

Deloitte.

Delivering Analytics: The CFO as Consumer and Leader of Data

Tom Davenport
Babson College/MIT/
International Institute for Analytics
Independent Senior Adviser,
Deloitte Analytics



Problem-solving with quantitative analysis—effective way



**Health care
executive**

- Runs a call center for customers
- Nursing background, with an MBA—not a quant, but appreciates quantitative thinking
- Key problem—do telephone interventions make customers more likely to avoid rehospitalization?
- Got lots of reports—figures up, figures down, no meaning
- Worked with quant group to do “smart innovation”—matched-pair tests
- Found that calls only worked for some diseases
- Reduced length of calls for other diseases
- Redeploying workers to other problems
- Now testing no calls at all

Problem-solving with quantitative analysis—ineffective way



**Insurance
executive**

- Ran a small unit specializing in credit default swaps
- Dramatically accelerated the number of CDSs sold
- Predecessor was a mathematician who understood models behind CDSs, was conservative in selling them, and debated models with staff
- “[He] knew a lot less math and had much less interest in debate.”—Michael Lewis¹
- “Patient Zero of the global economic meltdown”—Matt Taibbi²
- Lost approximately \$85 billion

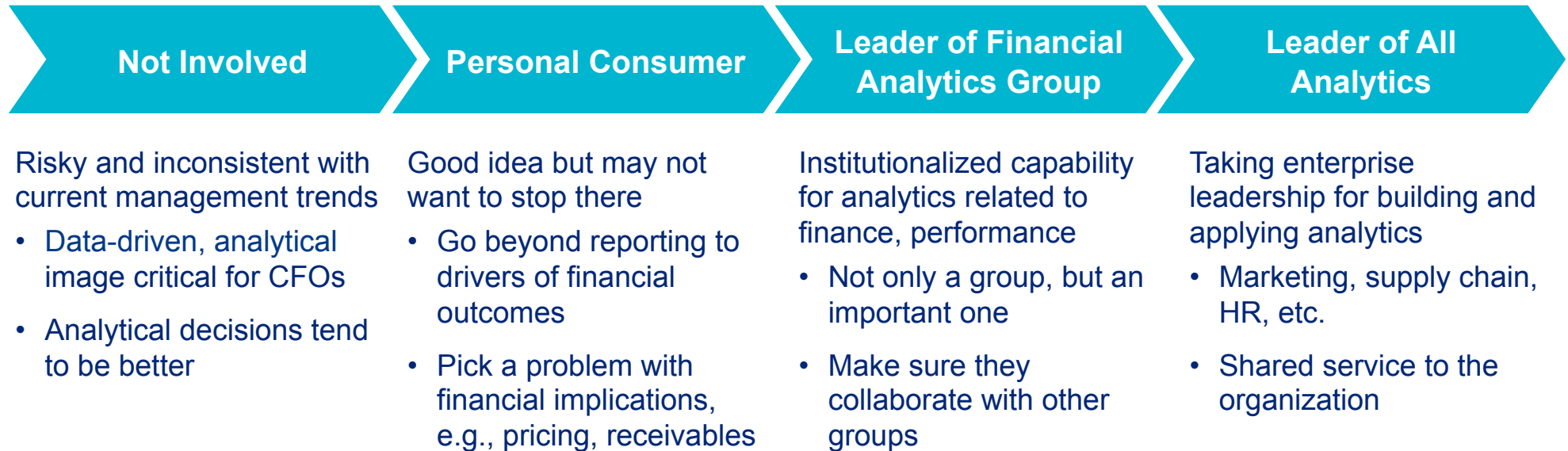
¹ “The Man Who Crashed the World,” Michael Lewis, *Vanity Fair*, June 30, 2009

² “How Wall Street is Using the Bailout to Stage a Revolution,” Matt Taibbi, *Rolling Stone*, April 2, 2009

The case for CFO involvement in analytics

- Leader of one of the organization's most numerate functions
- Analytics can cost, save, or make substantial amounts of money
- They should be applied to areas that move the performance needle
- They are an increasingly important resource and should have a senior leader to guide them
- They should be led by an "objective" enterprise service function

CFOs as consumers and leaders of data and analytics— alternative roles



Personal consumption—three stages, six steps

Framing the problem



1

Problem recognition

2

Review of previous findings

Solving the problem



3

Modeling

4

Data collection

5

Data analysis

Communicating/acting on results



6

Results presentation and action

CFO-appropriate

CFO-appropriate

Framing the problem



1. Problem recognition

- The least structured—but most important—step
- Usually starts with a broad hypothesis
 - “We’re spending too much on marketing.”
 - “Our customer attrition levels seem very high.”
- Must eventually become much more specific and testable
- What type of story do you want to tell?

2. Review of previous findings

- Has anyone solved a problem like this before?
 - Internet search
 - Talk to other decision makers and analysts in your company
 - Begin working with an experienced analyst
- Might suggest data, method, specific algorithm
 - Poisson distribution for bomb clusters in WW2 London



Types of analytical stories

- CSI: Analytics
 - Solve a tactical problem with analytics
 - Online travel site
- Eureka!
 - Solve a long-term strategic problem with analytics
 - Online real estate site
- Mad scientist
 - Do a rigorous experiment to establish causality
 - Bank, supermarket chain, restaurant chain
- Survey
 - Observe, codify, and analyze something that has already happened
- Prediction
 - Use data about the past to predict the future
- What happened?
 - Straightforward reporting



Solving the problem (mostly for quants)



3. Modeling/variable selection

- A purposely simplified representation of reality
- Variables can be objective or subjective
 - “Should I get a pet?”
- We’re still in intuitive hypothesis territory



4. Data collection

- How much precision measurement in your variables?
 - Binary, categorical, ordinal, numerical
- What type of data would be most useful?
 - Primary or secondary
 - Structured or unstructured



5. Data analysis

- Method driven by various factors
 - Type of story, descriptive vs. inferential analysis, level of measurement, number of variables
 - Many data analyses involve regression

Communicating and acting on results



6. Results presentation and action

- Not normally focused on by teachers, but beginning to change
- A problem throughout history
 - Florence Nightingale vs. Gregor Mendel
- Need to tell a story with narrative or pictures
 - Like crafting your performance story for investors
- Modern analytical communications for internal stories include:
 - Interactive graphics
 - Automated narrative generation
 - Related videos
 - Games, simulations, walk-throughs

A great analytical communicator—Dr. John Gottman— co-founder of the Gottman Institute

Measured and modeled key behaviors between 700 couples in conversation

Humor: +4

Agreeing: +4

Joy: +4

Affection: +4

Interest: +2

Anger: -1

Domineering: -1

Sadness: -1

Whining: -1

Belligerence: -2

Defensiveness: -2

Stonewalling: -2

Disgust: -3

Contempt: -4



- Need 5:1 ratio of positive to negative behaviors
- Model was very effective at predicting relationship failure
- Published the model with Dr. James Murray
- Expanded study to 10,000 couples in randomized clinical trial
- Wrote scholarly and popular books, created videos
- With Julie Gottman, developed a workshop for couples and therapists

Quantitative analysis at Transitions Optical



1. Problem recognition:

CFOs and other executives at Transitions' parent companies felt that the company was spending too much on marketing, with no evidence of its success or ROI



2. Review of previous findings:

The CMO knew that this sort of “marketing mix” analysis was possible, so he contacted a consulting firm that specialized in it.



3. Modeling/variable selection:

Typical approach with marketing mix models is to find the weekly or monthly advertising, promotion, and pricing levels that maximize revenue or profit margin. They involve variables of marketing response, marketing costs, and product margins, and control for factors like macroeconomic performance and weather.

Quantitative analysis at Transitions Optical (continued)



4. Data collection:

Most difficult step for Transitions. They went through a multiyear effort to collect customer data from channel partners. The data came in 30 different formats, and was eventually stored in a customer data warehouse.



5. Data analysis:

Consultant did the data analysis, which was based on linear and non-linear programming (optimization) models.

6. Results presentation and action:

Transitions hired new employees to interpret the models and lead discussion and action on them. The models led to substantially higher levels of marketing spending and TV advertising.



What you should expect of your quants

- Learn the business process and problem
- Communicate results in business terms
- Seek the truth with no predefined agenda
- Help to frame and communicate the problem, not just solve it
- Don't wait to be asked



What your quants should expect of you

- Form a relationship with your quants
- Give them access to the business process and problem
- Ask lots of questions, particularly about assumptions
- Focus primarily on framing and communicating the problem, not solving it
- Ask for help with the entire decision process
- Establish a culture of honesty and self-examination, and admit your decision errors



Analytical relationships

- Analytics people have to work closely with:
 - Business decision makers
 - IT organizations
 - Product developers
 - Outside ecosystem members
- Communications are critical but rarely taught
- “It’s not about the math”
- Agile methods help, too



Frank Friedman, Chief Financial Officer, Deloitte LLP



- Established a strategic analytics group to bring a higher level of understanding about how the business might operate
- Looking at drivers of the business
 - Pricing, profitability, hiring success, overall performance
- Group includes people with atypical backgrounds
 - Data scientists, mathematicians, statisticians, economists
- Insists on their describing analytics in layman’s terms
 - “You guys have to pretend I know nothing.”
 - “What does it mean, what’s the outcome, what’s the implication?”
- Questions are the key
 - “I question everything, always.”
 - “If I can’t articulate it, I can’t defend it.”
- “It’s important not to believe you are the smartest person in the room.”

Improving your company's analytical decisions

- Create an analytics group or take responsibility for analytics overall
- For personal consumption, pick a problem that's important but manageable, and for which data exists
- Hire or consult with a quant
- Go through the six steps
- Work on relationships, not just math
- Measure the decision outcome before and after
- Repeat and expand





This publication contains general information only and is based on the experiences and research of Deloitte practitioners. Deloitte is not, by means of this publication, rendering business, financial, investment, or other professional advice or services. This publication is not a substitute for such professional advice or services, nor should it be used as a basis for any decision or action that may affect your business. Before making any decision or taking any action that may affect your business, you should consult a qualified professional advisor. Deloitte, its affiliates, and related entities shall not be responsible for any loss sustained by any person who relies on this publication.

About Deloitte

Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited, a UK private company limited by guarantee, and its network of member firms, each of which is a legally separate and independent entity. Please see www.deloitte.com/about for a detailed description of the legal structure of Deloitte Touche Tohmatsu Limited and its member firms. Please see www.deloitte.com/us/about for a detailed description of the legal structure of Deloitte LLP and its subsidiaries.