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Analytics:
It is all about the money



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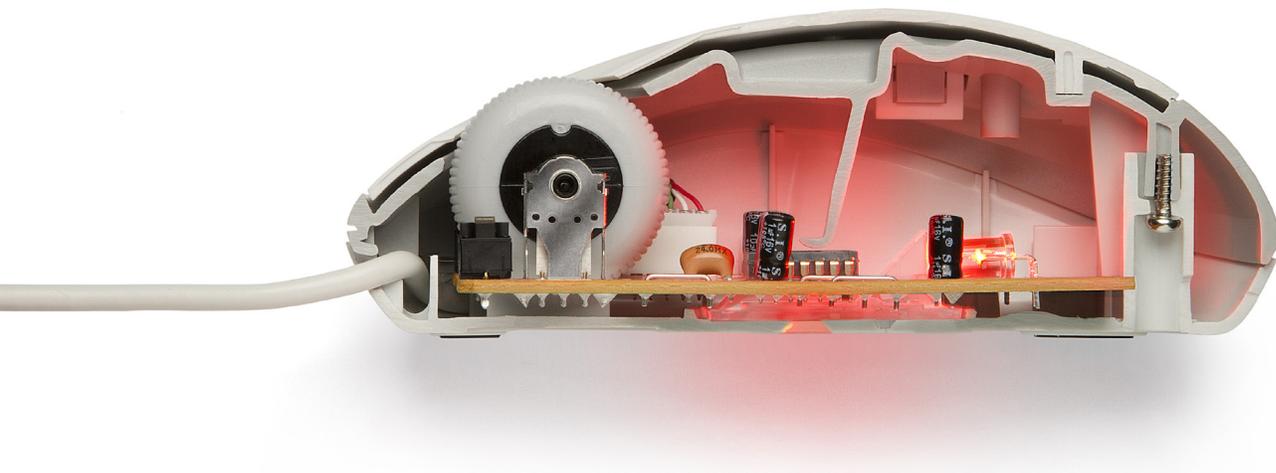
Big data challenge and opportunity

Analytics and big data are hot topics today. Many companies are embarking upon projects and programs in those areas. There is a tendency in such a fashionable area to pursue projects for their own sake, but that is a mistake. As with any other important resource, the focus for big data and analytics projects should be on business value and return on investment, rather than the faddish elements of the phenomena.

It is both a challenge and an opportunity with big data and analytics that they can be applied to many different areas of a business. Marketing, supply chain, new product development, human resources, finance, and every other business function can potentially benefit from more analytical decisions and processes. Therefore, deciding where to apply analytics in what order can be a challenging exercise. Prioritizing analytical projects by their economic return is the most logical way to select among alternatives.

Building analytics and big data capabilities requires investment in people, technology, and sometimes data itself. These capabilities are not a good investment if there are no sufficient returns to justify the spending. Some organizations may want to create big data and analytics initiatives just because it is fashionable, but without a solid financial basis for doing so, their interest is likely to wane.

Of course, there are a variety of alternative ways to make or save money with analytics and big data. Success with these tools starts with an understanding of the money-related alternatives they involve and analysis of where in a company is the most advantageous area to employ them. Financial returns also depend, in part, on how the analytics are implemented, which we will describe at the end of this article.



How can analytics make or save money?

As with any other resource, there are several different ways in which analytics and big data can make or save money for companies. Planners of initiatives should be clear from the beginning about which of these they are pursuing, or they are unlikely to accomplish any of them. The alternative approaches—along with examples of their application—are described below.

Incremental revenue

The “upside” of analytics and big data typically involves incremental revenue. This goal is particularly common for marketing, sales, and new product development applications. It can be achieved through selling more of existing products and services, getting more for each existing product and service sold, or through developing and selling new products and services based on data and analytics. Selling more of existing products and services is the primary focus of most marketing analytics, including efforts to target promotions and make “next best offers” based on customer purchases and behaviors.¹ This is also the primary focus of “test and learn” marketing initiatives to tune or improve websites; such “A/B testing” can improve website visits and conversions. In general, small-scale testing is a useful means to establish the monetary value of incremental revenue applications because it is difficult to know how successful they will be in advance.

Getting more money for the same products and services is typically accomplished through pricing optimization initiatives. In one of the earliest business applications, these approaches were pioneered in “revenue management” contexts in services, including airlines, hotels, and sports and entertainment events. More recently, pricing optimization has been applied to almost every type of business, including business-to-business industries involving industrial products.² If a company has accurate data on what prices have been charged and offered in the past, pricing optimization is a reliable means of making money with analytics.

New products and services based on data and analytics are a primary focus for organizations focused on big data.³ The pioneers of these capabilities were online firms, such as

Google (most of its offerings, including search, are based on data and analytics), LinkedIn (with such “data products” as People You May Know, Jobs You May Be Interested In, and Groups You May Like), and Facebook (with various social marketing offerings, such as Custom Audiences and Facebook Exchange). More recently, traditional large companies, such as GE, JPMorgan Chase, and Monsanto, have developed new products and services based on data and analytics to offer to customers.

The increased revenue from such data and analytics-based offerings, however, is difficult to measure in many cases. It is common, for example, for companies not to charge separately for these offerings, but to bundle them in with other products and services. In online businesses, it is often possible to run tests of how new data products affect metrics, such as unique visitors and time spent on the site. If there is a means to translate these metrics into financial benefits (e.g., a business model based on digital advertising), it may be possible to determine the value of a specific product offering.

Cost savings

Analytics can also be used to save or cut costs. Resource optimization—using analytics to determine the optimal amount of an expensive business resource—was one of the earliest business uses of analytics. The approach has been used in a variety of settings and industries, including:

- Determining the right amount of inventory to hold in warehouses and distribution centers to prevent stock-outs in consumer products firms
- Determining the optimal level of employee staffing in airline and retail firms
- Optimizing the flow of components and raw materials in manufacturing production lines
- Determining the right time to replenish a supply chain, including cash for ATMs and trash barrel emptying in city government

This type of optimization can be done on a large scale.



At a US consumer products company, a major redesign and optimization of the company’s product supply network in the early 2000s brought the company \$1.5 billion in cash savings. The savings resulted from decreased inventory, transportation costs, and distribution and warehousing facilities.⁴

¹ Davenport, Thomas H.; Mule, Leandro Dalle; Luckner, John; “Know What Your Customers Want Before They Do,” Harvard Business Review 89:12, 84-90, 2011.

² Meehan, Julie et al, Pricing and Profitability Management, Wiley, 2010.

³ Howard, Jeremy et al, Designing Great Data Products, O’Reilly Media, 2012

⁴ Farasyn, Ingrid et al, “Inventory Optimization at Procter & Gamble: Achieving Real Benefits”

Transportation costs are a frequent target for optimization. Shippers, such as UPS, FedEx, and Schneider National, have long worked on optimizing route networks and dispatching. UPS states that its analytics and big data work led in 2011 to reductions in fuel usage of 8.4 million gallons and 85 million miles from its delivery routes.⁵

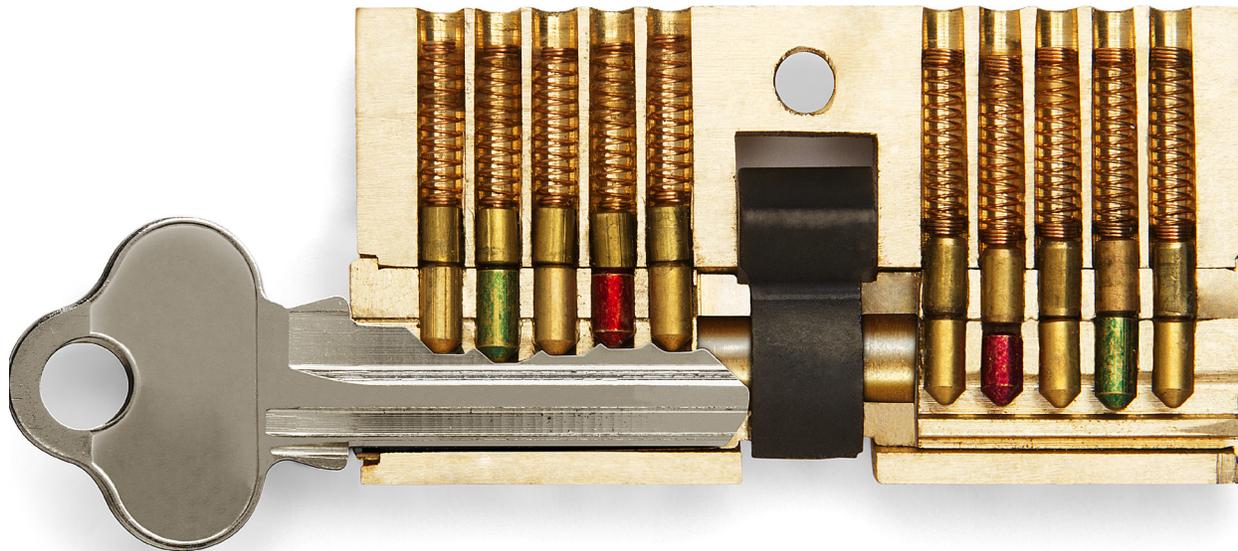
Optimization is not the only way to use analytics and big data to save money. Companies are increasingly using analytics to test “what works” in marketing and capital investments. Marketers, for example, use “marketing mix” and attribution analysis to determine what is the optimal mix of marketing activities (media, promotions, etc.) and to attribute sales to particular customer touchpoints.⁶ The resulting analyses may or may not result in lower marketing expenditures, but the resulting levels of spending are more likely to be effective.

Rigorous, controlled testing can also make it possible to determine what types of capital investments are most effective. For example, Darden Restaurants tested the effectiveness in customer acquisition and retention of interior and exterior remodels of its Red Lobster chain, and also tested three different levels of spending.⁷ The company found that interior, middle-level remodels were the most effective. This kind of targeting of capital investments can save considerable money for companies.

Finally, companies can save money through working capital optimization and reduction. Working capital may involve reductions in cash on hand, inventory, or payables. Any of these resources can be reduced through analytics, including forecasting, simulation, and optimization.

Working capital improvements can yield dramatic savings. The Warner Robins Air Logistics Center, which repairs military aircraft for the US Air Force, used operations research methods to speed repair processes for C-5 aircraft, allowing reductions in working capital of approximately \$50M and return of five aircraft (worth \$2.37 billion) to the Air Force’s operational inventory.⁸

Incremental revenue and cost savings, then, are the two possible ways to make money with data and analytics, and there are a variety of alternative ways to achieve them. Companies need to examine their financial reports to understand where the highest leverage opportunities might be from analytics and big data. Other characteristics of the business might also drive the focus, as discussed in the next section.



⁵ Davenport, Thomas H., “Big Brown Finds Big Money From Big Data,” The Wall Street Journal, April 9, 2014, <http://mobile.blogs.wsj.com/cio/2014/04/09/big-brown-finds-big-money-from-big-data/>

⁶ Dekimpe, M.G. & D.M. Hanssens, “Time Series Models in Marketing: Some Recent Developments,” Marketing - Journal of Research and Management, 6 (1), 2010.

⁷ O’Sullivan, Kate, “Ready, Set, Grow;” CFO Magazine, May 2010, <http://ww2.cfo.com/strategy/2010/05/ready-set-grow/>

⁸ M.M. Srinivasan et al, Warner Robins Air Logistics Center Streamlines Aircraft Repair and Overhaul, Interfaces 37:1, January-February 2007, 7-21.

Where is the money in your company?

In addition to the specific financial approach for making or saving money, companies need to target specific types of initiatives to achieve a financial return from analytics and big data. Not all possibilities will make sense given the industry and focus of your business. There are several key questions that a company can ask to narrow down the financially viable possibilities.



Do you have businesses, consumers, or intermediaries as customers?

Customer analytics are among the most popular and important types of applications. There are some types of analytics initiatives that only make sense given a certain customer type. For example, recommendation or “next best offer” applications typically require a large number of customers and may not be suited to business-to-business settings. Direct and targeted offers or ads to customers may not be possible at all if a company sells through intermediaries, as in the automobile and consumer products industries. Whatever your customer situation, as much as possible, you should attempt to try out customer data and analytics initiatives on a small scale to learn their potential financial impact.



What are the major strategic and tactical decisions your organization makes that drive its financial success?

Analytics are primarily intended to support decisions, so focusing on the specific decisions that need to be improved is a way to ensure impact from your analytics investments. It is possible that analytics can be used to support big-ticket strategic decisions, such as mergers and acquisitions, but the most likely decision candidates are those that are made often and that yield a good amount of data. These include pricing and promotion decisions in marketing, hiring, retention, and promotion decisions in HR, and inventory optimization decisions in supply chain. If you have a good sense of which decisions really drive financial performance—typically these would come from a broad, process-oriented business architecture—you can increase the likelihood that better decisions will equal better financial performance.



What is your business model?

Do you get most revenue from products or services? Does traffic to your website pay the bills? Analytics can support a variety of business models, but the nature of the model will drive what applications make the most business sense. GE, for example, knew that its industrial products businesses (including turbines, locomotives, and jet engines) get half of their revenues from services, so they collected data from sensors on these products and began to use them to optimize services for customers.⁹ Other companies, such as the real estate information website Zillow, receive substantial amounts of revenue from website advertising. Therefore, it was beneficial for Zillow to develop website features based on data and analytics that drove viewers to the company’s site. The “Zestimate,” an analytical estimate of what a house is worth, has been particularly successful in that regard.



Do you have high costs from fixed assets or inventory?

As mentioned earlier, companies with high level of inventory or other fixed assets can optimize the amounts and usage of those assets with analytics. Airlines, for example, optimize the use of their planes, landing slots, and crew to get the maximum amount of revenue from them. Even companies like Netflix use analytics to determine what video assets to buy from movie studios and even which ones to create in terms of produced content.¹⁰



Where are your greatest G&A expenses?

Analyzing a company’s selling, general, and administrative expenses for daily operations can provide guidelines for which analytical problems to tackle. For pharmaceutical companies, for example, the sales force is a large expense. Many of these companies, including Merck & Co., have optimized the number of salespeople in particular regions and for particular therapeutic categories. Merck has even developed an analytical application for use by field sales managers to help them decide whether to replace a sales rep that leaves the company. Other companies with high sales expenses are analyzing the sales pipeline and targeting the accounts that will benefit from sales force attention.¹¹

While none of these questions will provide an unambiguous answer to which analytical applications will provide the greatest financial return, they can definitely shed considerable light on the issue.

⁹ Lakhani, Karim et al, “GE and the Industrial Internet,” Harvard Business School case study, 2014.

¹⁰ Carr, David, “Giving Viewers What They Want,” The New York Times, February 24, 2013.

¹¹ Baier, M. et al, “Sales-Force Performance Analytics and Optimization,” IBM Journal of Research and Development 56:6, November/December 2012, http://ssg.mit.edu/~krv/pubs/BaierCCLMRSSV_ijrd2012.pdf

Implementing your analytics and big data initiatives for maximum return

The way in which your organization implements its analytics and big data programs can have as great an impact on your financial returns as the specific applications it chooses to develop. There are several steps that can dramatically improve the likelihood of a positive financial outcome from analytical projects.

“Test and learn” is one of those steps. As mentioned above, it is an approach to rigorously testing changes to your organization on a small scale before rolling them out in full. Rigorous testing demands such components as control groups, random assignment to test vs. control groups, and statistical analysis of differences between groups.¹² At Cigna, for example, the analytics group established a “Smart Innovation” methodology that used test and learn approaches for many core operational analyses, including determination of whether disease management calls work to reduce hospitalization levels in the care of patients with chronic disease.¹³

Another way to improve financial returns is to minimize investments in data and analytical infrastructure that are not tied to a specific decision. A prime example is the enterprise data warehouse, which is typically intended to support a wide variety of data and analytically driven decisions. If a warehouse is developed without clarity on what decisions it will support, much of the investment in it can be wasted. Enterprise warehouses that are built up over time—adding data as particular decision improvement projects warrant—is usually a more fiscally responsible approach.

Big data projects are particularly likely to become “fishing expeditions” for what findings and insights can be found in a large quantity of data. Make sure that big data projects have a business problem from the beginning. It is fine to investigate the potential value from a pool of data, but having a business problem in mind will limit unproductive analysis.

With analytics and big data being popular business concepts today, it is easy to get caught up in the hype about them and what they can do. Savvy, financially-oriented managers will not get caught up in analytical catchphrases and buzzwords, including “the Internet of everything,” “omni-channel,” or “360-degree view of the customer.” With the latter term, for example, it may be nice to know the customer from all directions or angles, but that would be very expensive. Perhaps some customer interactions with a company are much more revealing of what they really want than others. A carefully-designed plan to pursue customer analytics will pick and choose the most effective approaches in terms of cost and benefit.

Adopting these approaches to targeting analytics and big data initiatives where they will provide the greatest payoff, and to implementing them in a financially responsible way, can greatly improve the benefits that organizations receive from these powerful business tools. They can also prevent the popular ideas from being treated as a short-lived fad. If they provide considerable financial return, they will become part of the long-term fabric of an organization’s focus and capabilities.

¹² Davenport, Thomas H., “How to Design Smart Business Experiments, Harvard Business Review, February 2009; Anderson, Eric T. and Simester, Duncan, “A Step by Step Guide to Smart Business Experiments, Harvard Business Review, March 2011.

¹³ Davenport, Thomas H. and Kim, Jinho, Keeping Up with the Quants, Harvard Business Review Press, 2013, pp. 4-6.

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