Harvard Business Review

WEBINARS

KEY LEARNING SUMMARY

Keeping Up with the Quants

featuring **Tom Davenport**

AUGUST 14, 2013

Sponsored by

HITACHI
Inspire the Next

AUGUST 14, 2013

Keeping Up with the Quants

OVERVIEW

Over the past decade, more organizations are using analytics to make more quantitative decisions. Quantitative analysis isn't new. But powerful IT, the abundance of data, more people with analytical skills, and the demand for better decisions are among the factors driving more analytical decision making.

A helpful framework for quantitative analysis involves: 1) framing the problem to be solved and the decision to be made; 2) solving the problem by creating a model, collecting data, and analyzing; and 3) communicating and acting on the results. Quantitative experts are needed to help solve analytical problems, with the involvement of analytically oriented business people in framing the problem and communicating the results.

While technology and analytical capabilities are extremely important, so too are trusted relationships between quants and non-quants. Quants must learn the business and be able to communicate results in business terms. Non-quants should involve quants in business decisions, should help frame the right questions, and should create a culture of honesty and experimentation. Through such relationships, quants and non-quants can work together to make better, more quantitatively driven business decisions.

CONTEXT

Professor Davenport shared insights from his latest book, *Keeping Up with the Quants*. He provided an overview of what analytics is as well as a six-step framework for quantitative analysis.

KEY LEARNINGS

Quantitative analysis isn't new, but over the past decade, analytics has become hot.

There have always been quants, including many leading scientists throughout history, who have relied heavily on data to drive decisions. There have also been non-quants who relied mainly on their gut and intuition to make decisions. Over the long term, there has been a general progression toward more data-driven, analytical decisions.

In modern times, the use of analytics has grown. In World War II, military analysts focused on supply chain and targeting optimization. Among companies, UPS started the first known analytics group in 1954. In the 1970s and 1980s, leading thinkers came up with ideas such as "decision support systems" and "executive support systems." The term "business intelligence" was coined in 1988. The idea of "competing on analytics" began in the early 2000s. And, the idea of using "big data" became popular in the 2010s.

CONTRIBUTORS

Tom Davenport
President's Distinguished Professor, Management and Information Technology, Babson College, and Visiting Professor, Harvard Business School

Angelia Herrin (Moderator)
Editor, Special Projects and Research, *Harvard Business Review*

There are multiple factors that have contributed to the explosion of analytics over the past decade. They include more powerful information technology, a critical mass of accessible data, a sufficiency of analytical skills, and a general demand by businesses for process optimization, differentiated products and services, and better decisions.

Use of analytics results in better decisions.

Even with the rise of analytics, a survey from 2009 found that 40% of important business decisions are based not on data and facts, but on "gut instinct." Other studies have found similar results.

This continued reliance on personal expertise and gut instinct does not produce the best possible decisions. Decisions that use data tend to be better. Extensive evidence has found that having experts make decisions is good, but having experts that use analytics is even better. Expert intuition is best only when there is little time, limited data, and few variables.

When many people think about analytics, they are thinking only about "descriptive" analytics. Descriptive analytics includes reports, scorecards, and alerts. This type of analytics is good to do, but it is only about the past and it doesn't explain why certain results were achieved.

Predictive and prescriptive analytics are more complex, but more valuable. These types of analytics involve creating a model that predicts what may happen in the future. Predictive and prescriptive analytics include randomized testing and optimization.

A framework for quantitative analysis can help organizations make better decisions and act on them.

In putting analytics to use, both business leaders and quants can benefit by thinking about qualitative analysis in terms of a simple, three-stage, six-step framework.

Stage I: Framing the Problem

This is defining the problem to be solved and the specific decision to be made.

- **Step 1: Problem recognition.** This is the least structured but most important step. It usually starts with a broad hypothesis about what is the problem and what is its underlying cause. From this broad hypothesis must eventually come a specific, testable hypothesis. Often organizations just analyze their vast amount of data and find various correlations without framing specific problems to solve. Also, an important part of thinking about the problem to be solved is thinking about what type of story to tell using quantitative analysis.

  Types of analytical stories can include using analytics to solve a long-term strategic problem, a short-term tactical problem, or even a mystery. Other types of stories include random testing, predictions based on analytics, and reporting survey results.

"Analytics has been hot for a decade. Companies and managers should be asking, 'What do I need to do to participate?'"

—TOM DAVENPORT

"Statistical predictions consistently outperform gut-based predictions."

—TOM DAVENPORT

- **Step 2: Review of previous findings.** An important step is to determine if this same problem has been previously solved, either within the organization or externally. Determining this can involve talking with analysts and decision makers in the company, connecting with other analytical people outside the company, and even doing Internet research. This research process might involve learning about potential methods, data, or algorithms to help solve the problem.

The involvement of business leaders in framing the problem to be solved is critical, and the more that these leaders know about analytics, the better the framing process.

Stage II: Solving the Problem

This is where the hard work of the quants takes place and non-quant business leaders are not terribly involved. Steps at this stage include:

- **Step 3: Modeling and variable selection.** A model is a purposely simplified representation of reality, and the variables used can be objective or subjective.
- **Step 4: Data collections.** In collecting data, organizations must determine how much precision they will have in their variables, which will affect the analysis that is conducted. Analysts must also determine what type of data would be most useful, such as primary or secondary data, and structured or unstructured data.
- **Step 5: Data analysis.** The method of data analysis used should be largely driven by the type of story to be told.

Stage III: Communicating/Acting on Results

- **Step 6: Presentation of results and action.** Traditionally, most quants have focused on performing the analysis as opposed to communicating the results, though this is beginning to change. Effective approaches involve telling a story with a narrative or pictures, as well as through games, simulations, and walk-throughs.

  An example of a great analytical communicator is Dr. John Gottman, who measured and modeled key behaviors between 700 couples in conversation. His model was extremely effective at predicting relationship failures. He successfully published this worked in academic journals as well as the mainstream press, has created videos, and has developed workshops for couples and therapists. His success demonstrates the ability to take complex analytical data and tell a story with broad interest and appeal.

Non-quants should have expectations of quants, and vice versa.

It is reasonable for non-quants (the deciders) to expect quants to learn the business and learn about the specific business problem to be solved. Quants should also be expected to help frame the problem, not just solve it. Non-quants should expect that quants will seek the truth with

"You should be spending as much time and effort on communicating as on solving a problem, which is rare."

—TOM DAVENPORT

no predefined agenda and that quants are able to communicate results in business terms. Also, non-quants should be able to expect that quants will be proactive and won't just wait to be asked to solve problems.

Quants can similarly have expectations of non-quants. Quants can expect to form ongoing relationships with decision makers and be given access to business processes and information. Quants should reasonably expect non-quants to ask questions, particularly about assumptions, and for non-quants to focus primarily on framing problems and communicating solutions and not on solving problems. Quants should also be able to expect that non-quants establish a culture of honesty and self-examination, and admit decision errors.

What non-quants (deciders) should expect of quants	What quants should expect of non-quants (deciders)
• Learn the business process and problem • Communicate result in business terms • Seek truth with no agenda • Help frame and communicate problem • Don't wait to be asked	• Form a relationship with quants • Give access to business process/problem • Ask lots of questions • Focus primarily on framing and communicating, not solving • Ask for help with entire decision process • Establish culture of honesty and admit decision errors

OTHER IMPORTANT POINTS

- **Embedding analysts.** In some organizations analytical teams are centralized and work with business units to solve problems as needed. In other organizations, analytical teams are decentralized and assigned to the business. Professor Davenport believes that a good practice is to have a centralized analytics function but for analysts to be "embedded" into the business. By being embedded, these individuals learn the business and build relationships.
- **Social media data.** All organizations should (and most already do) have some ability to track and monitor what is said about their company via social media. The key is then translating what is learned into action, which often does not occur.
- **Effect on innovation.** Analytics is often applied to try to optimize an organization's operation, with use in the supply chain and for marketing activities. To date, analytics is often not heavily used as part of companies' innovation activities. A way in which analytics could be put to great use as part of innovation is through conducting and measuring the results of frequent, low-cost tests.

BIOGRAPHIES

Tom Davenport

President's Distinguished Professor, Management and Information Technology, Babson College and Visiting Professor, Harvard Business School

Voted the third leading business-strategy analyst (just behind Peter Drucker and Tom Friedman) in *Optimize Magazine*, Thomas Davenport is a world-renowned thought leader who has helped hundreds of companies revitalize their management practices. He combines his interests in business, research, and academia as the President's Distinguished Professor in Management and Information Technology at Babson College. He is currently serving as Visiting Professor at the Harvard Business School. Tom earned a PhD from Harvard University in social science and has taught at the Harvard Business School, the University of Chicago, Dartmouth's Tuck School of Business, and the University of Texas at Austin. He has also directed research centers at Accenture, McKinsey & Company, Ernst & Young, and CSC.

Angelia Herrin (Moderator)

Editor for Research and Special Projects, **Harvard Business Review**

Angelia Herrin is Editor for Research and Special Projects at *Harvard Business Review*. At *Harvard Business Review*, Herrin oversaw the re-launch of the management newsletter line and established the conference and virtual seminar division for *Harvard Business Review*. More recently, she created a new series to deliver customized programs and products to organizations and associations.

Prior to coming to *Harvard Business Review*, Herrin was the vice president for content at womenConnect.com, a website focused on women business owners and executives.

Herrin's journalism experience spans twenty years, primarily with Knight-Ridder newspapers and USA Today. At Knight-Ridder, she covered Congress, as well as the 1988 presidential elections. At USA Today, she worked as Washington editor, heading the 1996 election coverage. She won the John S. Knight Fellowship in Professional Journalism at Stanford University in 1989–90.

Sponsor's Perspective

Data-driven understanding of machines and physical systems is the next Big Data challenge. Traditionally, for industrial and physical systems, we had "systems of record", however the real value is in deploying "systems of engagement". Increasingly, the industrial operations and physical systems produce a continuous stream of sensor data, event data and contextual data. This unprecedented amount of data needs to be stored, managed, analyzed and acted upon for optimal operations of these systems. Hitachi, with its assets and deep expertize in social infrastructure, information technology, and consulting/solution building, is a leader in this emerging landscape. Hitachi Big Data Lab is at the core of the Hitachi vision to meet market demand.

Let's take the example of a complex mining environment where integrated field management systems can lead to significant cost benefits. We have data coming from people, machines and processes, including the mining equipment, the maintenance operations, and the fleet deployed in the field. This data can be used to maintain equipment according to their actual condition, to respond well to real-time changes in environments, to reduce downtime of expensive equipment, to accurately schedule crew and machines, and to optimize the supply chain. Examples from industries abound: integrated farming systems that dramatically reduce risk, improved drilling operations that reduce Non Productive Time, and more. Hitachi Big Data Lab reviews customers' disparate environments to build the right operational, interoperable systems and, when needed, to invent new technologies to complete the most appropriate business operational appliances. As customers discover new value in their data, new demand for applications will emerge and Hitachi Big Data Lab is ready to meet this need.

Companies still have trouble with the complexity of building the right big data application and infrastructure. They know they need to reap the benefits but often don't know where to start. Hitachi has industry expertise that ranges from train management systems to MRI scanners and is building a world class expertise in big data. In a single global structure, we have solution stacks, data scientists, architects and consultants who are ready to build the right big data analytics solutions to reinvent the way global business operates.

ABOUT THE HITACHI BIG DATA LAB

The Hitachi Big Data Lab is a global strategic team that was created with specific expertise in solving vertically integrated big data challenges. The lab helps customers with inventions that can transform their business. For additional information on Hitachi's perspective of big data, visit: http://www.hds.com/solutions/it-strategies/big-data/?WT.ac=us_mg_sol_bigdat. For more information on Hitachi's operations in the U.S., please visit: www.hitachi.us.