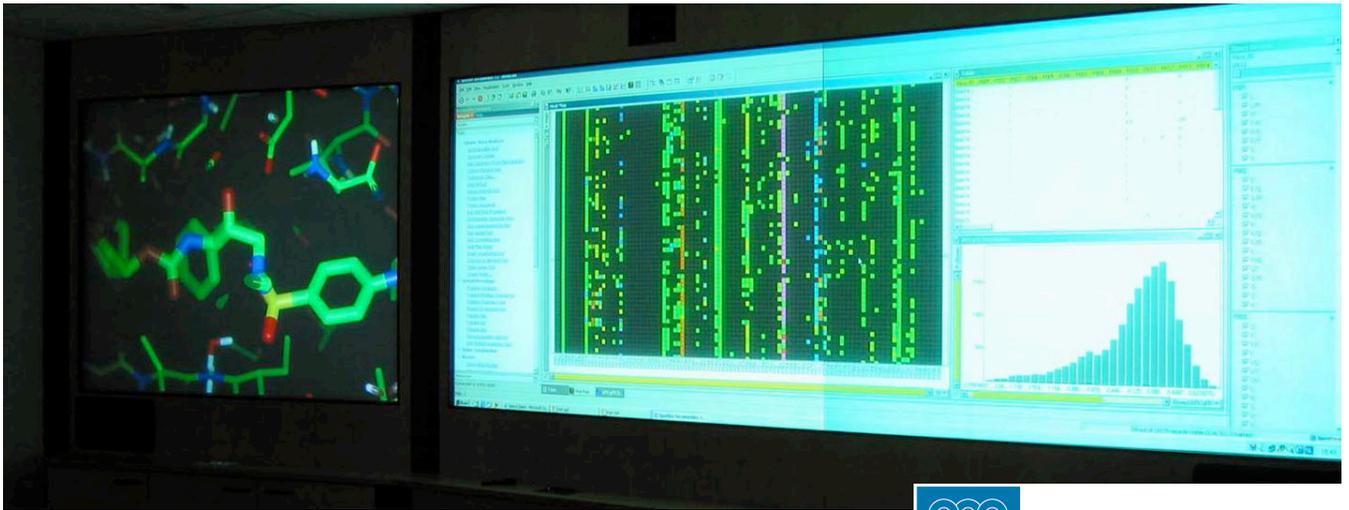
How a new form of data visualization promises to do away with the meetings we all know and loathe

Will Dilbert always be with us? The comic strip mocking cubicle culture turned twenty last year, but hasn't aged a day.¹ That's because the fundamental unit of "knowledge work" hasn't changed much either—we still languish in meetings. They're where decisions great and small are made, where innovation happens, or doesn't happen, and where companies settle upon grand strategies.

But despite radical changes in corporate culture and structure, competitive pressures that didn't exist when the Berlin Wall fell, and the billions upon billions invested in information technology that has progressed through a dozen cycles of Moore's Law since then (not to mention the advent of the Internet), most companies remain in the thrall of meetings. The rituals remain the same: questions are asked beforehand, data collected, reports

generated, and, in due course, slides and spreadsheets are publicly presented. Then someone asks a question that can't be answered, and someone else responds "That's a good question; I'll get back to you." Hours, days, weeks go by before the process repeats itself with another unanswerable query, and what is by now a vicious cycle continues. In the meantime, the original assumptions are often rendered obsolete by some shocking development or a rival's checkmate.

Although they fly in the face of two decades' worth of management wisdom—all of which sounds a warning to move faster—meetings continue to set the pace of corporate metabolisms. Not even the tools have changed—Microsoft Office® also turned twenty last year. Like Dilbert, PowerPoint® and Excel® will seemingly be around forever.



Company meetings are beginning to resemble scenes from the movie *Minority Report*² – with data being manipulated and analyzed real-time on large screens



CITO Research

But not at Organon BioScience, acquired last year by Merck & Co.³ The first drug to emerge after the acquisition, a fertility treatment named Elonva, was developed by Organon. It might also be the first drug created without a total reliance on spreadsheets.

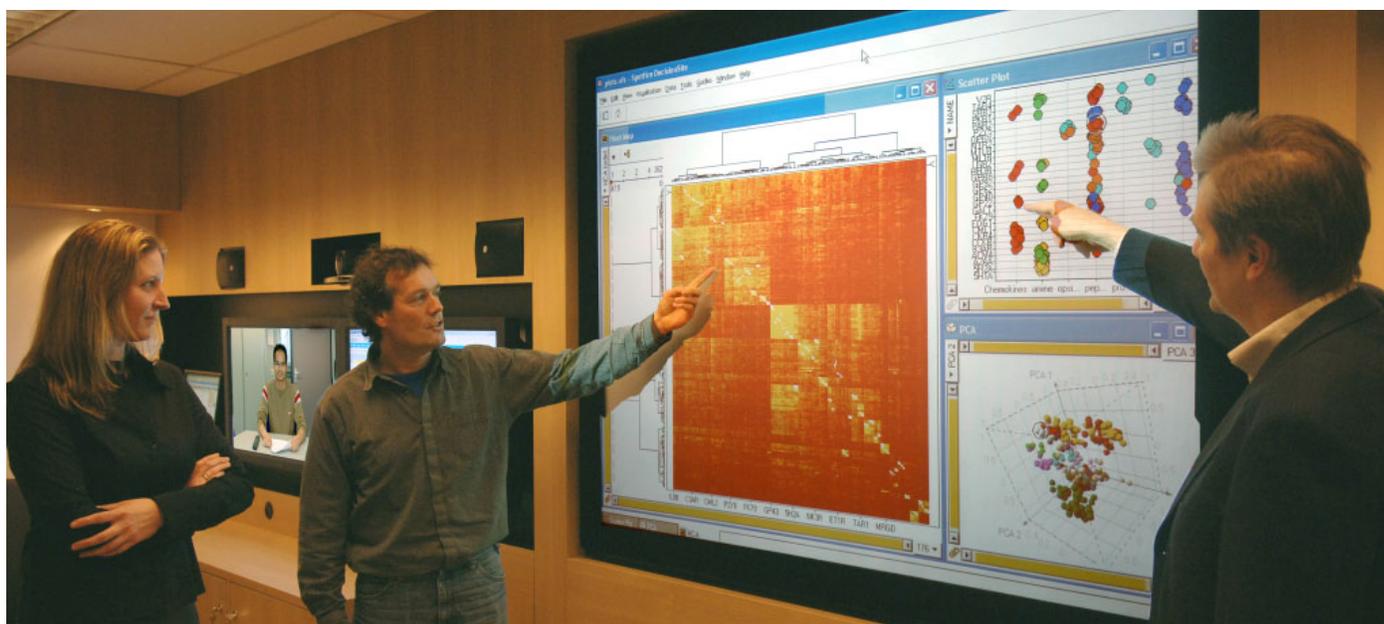
Meetings at what were once Organon's Dutch laboratories bear a greater resemblance to the film *Minority Report* than a Dilbert strip.⁴ Like the investigators led by Tom Cruise, Organon's scientists crowd into conference rooms and lecture halls where data drawn from lab tests and clinical trials appear on flat-screens as elegant 3D images. The underlying information has been gathered and reproduced in real time from vast troves of data comprised of thousands of genes, millions of compounds, and dozens of dosages, any and all of which may play a critical role in

determining whether a promising drug will turn out to be a multi-billion dollar blockbuster or a toxic dud.⁵

What really sets these meetings apart from Dilbert's, however, is the ability of Organon's scientists to manipulate the data itself. Rather than read aloud from PowerPoint decks, team leaders are encouraged to zoom, swoop, and drill through data sets in an interface so intuitive "that even my mother can understand it," says Jacob de Vlieg, head of the labs' molecular design and informatics department. Instead of simply presenting their findings, researchers use these occasions to spot patterns in the data, ask questions, share hypotheses, and hotly debate them while it's still fresh in their minds. In the moment, you can include or exclude data that may be distorting the true picture.

The vicious circle of unanswerable queries has been squared. And because the software is so easy to use, de Vlieg says, Organon has been able to convince Luddites to roll up their sleeves and dive in. "We can bring it to the masses, so expert users can be bridged with the people who really do the work, ask the relevant questions, and see all the details. The two were always separated in the past."⁶

A new kind of meeting has spawned a new meeting culture at Organon—and with it, a new arena for office politics. The winners are able to think on their feet, ask questions, explore topics on the fly, and make decisions based on discoveries buried in mounds of data. With the facts at their fingertips, they're able to achieve consensus through the strength and clarity of their arguments, rather than their position. The losers cling to



Organon uses TIBCO Spotfire® Analytics in live meetings across its drug discovery organization

their spreadsheets, stacks of reports, and PowerPoint decks, trying to control information rather than share it. At stake isn't just Organon's replenished pipeline, but the evolution of meetings into something far more useful and dynamic than we've known.



The modern meeting is partly a function of technology. Besides slides and spreadsheets, a class of software broadly referred to as business intelligence (BI) guides most decision making in companies.⁷ These industrial-strength applications typically aggregate information in data warehouses or data marts to enable mining, online analytical processing (OLAP),⁸ and similar techniques, which inevitably lead to stacks of reports that are invariably presented in meetings. The problem with this time-tested approach is that reports are both static and stale, leading to decision-making paralysis. Rather than sifting through a hundred reports, line managers would prefer to have one meeting like Organon's, in which they can ask a hundred questions with all of the relevant people present and quickly come to a consensus. Picture an entire company run this way, with a correspondingly higher metabolism.

Advocates of "dynamic meetings" like these argue that, while traditional BI is well-suited to strategic functions such as budgeting, planning, and forecasting, the model is outdated when it comes to operations, where even the questions are unknown until frontline executives begin parsing the data. Early adopters besides Organon and its rivals (which are struggling to cut the time and costs it takes to bring new drugs to market) include oil & gas industry players like Chevron,⁹ which is constantly crunching geological data in its hunt for new wells, and financial players, such as hedge funds, which can never have enough data fast enough.¹⁰

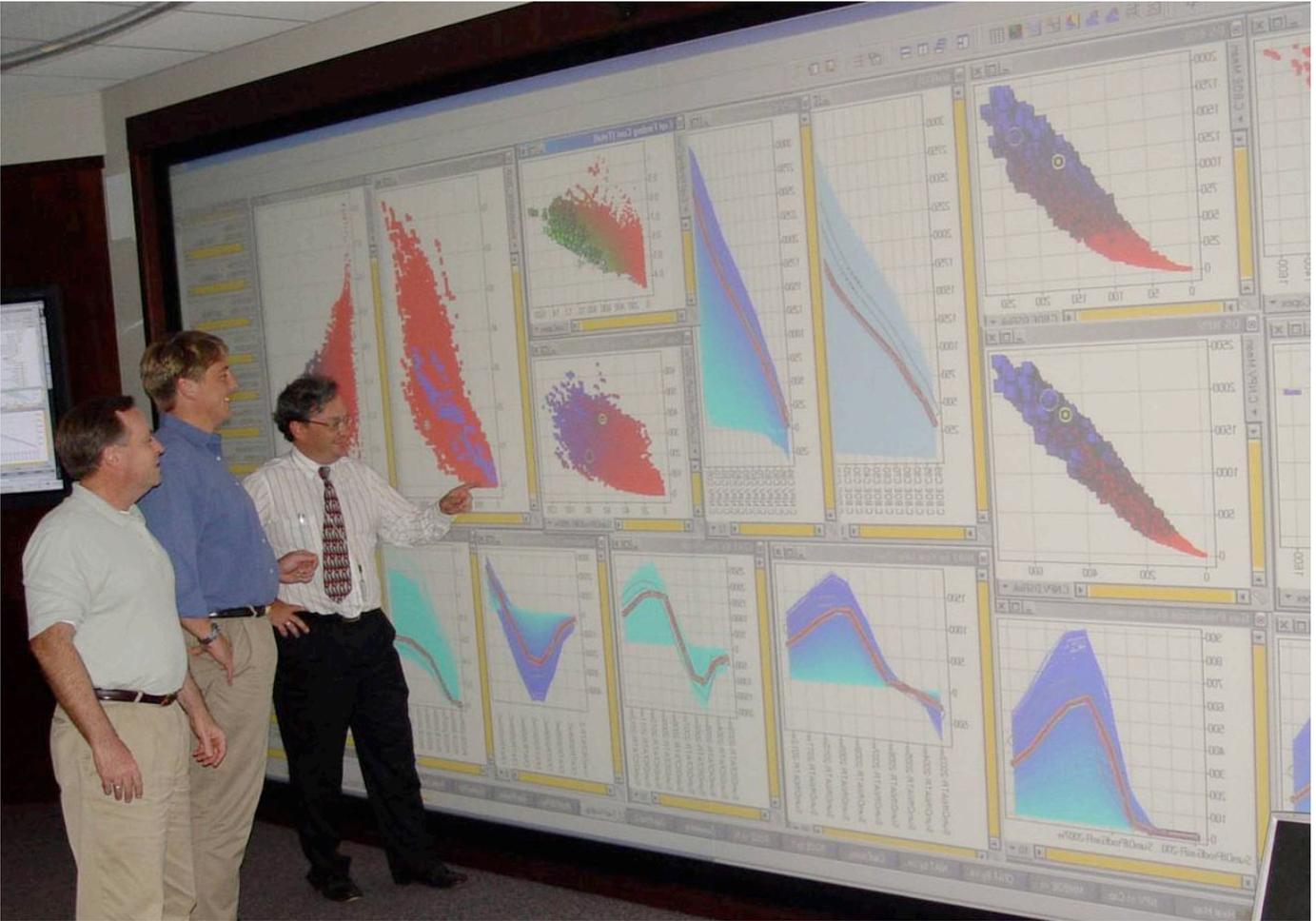
An oil executive sums up their shared dilemma neatly. "When I drive into work every morning I know the shit's going to hit the fan probably around 10:00 in the morning," he says. "I have no idea what's going to hit the fan, but something's

going to happen, and I won't be ready for it. I don't know what it is, and I don't turn to my traditional business intelligence system. I usually end up running the closest report I can find, sticking it in Excel and then laboring through this 'spreadmart' to figure out how to answer the problem."

He isn't alone. Organon's scientists also relied on Excel, because it was the only interface understood by all of them. That changed in 2006 with the installation of TIBCO Spotfire® across what-was-then Organon BioSciences' R&D division.¹¹ Spotfire's software is responsible for both the *Minority Report*-style visualizations and the switch to more dynamic meetings. In a report issued last spring, the Aberdeen Research Group named Spotfire the best analytics software in the industry—ahead of such heavyweights as IBM, SAP, Oracle, and SAS.¹² In particular, the report's authors praised its simplicity, interactivity, speed, and flexibility—and how these help non-technical users stumble upon discoveries in huge data sets.

If traditional BI is the holdover from the computing environment of twenty years ago, then Spotfire hints at the software needed to make dynamic meetings the standard—a BI platform with enough computing power to grapple with data in real time, rather than aggregated ahead of time, and an interface that borrows its cues from the vocabulary of touch screens, video games, and similarly intuitive ways of manipulating information. (Tellingly, it began life as human-computer interaction experiments at the University of Maryland.)

The value of dynamic meetings is premised on the notion that an "information advantage" begets a competitive one. The ability to filter more data more quickly yields more insights and a faster reaction time. These incremental advantages then slowly accrete over time into leaner, more responsive organizations. In practice, the anti-Dilbert office is a workplace shorn of traditional politics, in which power plays are replaced with a higher degree of transparency. Many companies fear the insidious



The ability to hold interactive meetings allows participants to ask and answer questions more quickly, yield more insights faster and quickly reach decisions in the meeting

effects of “confirmation bias,” the unconscious tendency to select data that supports one’s theories and assumptions while discarding data that does not.¹³ Dynamic meetings make it more difficult for managers to cherry-pick evidence. They must be prepared to defend, explore, and consider options with a group free to roam through the supporting evidence, rather than simply dictate their agendas via PowerPoint.

The potential upside is more collaboration, more consensus, and, in theory, more accurate decisions. Achieving the grail of total information awareness in the name of risk management is impossible without a way to visualize it. The downside is the ever-present risk of culture shock, especially along demographic lines. Younger, more aggressive analysts have been quick to adopt the dynamic

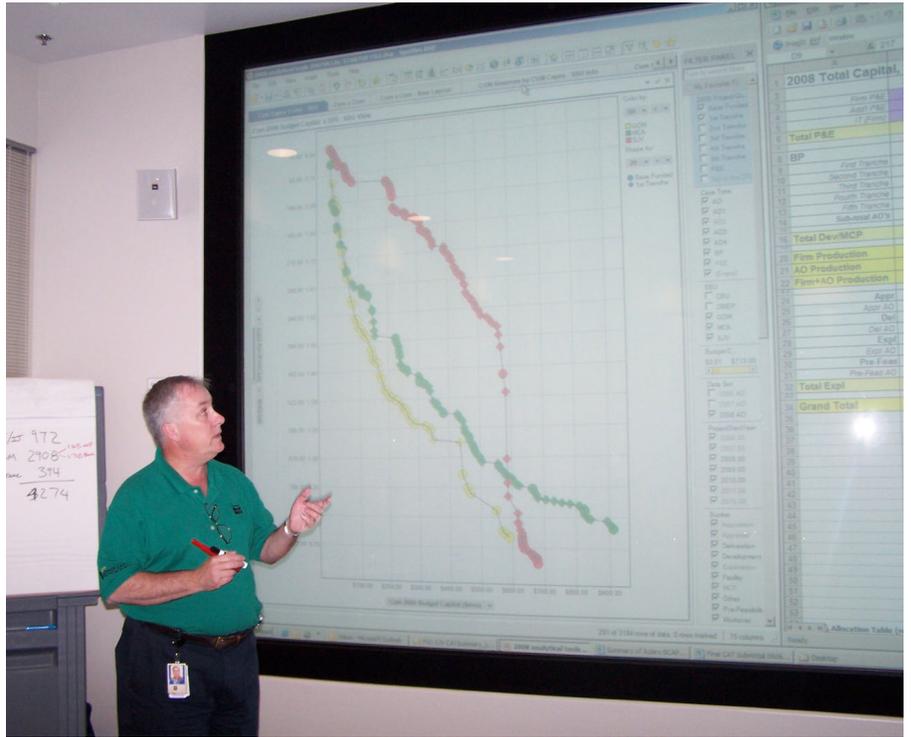
meeting and its supporting software, as they were practically weaned on such screens. Veteran managers who’ve honed their political skills to a fine point proved more resistant, but they’ve gradually given way, conceding that demands of leadership and competition have forced them to get their hands dirty with the data.

Dynamic meetings pose an even greater challenge to software vendors and IT departments, which have spent billions to acquire and install business intelligence applications at precisely the moment when new analytical and visualization tools like Spotfire’s threaten to render their model obsolete.



Business intelligence evolved to meet a very specific set of strategic planning needs. They were designed to answer “known unknowns”—eternal variables such as revenue, profitability, earnings per share, customer satisfaction, and so on. Their reports are descriptive rather than predictive and are not easily modified to add variables or ask new questions. Doing so typically requires the intervention of IT departments, which then engage in a long requirements-gathering process that mirrors the vicious circle and interminable lag between meetings. It becomes necessary to anticipate the questions you want the reports to answer—a tell-tale sign you already have an idea of what those answers will be.

While BI applications have become highly proficient at capturing, cleansing, and storing gigantic volumes of data for big picture analysis and meeting regulatory guidelines (Sarbanes-Oxley has made them ubiquitous),¹⁴ the software hasn't kept pace with corporate structures and day-to-day operations. Tactics and decision-making have evolved to keep pace with changes in the marketplace, but the software hasn't. Befitting a platform designed to meet the needs of 20 years ago, BI applications serve hierarchies of programmers, analysts, and executives in rigidly defined roles. Lost in all of this are the managers on the front lines trying to summon reinforcements.



Chevron leads the way in using dynamic meetings to analyze and decide which wells to drill or workover to increase production in oil fields

Like the oilman who drives to work each morning dreading what will hit the fan —“unknown unknowns”—operations executives crave the ability to comb through data as it arrives, rather than prep questions in advance and wait for a report to land on their desks. They won't know what they're looking for until they find it—which makes traditional BI and its long lead times nearly useless to them. This invariably leads to kluges such as the “spreadmart”—a BI report imported into Excel for ad hoc analysis before being cut-and-pasted into a PowerPoint presentation.

Capitalizing on the information advantage of dynamic meetings calls for changes in not only how decisions are made, but also in the role of IT

departments in supporting day-to-day operations. Just as they've closed the loop in meetings, next-generation BI applications, such as Spotfire's, herald a shift away from reports and requirements-gathering toward the need for a deeper understanding of the relationships between different streams of data and how to render those relationships visually for instant analysis.¹⁵ If and when that happens, BI's new task will be creating “information spaces” in which anyone can summon and probe the data they need while the very act of looking leads to innovation.



Organon wasn't the first to deploy dynamic meetings in the hunt for new drugs, but it

has been the most enthusiastic. Elsewhere, Fournier Pharma¹⁶ uses the technique to visualize and understand the results of its gene expression tests while Pfizer¹⁷ employs it to prepare clinical trial reports for the Food & Drug Administration.

Among oil & gas companies, Chevron has led the way in using dynamic meetings to analyze and map production and pressure trends in oil fields. And then there's the question of deciding where to drill—guessing the exact spot above an ocean and miles of solid rock. “Exploration is probably one of the most data-intensive processes in the world,” says Mark Ruths, senior staff geophysicist for Chevron, “especially when you factor in the sheer volume of data and how disparate it is.”

In the past, Ruths and his staff grappled with spreadsheets, maps, and output from various specialized applications. While analysts were adept at asking the right questions and creating visuals for PowerPoint decks, there was always one query no one could answer. Now, says Ruths, you show a visualization and people go ‘Wow!’ and then they bring their experience to bear on the problem, increasing everyone's confidence that we're on the right track and no one has missed anything. Debates that once ended inconclusively because of articles of faith on both sides have been settled in a single meeting, saving time, money, and—most of all—the need for additional meetings.

“You're never going to get everyone in the same room again,” says Ruths, “and even if you do,

they will never remember what they were talking about before, and you'll never recapture it. What this does is let you answer questions as they're being asked. You'll make a decision, and you will never have another meeting about this. That's huge.”

There are signs dynamic meetings are beginning to catch on beyond Big Oil and Big Pharma. Unilever¹⁸ uses them to analyze the nutritional content of its global food and beverage portfolio while the nonprofit Genomics Institute¹⁹ does a similar analysis with rice, mapping and studying its genome. Financial firms, including Fidelity and the Royal Bank of Scotland, use dynamic meetings to continually monitor and assess risk in their portfolios while high-tech manufacturers like Toshiba²⁰ have adopted the practice as part of their philosophy of process improvement.

The next challenge, they say, is finding ways to make dynamic meetings more accessible to non-technical users. While Organon and others have gone as far as to fill entire auditoriums with screens, more often than not, the interface remains point-and-click. If the software continues its evolution in the direction of *Minority Report*, expect to see touchscreen displays, such as Microsoft Surface^{TM21} or Perceptive Pixel's multi-touch walls²²—used to terrific effect by CNN anchor John King during the 2008 presidential campaign²³—recruited to replace point-and-click with simple pointing.



Endnotes

1. “Happy 20th Birthday, Dilbert!” Fast Company, April 2009. <http://www.fastcompany.com/magazine/134/celebrate-dilberts-20th-birthday.html> Twentieth Century-Fox Film Corporation
2. *Minority Report* (2002), Steven Spielberg, Twentieth Century-Fox Film Corporation
3. “This Baby Is A Nice Addition.” The Motley Fool, Nov. 20, 2009 <http://www.fool.com/investing/general/2009/11/20/this-baby-is-a-nice-addition.aspx>
4. “TIBCO Spotfire Helps Organon Bridge the Data Gap Between Basic Research and Clinical Trials.” (PDF marketing material)
5. Ibid.
6. Ibid.
7. “Business Intelligence.” Wikipedia. http://en.wikipedia.org/wiki/Business_intelligence
8. “Online Analytical Processing.” Wikipedia. http://en.wikipedia.org/wiki/Online_analytical_processing

9. "Analytics promise to improve reservoir, well recovery." E&P, May 2009. <http://www.epmag.com/Magazine/2009/5/item36542.php>
10. "Risk Management – Shaping Up? Wilmott Magazine, May 2009. <http://vmullur.blogspot.com/2009/06/risk-management-shaping-up.html>
11. "TIBCO Spotfire Helps Organon Bridge the Data Gap Between Basic Research and Clinical Trials." (PDF marketing material)
12. "Business Intelligence: Reporting and Analytics AXIS." Aberdeen Group, Q2 2009. (PDF document)
13. "Confirmation Bias." Wikipedia. http://en.wikipedia.org/wiki/Confirmation_bias
14. "The Impact of the Sarbanes-Oxley Act on Financial Reporting & 360-Degree Insight." Information Management, November 2003. <http://www.information-management.com/issues/20031101/7604-1.html>
15. "The New Decade of Advanced Analytics: Roll Over Rocket Scientists!" James Kobielus, Forrester Blog, January 5, 2010. http://blogs.forrester.com/business_process/2010/01/the-new-decade-of-advanced-analytics-roll-over-rocket-scientists.html
16. "Spotfire Takes Center Stage at Fournier Pharma." TIBCO Spotfire Case Study (PDF). <http://spotfire.tibco.com/contentcenter/casestudies/fournier-pharma.aspx#>
17. "Pfizer Deploys Intranet-based StatServer Technology To Improve FDA Reporting." TIBCO Spotfire Case Study (PDF). <http://spotfire.tibco.com/contentcenter/casestudies/pfizer.aspx>
18. "Spotfire Bakes and Brews Nutritional Reviews for Unilever." TIBCO Spotfire Case Study (PDF). <http://spotfire.tibco.com/contentcenter/casestudies/unilever.aspx>
19. "S-PLUS Software Mines Genomic Data." TIBCO Spotfire Case Study (PDF). <http://spotfire.tibco.com/contentcenter/casestudies/genomics%20institute.aspx>
20. "Toshiba Gains an Information Advantage with Visual, Interactive Analytics." TIBCO Spotfire Case Study (PDF). <http://spotfire.tibco.com/contentcenter/casestudies/toshiba.aspx>
21. <http://www.microsoft.com/surface/>
22. <http://www.perceptivepixel.com/>
23. "CNN Hits The Wall for the Election" Washington Post, February 5, 2008. <http://www.washingtonpost.com/wp-dyn/content/article/2008/02/04/AR2008020402796.html>



CITO Research