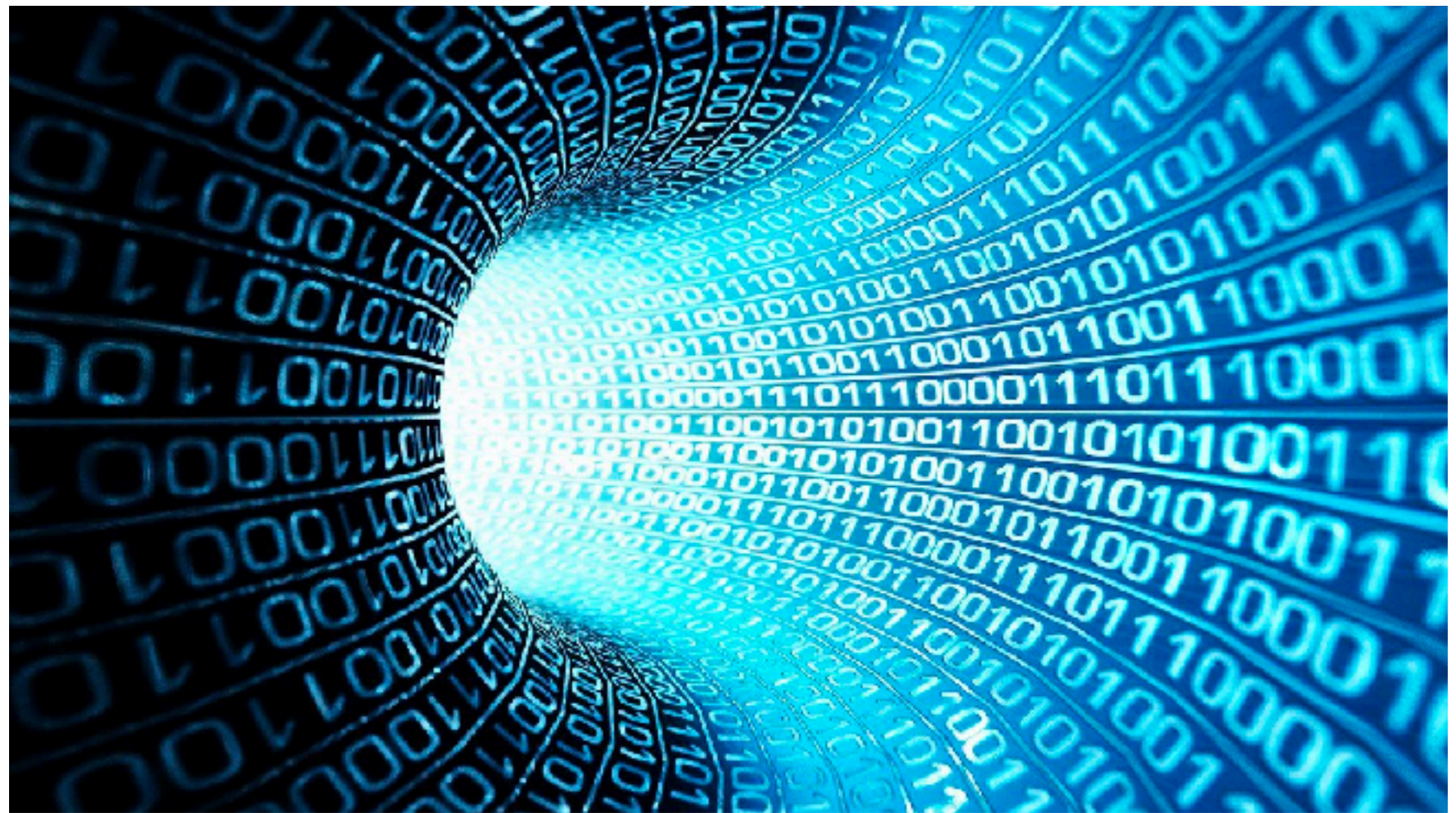# Data Say What?

A Crash Course in Designing Metrics that Matter

What this talk is not about

- Data science

- The really cool tech behind data analytics
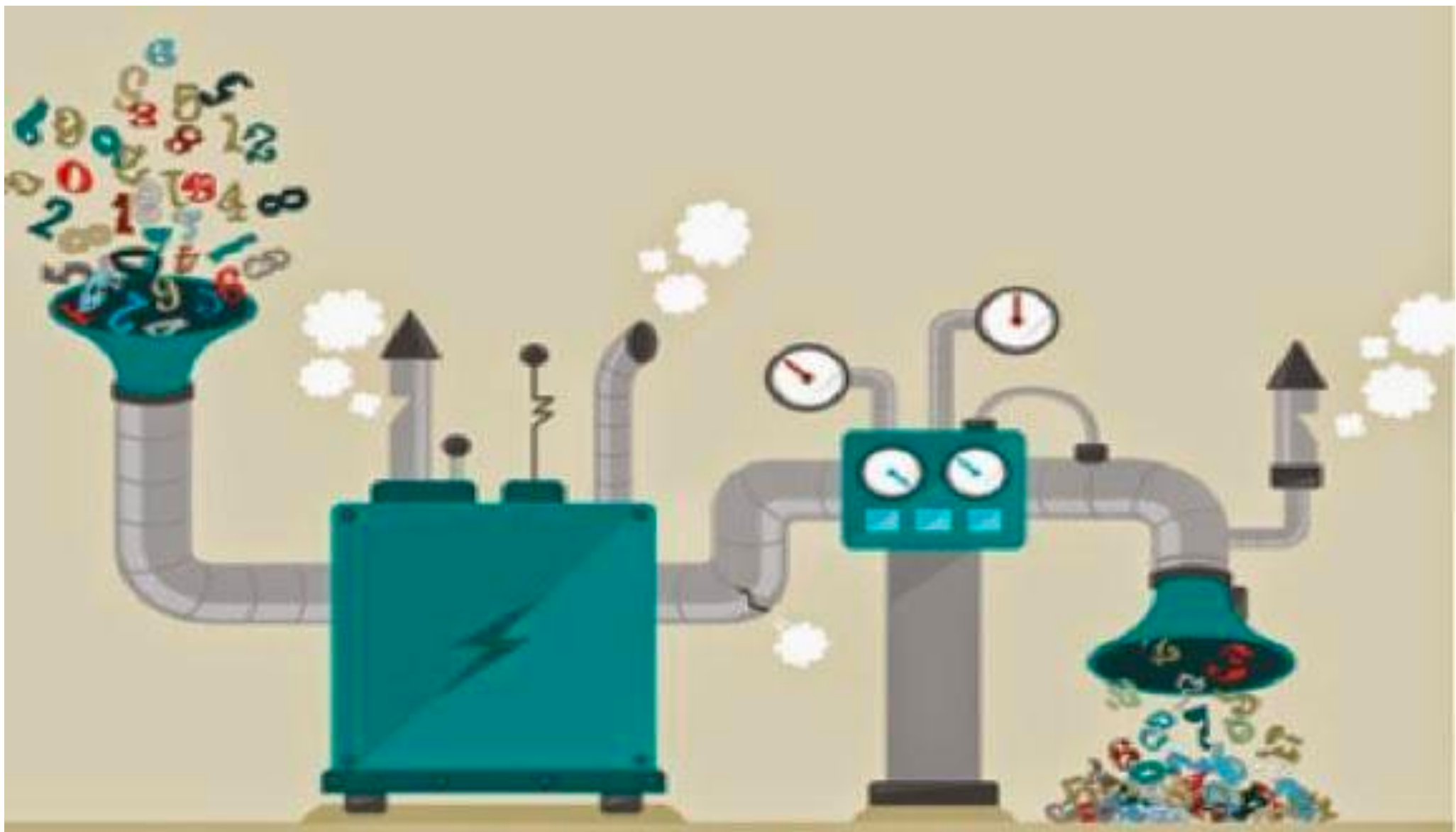
YOU KEEP USING THAT WORD

I DON'T THINK IT MEANS WHAT YOU THINK IT MEANS

What we are focused on

- Garbage in -> garbage out

Are you using the right metrics

- Choose your KPIs wisely

  - THE critical question

- If we are focused on the wrong KPI we may not be encouraging the behavior we are after or…

  - We may not get the outcome that is wanted

- But I digress……

But first some Terms

- Metric

- KPI

- Hypothesis

- Data Driven

What is a Metric

- Metrics are everywhere

  - Especially in an IOT frenzied world

- Measure everything

- Capturing data points is the first step

What is a KPI

A Key Performance Indicator is a measurable value that demonstrates how effectively a company is achieving key business objectives. Organizations use KPIs at multiple levels to evaluate their success at reaching targets. High-level KPIs may focus on the overall performance of the business, while low-level KPIs may focus on processes in departments such as sales, marketing, HR, support and others

KPIs are related to metrics

- Which data point out of all the metrics you are capturing really is a driver for the business

- # of shots pulled?

- Number of Latte's?

- Number of unique store visitors?

- What is the correlation with your chosen KPI and your vision of the business?

Be careful of Correlation vs Causation

- When choosing a KPI be mindful of what caused what.

- Often what looks related is spurious

- A good KPI is factually proven

  - e.g. A good hypothesis via the scientific method

US spending on science, space, and technology

correlates with

Suicides by hanging, strangulation and suffocation

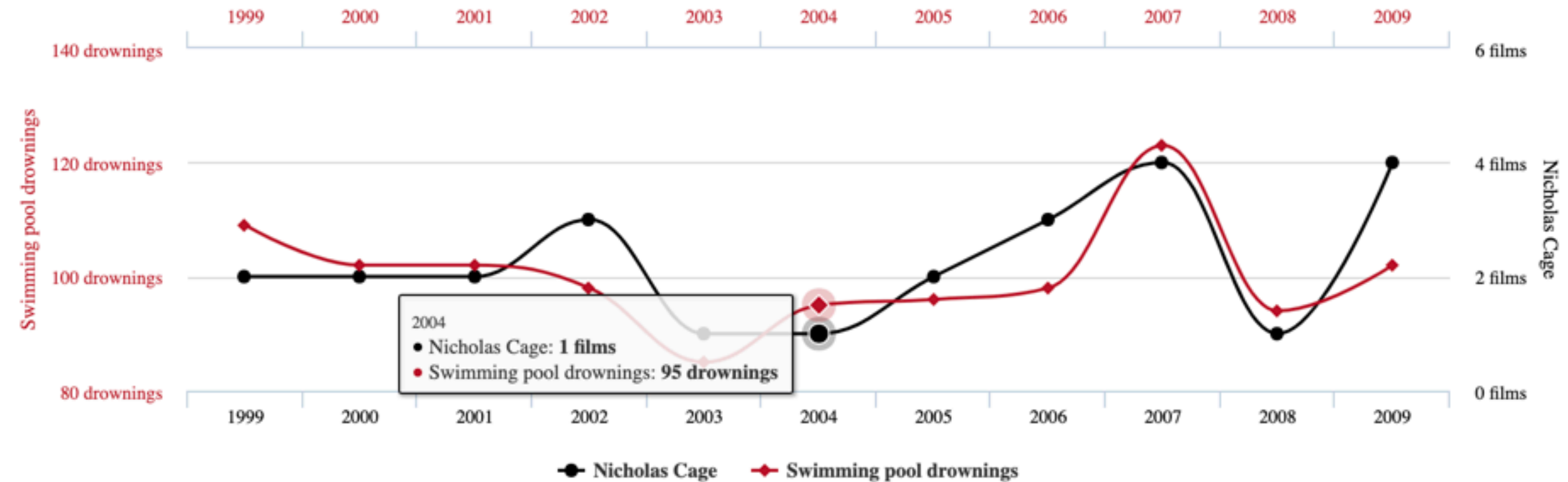Correlation: 99.79% (r=0.99789126)
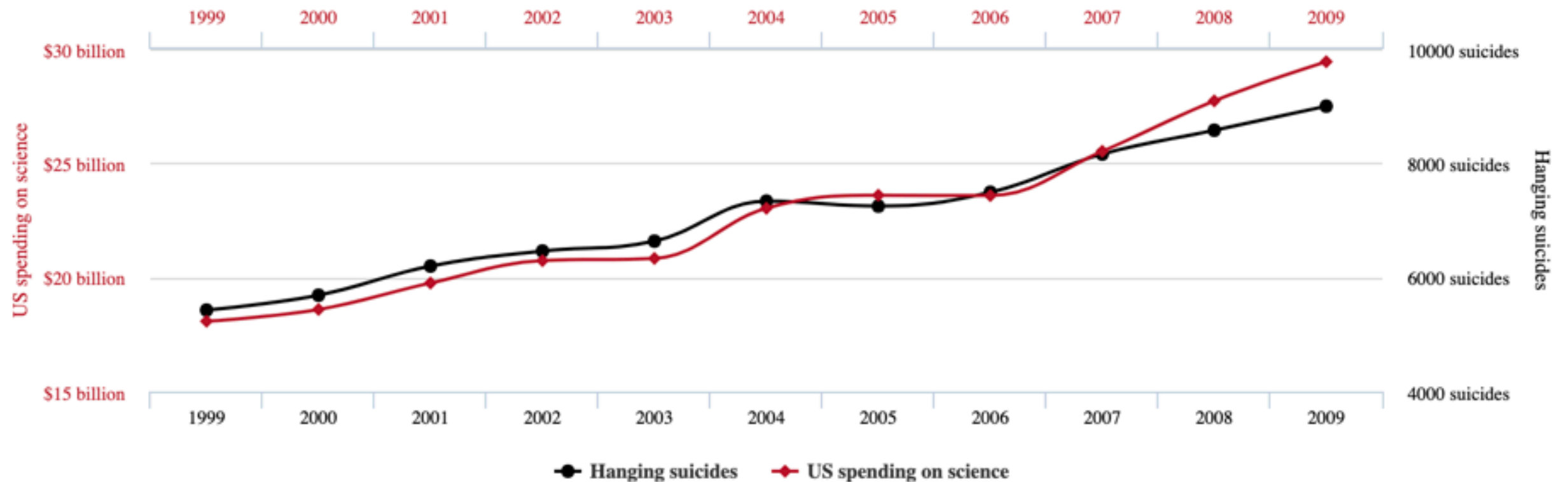
Data sources: U.S. Office of Management and Budget and Centers for Disease Control & Prevention

Number of people who drowned by falling into a pool

correlates with

Films Nicolas Cage appeared in

Correlation: 66.6% (r=0.666004)

2004
- Nicholas Cage: **1 films**
- Swimming pool drownings: **95 drownings**

Legend: Nicholas Cage — Swimming pool drownings

Data sources: Centers for Disease Control & Prevention and Internet Movie Database

What is this Hypothesis thing

- Thought we left that in science class back in high school?

- Back to the fundamentals

- Basically the initiation of the scientific method

  - "An Educated Guess"

- Now prove it

  - Design the test. Execute the test. Determine outcome.

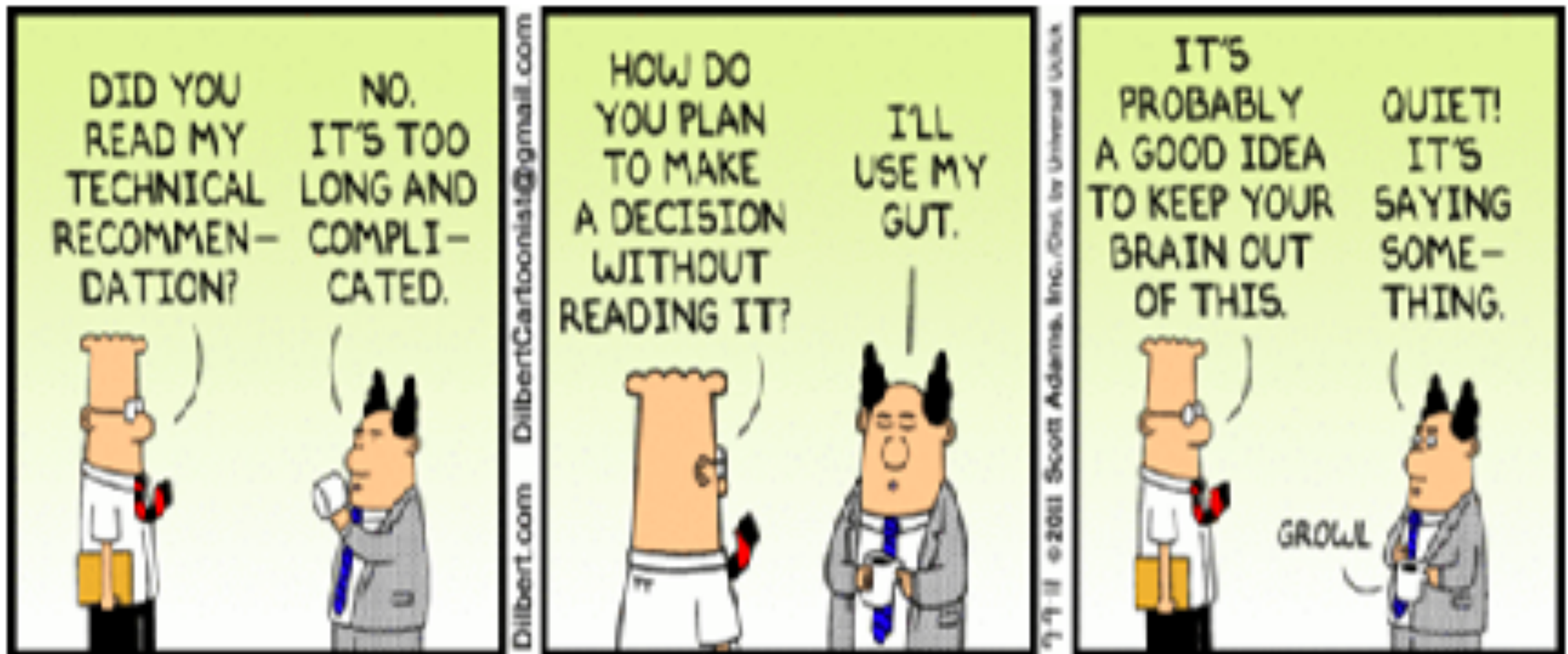- How you go about that is the important part

What makes a good hypothesis

- Complete Sentence

  - "If I change this, it will have this effect"

  - I believe that…. If I am right then I will….to test this I will…

- Be Specific as possible

- Answer the question with observable evidence/logic

- Must be testable

  - Be careful here..

***Driven by data

Why being data driven is important!

Being Data Driven

- Align - on goals and KPIs

- Discover - hypothesis

- Assess - hypothesis and your approach

- Assess - hypothesis and your approach

- Prioritize - your hypothesis

- Test - your hypothesis

- Act - on result

- Learn - for the future

- Metrics > Hypothesis > Experiment > Act

Tracking & communicating performance of KPIs & supporting metrics against targets.

Capturing, prioritizing & confirming the assumptions driving key investments with data & testing.

Performance Measurement

Hypothesis Validation

Support

Enablement tasks, including quick data pulls, platform integration, tool training & data governance.

Be accountable

- There is no improvement without admitting mistakes

- Use data to move towards objectivity

- Admit when you got it wrong!

- "But I don't think this defense is complete — at least if we're talking about FiveThirtyEight's Trump forecasts. We didn't just get unlucky: We made a big mistake, along with a couple of marginal ones."

2016 Election

1. Our early forecasts of Trump's nomination chances weren't based on a statistical model, which may have been most of the problem.

2. Trump's nomination is just one event, and that makes it hard to judge the accuracy of a probabilistic forecast.

3. The historical evidence clearly suggested that Trump was an underdog, but the sample size probably wasn't large enough to assign him quite so low a probability of winning.

4. Trump's nomination is potentially a point in favor of "polls-only" as opposed to "fundamentals" models.

5. There's a danger in hindsight bias, and in overcorrecting after an unexpected event such as Trump's nomination.

**From https://fivethirtyeight.com/

Back to KPIs

KPIs are Effective

- What makes them so?

  - They are valuable due to the action they encourage

  - They are essentially a form of communication

- Should be succinct, clear and relevant

- It all originates with what your objectives are

KPIs answer 2 questions

- Q1: What are we trying to achieve

- Q2: How do we know when we have arrived?

- A KPI is not a KPI without a target!!!!

- Targets can be:

  - a fixed value

  - A defined range

  - Even in some cases a SWAG will work

- What does NOT work is "We will know when we get there"

- With nothing to target you have no dashboard!

Talk Back

- Your companies objective is to grow revenue

- What would be some possible KPIs to track?

Defining a KPI

- What is your desired outcome?

- Why does this outcome matter?

- How will progress be measured?

- What are the ways that the outcome can be influenced?

- How will you know when you have achieved your outcome?

- How often will you review progress?

Good KPIs are SMART

- Specific

- Measurable

- Attainable

- Relevant

- Time Frame - cannot be open ended

https://en.wikipedia.org/wiki/SMART_criteria

Be even Smarter

- Evaluate

- Reevaluate

- Remember: things change. New metrics can be uncovered to change your viewpoint on your KPI. Use the scientific method.

Tracking progress

- Data visualization

- We have all seen them: dashboards with dials/gauges/charts, etc

- Incredibly important to sift through the metrics to identify the KPIs that will definitively tell you if you are making progress

Sales KPIs

- Number of New Contracts Signed Per Period

- Dollar Value for New Contracts Signed Per Period

- Number of Engaged Qualified Leads in Sales Funnel

- Hours of Resources Spent on Sales Follow Up

- Average Time for Conversion

- Net Sales – Dollar or Percentage Growth

Example

- Reduce time lost due to tech issues

- KPI target: 1 hour/week

- Reporting frequency: Weekly

- KPI to track: System downtime

Put it in action

- Your group has made it an objective over the next quarter to reduce product defects when new features are released.

- Formulate your desired outcome statement. Be SMART.

- What metrics are available for tracking your progress?

- What KPIs can you track to determine your progress?

- Are there any hypothesis that need to be proven/explored?

- What metrics will be a part of your dashboard to track progress?

Step 1: Clear Objective

- A KPI needs to be intimately connected with a key business objective. Not just a business objective, or something that someone in your organization might happen to think is important. It needs to be integral to the organization's success.

- Otherwise you are aiming for a target that fails to address a business outcome. That means that, at best, you're working towards a goal that has no impact for your organization…

Step 2: Identify the key Metric

- How will you know that you are making progress towards your goal?

- This is the measurable part of your KPI that is tied to your objective

Step 3: Socialize the KPI

- Is everyone on board?

- What outstanding questions need to be answered?

- Remember: this KPI will be a guiding light for achieving the stated objective that it is tied too

Step 4: Review

- Things change

- Check in regularly to make sure your KPI is attainable and still relevant

Step 5: Make sure your KPI is actionable

- Review business objectives

- Analyze your current performance

- Set short and long term KPI targets

- Review targets with your team

- Review progress and readjust

Step 5: Update as needed

- Nothing is static

- Check in regularly on KPI progress to not just determine how you are performing but where the KPI is still relevant.

  - Things evolve and your KPI may no longer be the best practice thinking

Step 6: Scrap it

- The most important part of any KPI is its utility. Once its outlived its usefulness, you shouldn't hesitate to toss it and get started on new ones that better align with your underlying objectives.

KPIs: another angle

- A Measure – Every KPI must have a measure. The best KPIs have more expressive measures.

- A Target – Every KPI needs to have a target that matches your measure and the time period of your goal. These are generally a numeric value you're seeking to achieve.

- A Data Source – Every KPI needs to have a clearly defined data source so there is no gray area in how each is being measured and tracked.

- Reporting Frequency – Different KPIs may have different reporting needs, but a good rule to follow is to report on them at least monthly.

Bring it home

- Pick an objective your group has

- Formulate a KPI with a desired outcome statement

- Be SMART

Thanks!