Rare Business Assets:
Tables and Graphs that Communicate

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Faced with the perennial challenge to compete and succeed, who has time to worry about the small things? Some things that seem small, perhaps even microscopic, however, are actually much bigger than they seem. Now is in fact the right time to "sweat the small stuff," especially when it contributes to the difference between success and failure.

Numbers in the Mist

As a 25-year veteran of business and technology consulting, I am often dismayed by examples of wasted time and money that manage to remain just under the radar. These days I'm fixated on one that is especially insidious (and costly) because it is rarely recognized, even though it erodes the usefulness of the information that is most critical to business success: the *numbers that measure performance*. Business metrics lie at the heart of every important decision you make. Your decisions are only as good as the numbers that inform them and the *communication* that presents those numbers to you.

Quantitative information is almost always communicated in the form of *tables* or *graphs*. Think about it. You depend on tables and graphs every day but what you might not realize is that they're *almost always poorly designed.* Why? Probably less than 1% of those who prepare tables and graphs have been trained to design them for effective and efficient communication. And why is that? In part, because we see so few examples of well-designed tables and graphs and therefore have no useful benchmarks to reveal, through contrast, the deficiency of those we use every day. Most tables and graphs are difficult and time-consuming to read, filled with unnecessary information and visual fluff, and are far too often downright misleading. In 1997 Edward R. Tufte, the world's leading expert in the visual presentation of information, convincingly demonstrated that the explosion of the space shuttle Challenger in 1986, which resulted in the deaths of seven astronauts, was in part the result of poorly-designed presentations to NASA officials about the potential risk of O-ring failure (Edward R. Tufte, 1997, *Visual Explanations: Images and Quantities, Evidence and Narrative*, Cheshire, Connecticut: Graphics Press). If the risk of O-ring failure in cold temperatures had been presented properly, decision makers would have understood the extreme risks involved and postponed the launch. An avoidable tragedy occurred because of an information display that was misleading. Every day, just like the officials at NASA, you rely on good data to inform your decisions. Lives may not be at stake, but livelihoods certainly are.

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The following example is typical of the graphs that I encounter in my work as an information design consultant. Imagine that you need an overview of sales performance at the start of each day, and this is what you're given:
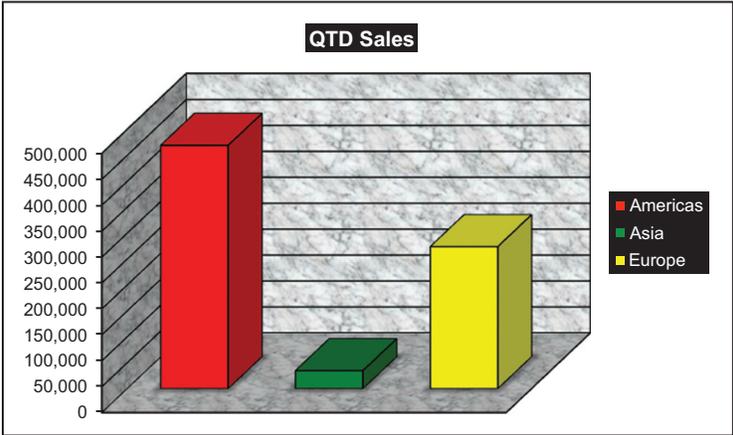
It's colorful, it's bold, it jumps off the page, but to what end? What is the message? Take a minute to look at this graph carefully to determine what it's telling you.

. . . .

What did you get? Probably something like the following:

- Sales for the *Americas* are better than sales for *Europe*, which in turn are better than sales for *Asia*. This much is clear.
- Sales for *Asia* don't amount to very much compared to the other regions.
- Sales for the *Americas* are over 400,000 or thereabouts. Sales for *Europe* are somewhere around 200,000. Sales for *Asia* appear to be about 50,000 – perhaps a little less.

That's not much information, and you certainly had to work for it, didn't you? Here are the actual values that were used to create this graph:

Americas	$469,384
Asia	$34,847
Europe	$273,854

You might not need to know the precise sales amounts, but I suspect you would want better accuracy than you were able to discern from this graph, and you would certainly want to get it faster and with much less effort. Also, several pieces of critical information aren't supplied by this graph, including:

- Given the fact that these sales are international, what is the unit of measure? Is it U.S. dollars, Euros, etc.?
- Quarter-to-date sales as of what date? If you filed this report away for future reference and pulled it out again a year from now, you wouldn't know what day, what quarter, or even what year it represents.
- How do these sales figures compare to your plan for the quarter?
- How do these sales figures compare to how you did at this time last quarter or in this same quarter last year?

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This graph lacks important contextual information and critical points of comparison. As a report of quarter-to-date sales across your major geographical regions, it doesn't communicate very much. It uses a great deal of ink to say very little, and the little it says it says poorly. The person who created this graph failed to discern the information that you needed and to design its presentation in a way that communicated clearly.

Given the intended message and the information that you would find useful as an executive, the following display tells the story much better:

2011 Q1-to-Date Regional Sales
As of March 15, 2011

| | Current | | | Qtr End | |
	Sales (U.S. $)	Percent of Total Sales	Percent of Qtr Plan	Projected Sales (U.S. $)	Projected Percent of Qtr Plan
Americas	469,384	60%	85%	586,730	107%
Europe	273,854	35%	91%	353,272	118%
Asia	34,847	5%	50%	43,210	62%
	$778,085	100%	85%	$983,212	107%

Note: To date, 82% of the quarter has elapsed.

This is a simple table but it is easy to read and it contains a great deal more information. No ink is wasted. There is no fluff. You could use this report to make important decisions. It communicates the information that you need clearly and efficiently.

Take a look at another example, this time of the increasingly common pie chart. This graph's purpose is to show how your company – *Company G* – is doing compared to the competition:
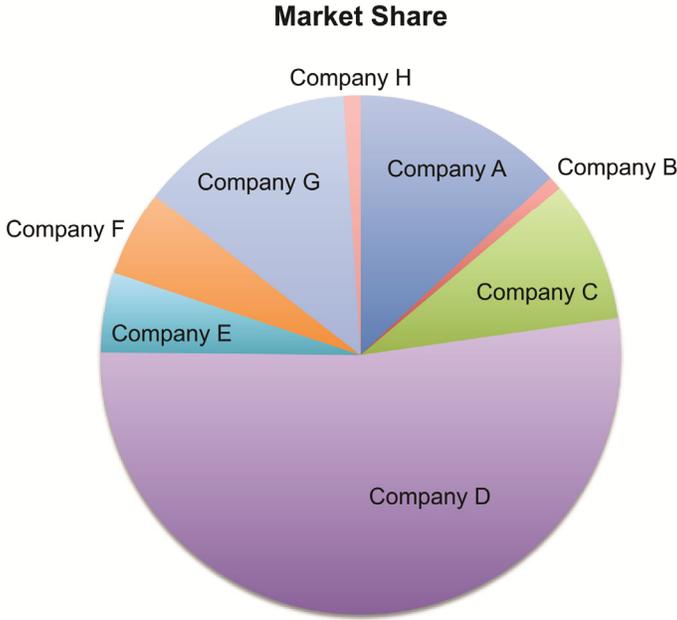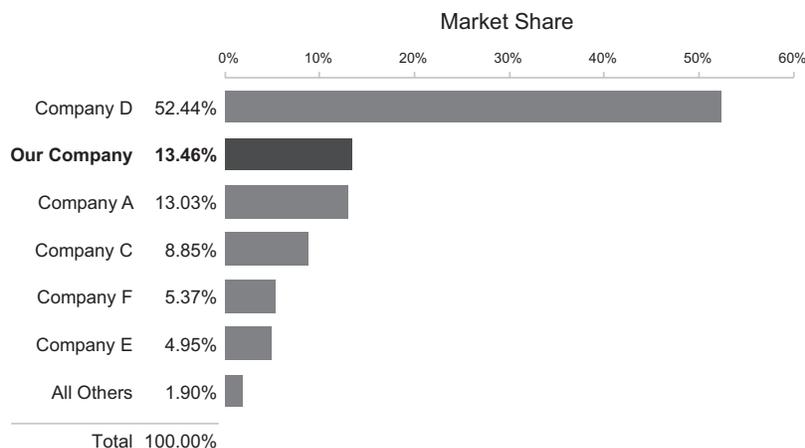

Market Share

Here it is again, this time dressed up a little with the addition of a 3-D effect:
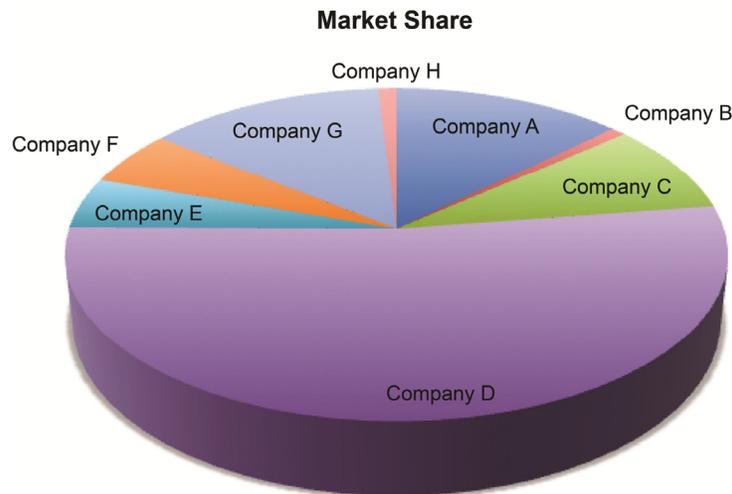
Market Share

Does the use of 3-D enhance the graph in a way that is useful? Do either of these pie charts enable you to determine Company G's market share compared to the competition? Can you determine Company G's rank compared to its competitors? Which has the greater share: *Company A* or *Company G*? Because of fundamental limitations in visual perception, you really can't answer any of these questions accurately.

Now look at the exact same market share data displayed differently:

Market Share

		0%	10%	20%	30%	40%	50%	60%
Company D	52.44%							
Our Company	**13.46%**							
Company A	13.03%							
Company C	8.85%							
Company F	5.37%							
Company E	4.95%							
All Others	1.90%							
Total	100.00%							

Did you have any trouble interpreting this information? I doubt it. Did you struggle to locate the most important information? Not this time. It's obvious that *Our Company* ranks second, slightly better than *Company A*, and that its market share is precisely *13.46%*. This display contains no distractions. It gives the important numbers clear voices to tell their story. The creator of this graph did a good job.

The Root of the Problem

How did we slip into such a sad state of quantitative miscommunication? The answer is tied to that little machine that has reshaped the face of business: the *personal computer*. Prior to the advent of the PC, tables and graphs of quantitative information

were generally produced through the use of a pencil, straightedge, graph paper, calculator, and hours of tedious labor. Then, when chart-producing software hit the scene, especially electronic spreadsheets, many of us who would have never before attempted to draw a graph suddenly became Rembrandts of the X and Y axes, or so we thought. Like kids in a toy store, we went wild over the available colors and cool effects, thrilled with the new means for techno-artistic expression. Through the *magic of computers*, the creation of tables and graphs became easy – perhaps too easy.

Today, everyone can produce reports of quantitative information in the form of tables and graphs. Children are now taught the mechanics of doing so in elementary school. To produce something with a computer, however, lends it an air of authenticity and quality that it doesn't necessarily deserve. In our excitement, many of us have forgotten the real purpose of quantitative displays: to *provide our readers with important, meaningful, and actionable insight* – in other words, to *communicate the data simply and clearly*. Don't misunderstand me, I'm not a Luddite, I don't advocate a return to pencils and graph paper. Rather, I propose that it's time to learn and apply knowledge of effective design to the tools at hand.
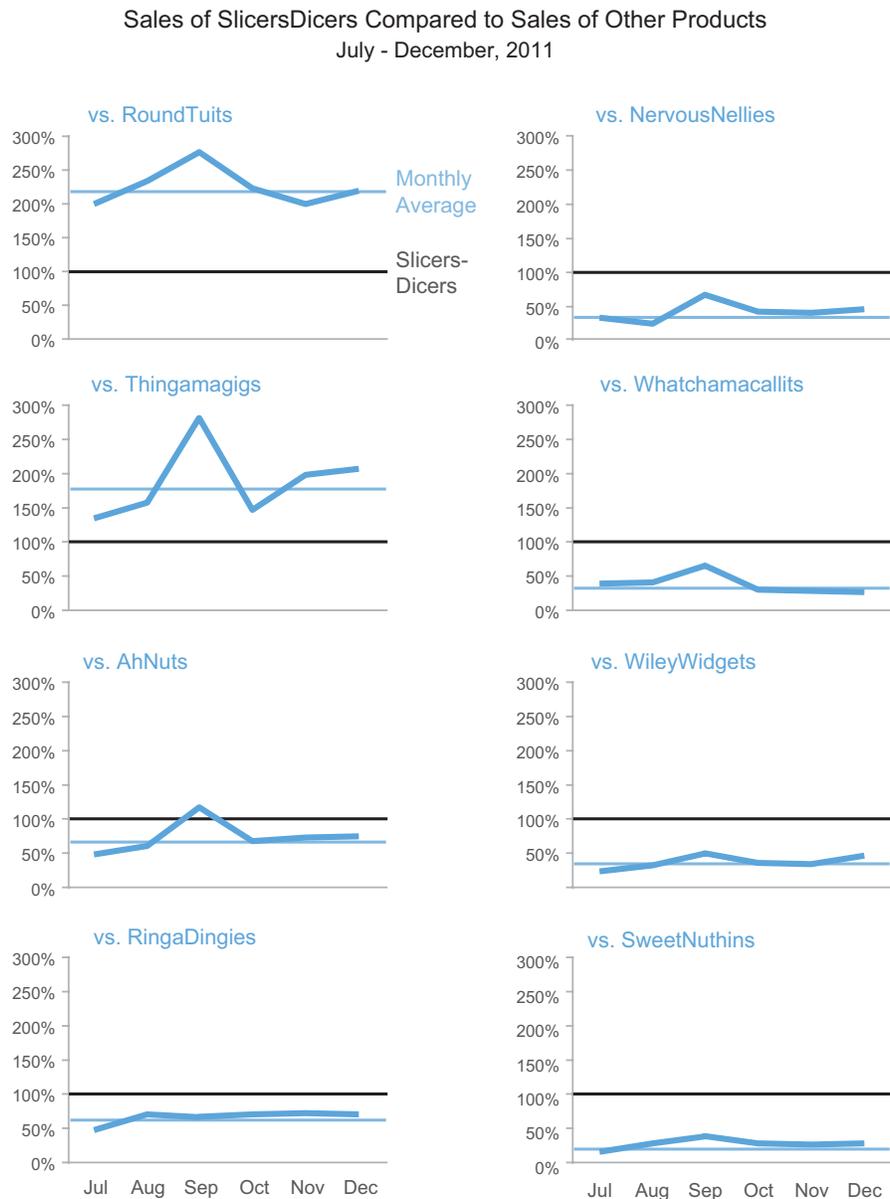
Let's take a look at one final example of the labyrinth that we navigate daily in our needlessly laborious quest for the numbers:

SlicersDicers Sales Compared to Other Product Sales
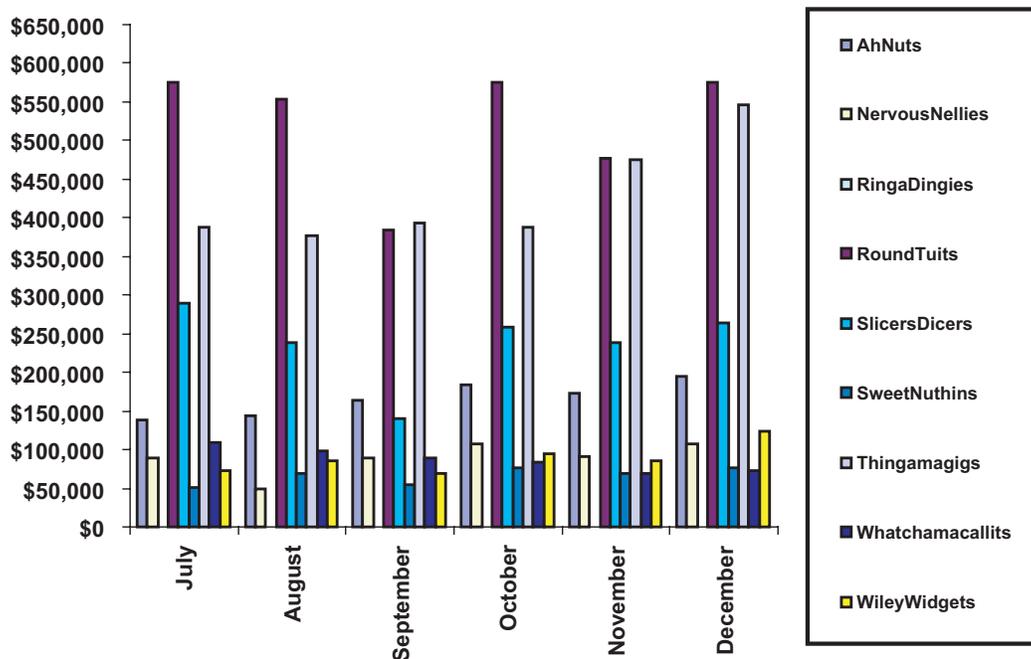
Without this graph's title, would you have any idea that its purpose is to compare the sales performance of the product named *SlicersDicers* to the performance of each of the other products? In the general field of design, we speak of things having *affordances* – characteristics that reveal how they should be used. A teapot has a handle. A door that you need to push has a push-plate. The design of something should suggest – in and of itself – how it should be used. This graph relies entirely on its title to declare its purpose. Not only does its design fail to suggest its use, it actually undermines its use.

Now take a look at a solution that was clearly designed to support the message directly and effectively:

Sales of SlicersDicers Compared to Sales of Other Products
July - December, 2011

vs. RoundTuits

Monthly Average

Slicers-Dicers

vs. NervousNellies

vs. Thingamagigs

vs. Whatchamacallits

vs. AhNuts

vs. WileyWidgets

vs. RingaDingies

vs. SweetNuthins

The creator of this display understands visual perception – what works, what doesn't, and why – and has applied this knowledge to the visual presentation of the numbers.

The Remedy

Does this level of expertise require years of training and experience? If it did, you might be justified in settling for the murky waters of poorly designed tables and graphs that you wade through today; but it doesn't. The practices that produce consistently effective quantitative communication are not intuitive but they are easy to learn. A few hours of study, reinforced by a few days of consciously applying the practices to real work, can produce this level of expertise and much, much more.

Given the right resources, the solution is quick, easy, and inexpensive. It is up to you to recognize the existence of this problem that currently undermines your efforts. It is up to you to demand the excellence in communication that is achievable. Any numbers that are worth presenting are worth presenting well.

About the Author

Stephen Few has worked for over 25 years as an IT innovator, consultant, and teacher. Today, as Principal of the consultancy Perceptual Edge, Stephen focuses on data visualization for analyzing and communicating quantitative business information. He provides training and consulting services, writes the quarterly *Visual Business Intelligence Newsletter*, and speaks frequently at conferences. He is the author of three books: *Show Me the Numbers: Designing Tables and Graphs to Enlighten*, Second Edition, *Information Dashboard Design: The Effective Visual Communication of Data*, and *Now You See It: Simple Visualization Techniques for Quantitative Analysis*. You can learn more about Stephen's work and access an entire library of articles at www.perceptualedge.com. Between articles, you can read Stephen's thoughts on the industry in his blog.