

Welcome to Basis Points! Each month, Basis Points provides you tips and techniques that we've gleaned from a variety of sources to help better your business life. The theme of this month's issue is "Numbers". Whether called data, metrics or "the bottom line", numbers are at the center of every enterprise. They help us measure progress and tell us whether we've succeeded or failed. In every instance, the data tell a story and craft a narrative. In this issue, we'll explore numerical literacy, share some insights on how data should be stored and remind you that numbers are an aid to – rather than a replacement for – judgment.

### Math Misdemeanors

Have you ever been guilty of these math misdemeanors?

► *The errant mean* – Reducing a universe of figures to its simplest form, the mean, hides the extremes, which can deceive the unwary. Example: put one foot in a bucket of ice water (0° Celsius) and another in a bucket of boiling water (100° Celsius). While the resulting "average" temperature (50° Celsius) is perfectly delightful, in reality, you're likely to incur both third-degree burns and frostbite. **Lesson: use averages smartly.**

► *Improper conversion* – In 1983, an Air Canada Boeing 767 lost power in both its engines at 41,000 feet over Red Lake, Ontario. Fortunately, the captain, an experienced glider pilot, was able to estimate the 767's optimal "glide ratio speed" and successfully landed the aircraft on a runway at a decommissioned air force base. What happened? At the time, Canada was converting to the metric system. This was the first jet in Air Canada's fleet to calibrate fuel reserves in liters and kilograms, rather than gallons and pounds. Maintenance crews – erroneously using Imperial rather than metric measurements – thought they filled the tanks. In reality, they only put in half the fuel needed for the plane to reach its destination. **Lesson: check your numbers twice, then once again.**

*"Statistics are too often used as a drunk uses a lamppost: for support rather than illumination"*

- Anonymous

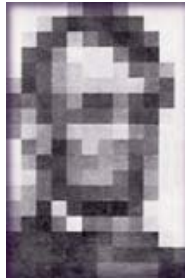
### The Use and Misuse of Figures

Harry S. Truman famously wished for a one-armed economist. Why? So that he wouldn't have to hear, "On the other hand..." While it's clear that executives who use quantitative information in their decision-making have competitive advantage over those who don't, it's equally true that data can often be manipulated to confuse or purposely mislead.

### How Important Is Sample Size?

Have you ever been asked to justify how a small sample size can be projectable to a larger universe? Here are two analogies to explain this phenomenon:

• **A Single Drop** - Suppose you're in front of a large body of water (e.g. an ocean or a lake) and you'd like to determine whether it's a freshwater or saltwater. By tasting a single drop, one can get an accurate result, even though the proportion of the sample to the larger universe is, quite literally, a drop in the ocean. Lesson: samples don't need to be large, merely representative.



• **Say "Cheese!"** - Digital cameras produce photos of real-world objects by converting them into pixels. Obviously, the greater the number of pixels (i.e. higher resolution) the sharper and more defined the final image. Although the human face consists of millions of cells, reasonable recognition can be achieved with only a thousand (or fewer) pixels. Doubt it? See if you can't identify the following person to the left, even with this low-resolution image.

### Data Data Everywhere

The 'data deluge' of the digital world in which we live makes the need to 'warehouse information' smartly more important than ever. Cesar Brea, a 20-year veteran of the e-business community, observes that – to put this data to best advantage – businesses need a digital infrastructure that provides:

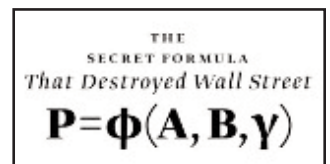
- a map that shows where all the data lives;
- a dictionary that explains what each piece of data means;
- a directory that explains how to retrieve the data;
- a guide that describes how routine analytics get done and associated decisions get made; and,
- a library (searchable at minimum, if not indexed) that stores all the individual bits of research (e.g. queries, tests, benchmarks) and conclusions you've reached in the past

Brea advises that the facts and figures you warehouse need to be "living documents" (like *Wikipedia*) rather than "static editions". He exhorts senior executives to think of this information as part of an "insight engine" that, properly maintained, will drive their businesses with power and efficiency.

Source: Cesar Brea's blog, "Octavianworld", [www.octavianworld.org](http://www.octavianworld.org)

### The Math Formula That Killed Wall Street

While it's difficult to point with certainty to one event that triggered the current economic crisis, more than a few experts believe that the near-universal use within the investment community of a single mathematical formula – specifically, a Gaussian copula function – is largely to blame. Devised by a Chinese math wizard, David X. Li, in 2000, this formula modeled default correlation on price – rather than real-world – default data, creating an elegantly simple (but, upon reflection, horribly erroneous) number that ratings agencies used to calibrate the risk of complex financial instruments such as credit default swaps (CDS) and collateral debt obligations (CDO).



Nicholas Nassim Taleb, who authored "The Black Swan", succinctly states the problem with the Gaussian copula function: "Co-association between securities is not measurable using correlation. Anything that relies upon correlation is charlatanism."

Source: "Recipe for Disaster: The Formula That Killed Wall Street", by Felix Salmon, *Wired Magazine*, February 2009