



Leveraging Big Data and Business Analytics

Sunil Mithas, *University of Maryland*

Maria R. Lee, *Shih Chien University, Taiwan*

Seth Earley, *Earley & Associates*

San Murugesan, *BRITE Professional Services, Australia*

Reza Djavanshir, *Johns Hopkins University*

Fueled by the growing popularity of social media, e-commerce, and an increased interest in business collaboration, there's been an explosion of data. However, enterprises don't always know how to use this "big data" to make (or automate) complex decisions, resulting in a business advantage. Powerful analytics techniques can help enterprises deal with complex decisions by providing new insights, creating a virtuous cycle by spurring an interest in and demand for better techniques, tools, and approaches for leveraging big data and business analytics.

Finding Value

There are debates about whether big data and business analytics represent a "radical shift or incremental change,"¹ and many firms are still in the early stages of developing strategies and governance processes to leverage these new capabilities. As is frequently the case with new approaches or classes of technology, there's a good deal of exploration and experimentation. However, continued support requires demonstration of clear value for the organization.

Therefore, it's critical for organizations to develop a realistic business case. Unless embarking on a pure research endeavor, big data projects that don't have a clearly defined outcome and tangible business case are less likely to retain long-term funds and resources. A recent vendor survey claimed that 55 percent of big data projects aren't completed, and many more fail to achieve their objectives.² This isn't surprising, given the amount of uncharted territory that big data projects are exploring. Efforts won't always lead to predictable or expected outcomes.

The goal of big data programs should be to provide enough value to justify their continuation while exploring new capabilities and insights. Again, the business case should be realistic—programs should aim to achieve expected results in some areas (for example, when analyzing unstructured customer feedback data), but they should push capabilities in other areas (attempting to anticipate user actions with predictive algorithms, for example).

In this Issue

The articles in this special issue speak to some of these challenges. In "Leveraging Big Data

Analytics to Reduce Healthcare Costs,” Uma Srinivasan and Bavani Arunasalam discuss the application of business analytics in healthcare—an enormous segment of the economies of industrialized nations. The healthcare field can benefit greatly from big data analytics, potentially using it to control costs, improve the quality of care, and increase the safety and efficacy of treatment. In particular, Srinivasan and Arunasalam explore how big data can lower costs by reducing fraud and waste in healthcare systems.

Medical claims are generally accepted as an example of big data, given their complexity and volume. Srinivasan and Arunasalam’s discussion of predictive analytics and text mining techniques, as well as of the statistical analysis of outlier and exception information, provides excellent examples of big data in action. In future work, they hope to integrate social graph data.

The article, “Business Process Analytics Using a Big Data Approach,” by Alejandro Vera-Baquero, Ricardo Colomo-Palacios, and Owen Molloy, describes an approach and architecture for monitoring and optimizing complex processes. Such processes can reside in an organization (across departments or business units, where multiple heterogeneous data sources and applications are part of the value chain) or across organizations, where complex related processes could be analyzed and optimized. An example within an organization is the customer journey: different departments and systems are in place for product marketing, purchasing, servicing, billing, and support. Business process analytics could measure the performance of these somewhat disconnected processes from external data (feedback forms, social media, and discussion forums) and compare that data with internal process performance across departments.

Another application of this approach is cross-organizational supply-chain process analysis and optimization—from upstream R&D through manufacturing and retail distribution. Vera-Baquero, Colomo-Palacios, and Molloy describe a framework that would support these and other types of scenarios. The approach uses local *business analytics service units*, consolidated through a *global business analytics service*. In this way, multiple complex processes

can be aggregated at local and global levels to provide process insights at the microlevel (detailed customer transaction or interaction level) and at the macrolevel (the supply chain’s overall health).

In “XBRL in Chinese Financial Ecosystem,” Li Jimei, Hu Yuzhou, and Du Meijie present the implications of the eXtensible Business Reporting Language (XBRL) on big data analytics in Chinese financial systems. They introduce XBRL, an open Internet standard built on an XML base, which professionals from a range of industries can use to address widely known challenges, such as the lack of visibility into systemic risks in the financial system. The authors also provide interesting insights into the implementation of XBRL procedures in China and explain some of the challenges faced.


Finally, in “Big Data and Transformational Government,” Rhoda C. Joseph and Norman

There’s a great deal of hype, confusion, and fear regarding big data, and numerous vendors have attempted to hijack the term for their own commercial benefit.

A. Johnson describe the role of big data in e-government. The article demonstrates how big data could increase operational efficiency and process effectiveness in the US government—particularly in the US Department of Veterans Affairs. The authors discuss the drivers of and barriers to big data and how big data can become a powerful tool that could transform the government.

As the articles illustrate, organizations must synchronize their strategies and capabilities to fully leverage the potential of big data and business analytics. They must develop appropriate governance processes and incentive systems to manage their internal knowledge and seamlessly integrate data from external and internal sources. Doing so requires careful thinking regarding the allocation of decision rights,

the role and configuration of IT departments, the allocation and justification of IT dollars and related big data and analytics projects, and the delivery of solutions using in-house versus external resources.³ There's a great deal of hype, confusion, and fear regarding big data, and numerous vendors have attempted to hijack the term for their own commercial benefit. What's being touted as a benefit of so-called big data projects is often nothing more than the benefit of traditional data and information management projects.

Big data projects and programs provide tremendous opportunity for organizations looking to transform their operations, innovate in their markets, and better serve their customers; however, these initiatives must be based on sound approaches and principles and not fads or empty vendor claims. We hope this special issue helps promote a better understanding to foster wider deployment of big data approaches and a new era of business analytics capabilities. 

References

1. K. Gillon et al., "Panel—Business Analytics: Radical Shift or Incremental Change?" *Proc. 32nd Int'l Conf. Information Systems*, Assoc. Information Systems, 2012; <http://aisel.aisnet.org/icis2012/proceedings/Panels/4>.
2. "Survey: What IT Teams Want Their CIOs to Know About Enterprise Big Data," InfoChimps, press release, 24 Jan. 2013; www.infochimps.com/press/survey-what-it-teams-want-their-cios-to-know-about-enterprise-big-data.
3. S. Mithas, *Digital Intelligence: What Every Smart Manager Must Have for Success in an Information Age*, Finerplanet, 2013.

Sunil Mithas is an associate professor in the Robert H. Smith School of Business at the University of Maryland. His research focuses on the strategic management and impact of IT resources. Mithas has a PhD in business from the Ross School of Business at the University of Michigan. He's the author of *Digital Intelligence: What Every Smart Manager Must Have for Success in an Information*


Age (Finerplanet 2013) and is a member of IT Professional's editorial board. Contact him at smithas@rhsmith.umd.edu.

Maria R. Lee is an associate professor in the Department of Information Technology and Management at Shih Chien University, Taiwan and is a visiting professor at the School of Computer Science and Engineering, University of New South Wales, Australia. Her research interests include knowledge management, e-commerce, and artificial intelligence. Lee has a PhD in computer science and engineering at the University of New South Wales, Australia. She's a member of IT Professional's editorial board. Contact her at maria.lee@mail.usc.edu.tw.

Seth Earley is CEO of Early & Associates and is founder of the Boston Knowledge Management Forum. His research interests include intranet design, knowledge management, content management systems and strategy, and taxonomy development. Earley has a BS in chemistry and is coauthor of *Practical Knowledge Management (IBM Press, 2001)*. Contact him at seth@earley.com.

San Murugesan is the director of BRITE Professional Services, Australia, and an adjunct professor at the University of Western Sydney. His areas of interest include green IT, cloud computing, IT in emerging markets, and Web 2.0 and 3.0. He's the incoming Editor in Chief of IT Professional and is a fellow of the Australian Computer Society. Contact him at san1@internode.net.

Reza Djavanshir is an associate professor of information systems at Johns Hopkins University. His research interests include system-of-systems and metasystems design, technology strategy, and global sourcing. Djavanshir has a PhD in system engineering from George Washington University. Contact him at rj@jhu.edu.

 Selected CS articles and columns are available for free at <http://ComputingNow.computer.org>.