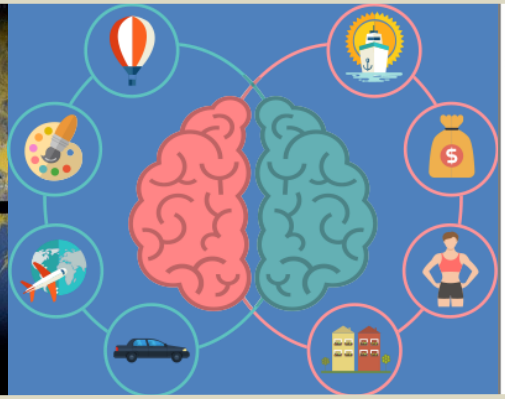
CORVELLE CONSULTING

sas THE POWER TO KNOW

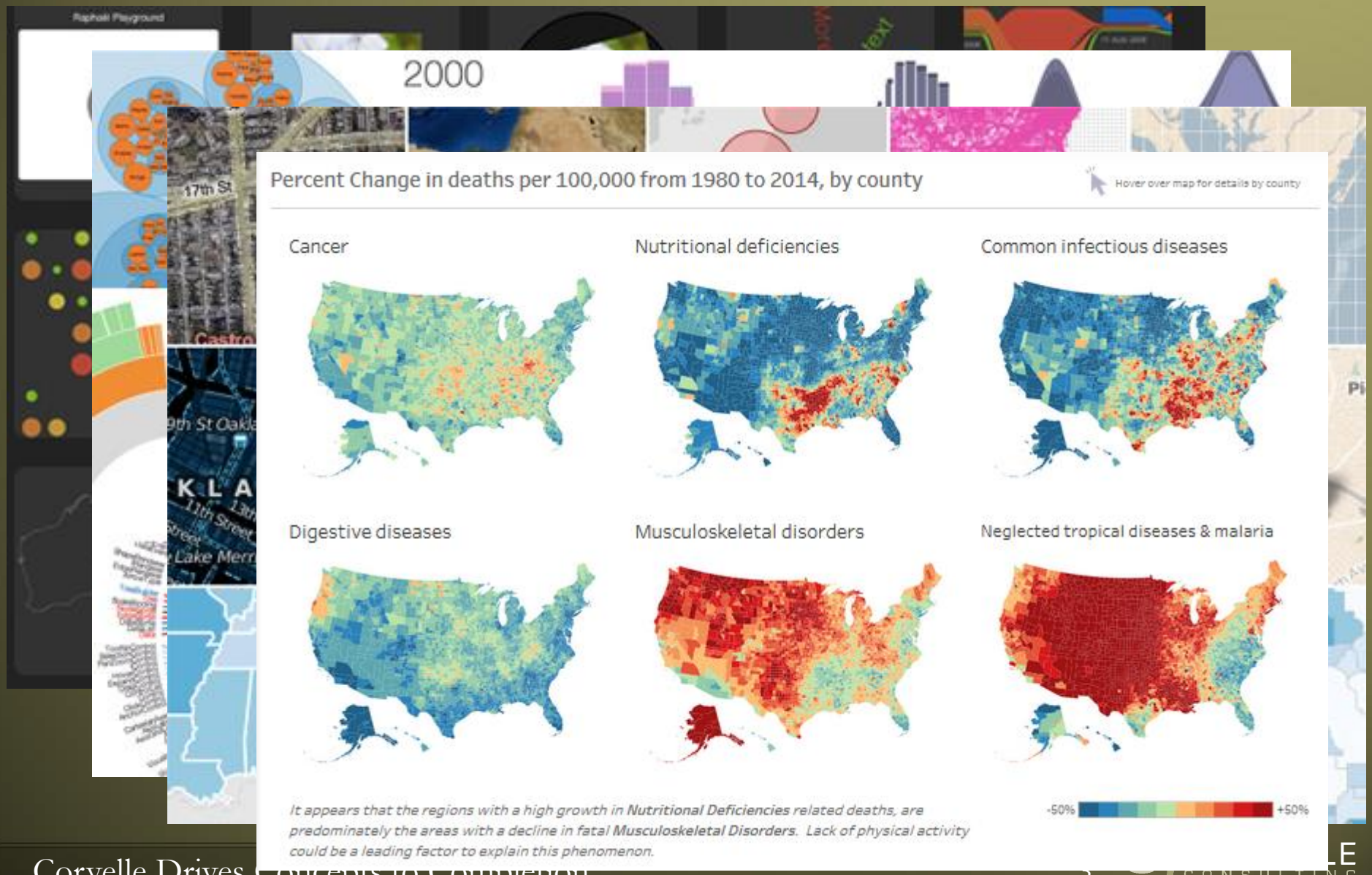
Creating Powerful Visualizations



Yogi Schulz Biography

- Corvelle Consulting
- Information technology related management consulting
- Microsoft Canada columnist & CBC Radio guest
- PPDM Association board member
- Industry presenter:
  - Project World - 6 years
  - PMI – SAC - 3 years
  - CIPS – many years
  - PPDM Association - several years

Vast Visualization Choice



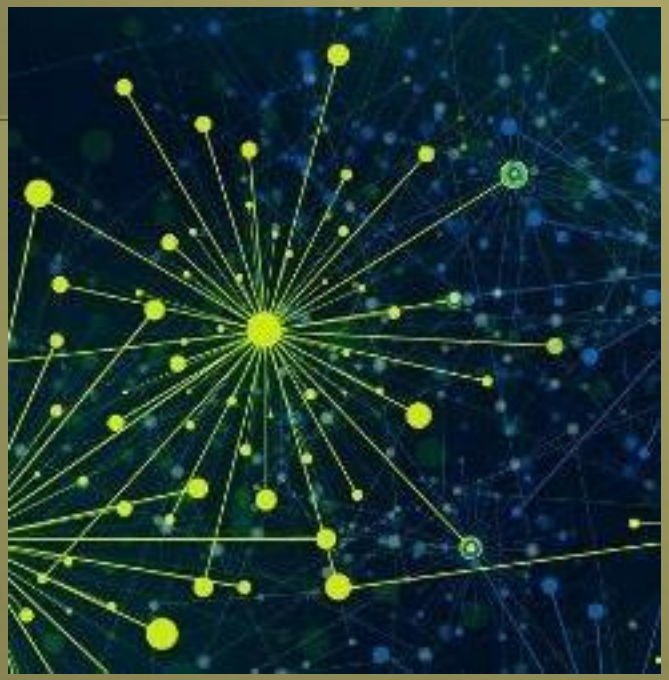
Presentation Outline

- Introduction
- Learning objectives
- Powerful visualizations:
  - Understand visualizations
  - Create visualizations
  - Refine visualizations
  - Present and practice visualizations
- Recommendations & actions

Learning Objectives

- Understand design considerations that lead to powerful visualizations
- Understa create visualizat
- Understa g visualizat

Understand Visualizations



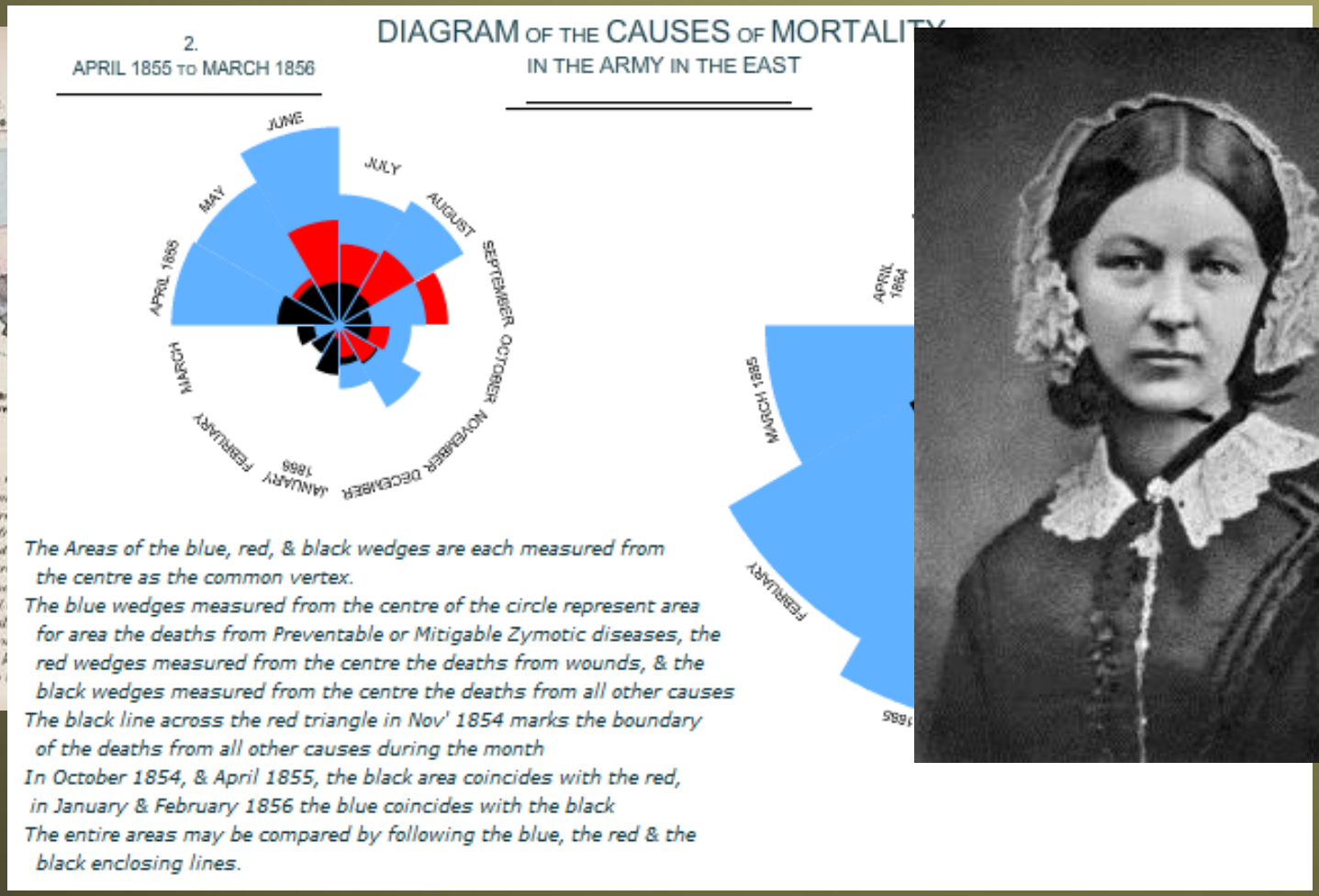
A Brief History of Data Visualization
When a Chart hits our Eyes

Whirlwind Tour of the History of Visualization

Charles Minard
1861

CORVELLE CONSULTING

Florence Nightingale's 'Coxcombs' 1858



Willard C. Brinton, 1914

First business book about visualization

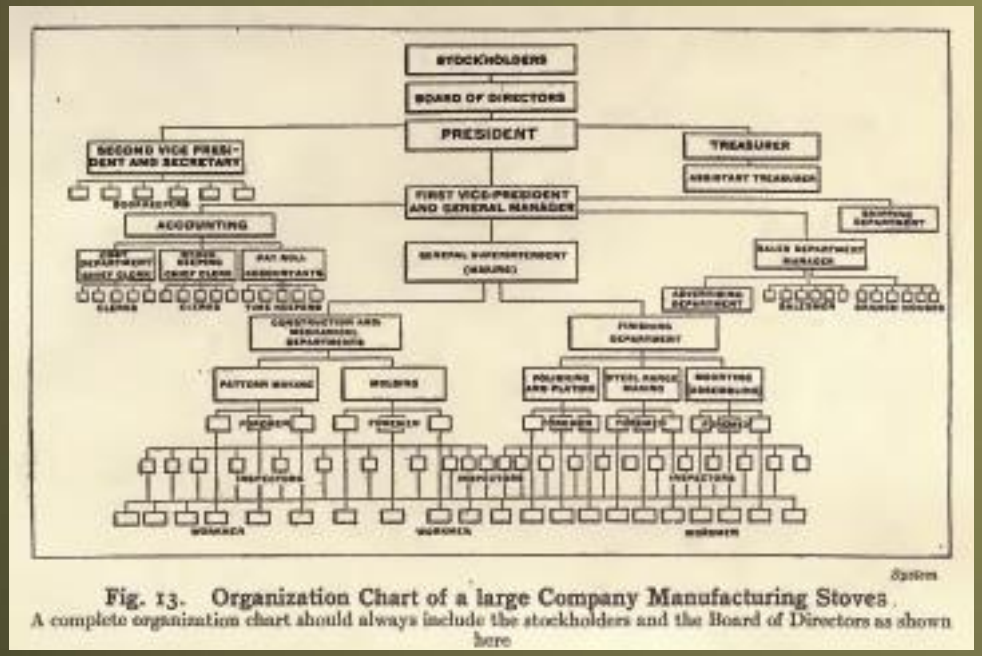
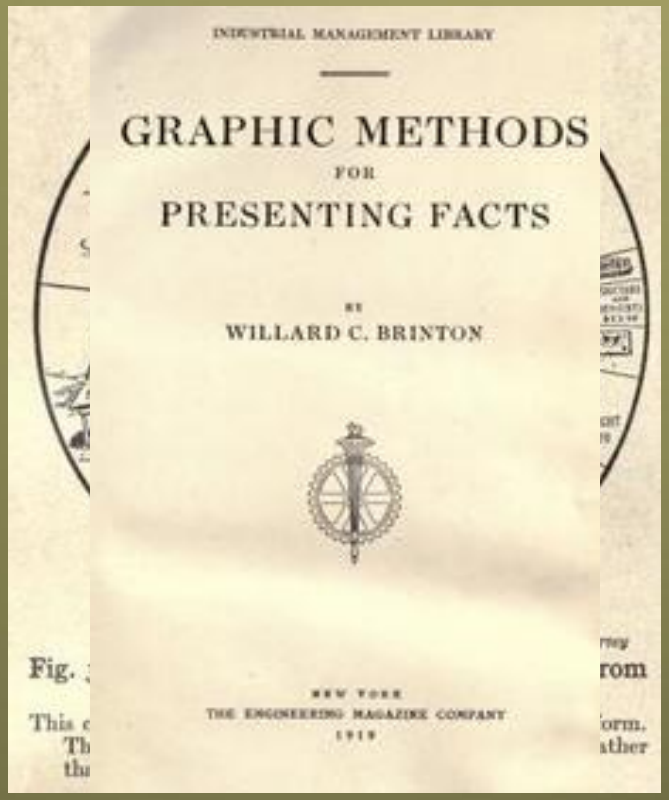


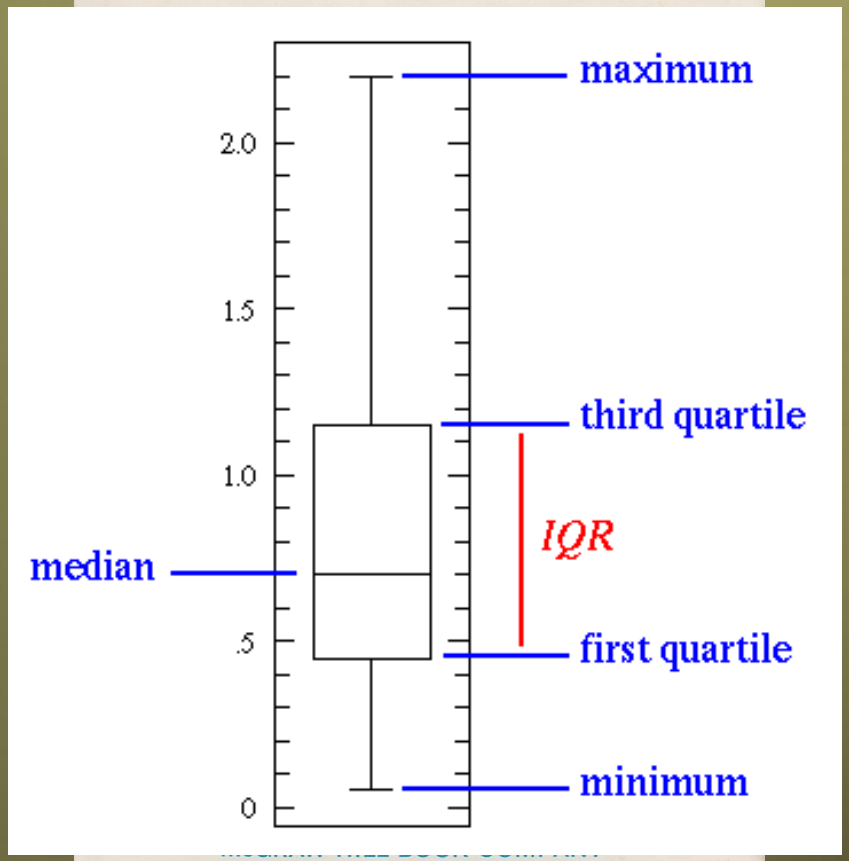
Fig. 13. Organization Chart of a large Company Manufacturing Stoves
A complete organization chart should always include the stockholders and the Board of Directors as shown here



- Rules for presenting data
- American consulting engineer

Mary Eleanor Spear 1952, 1969

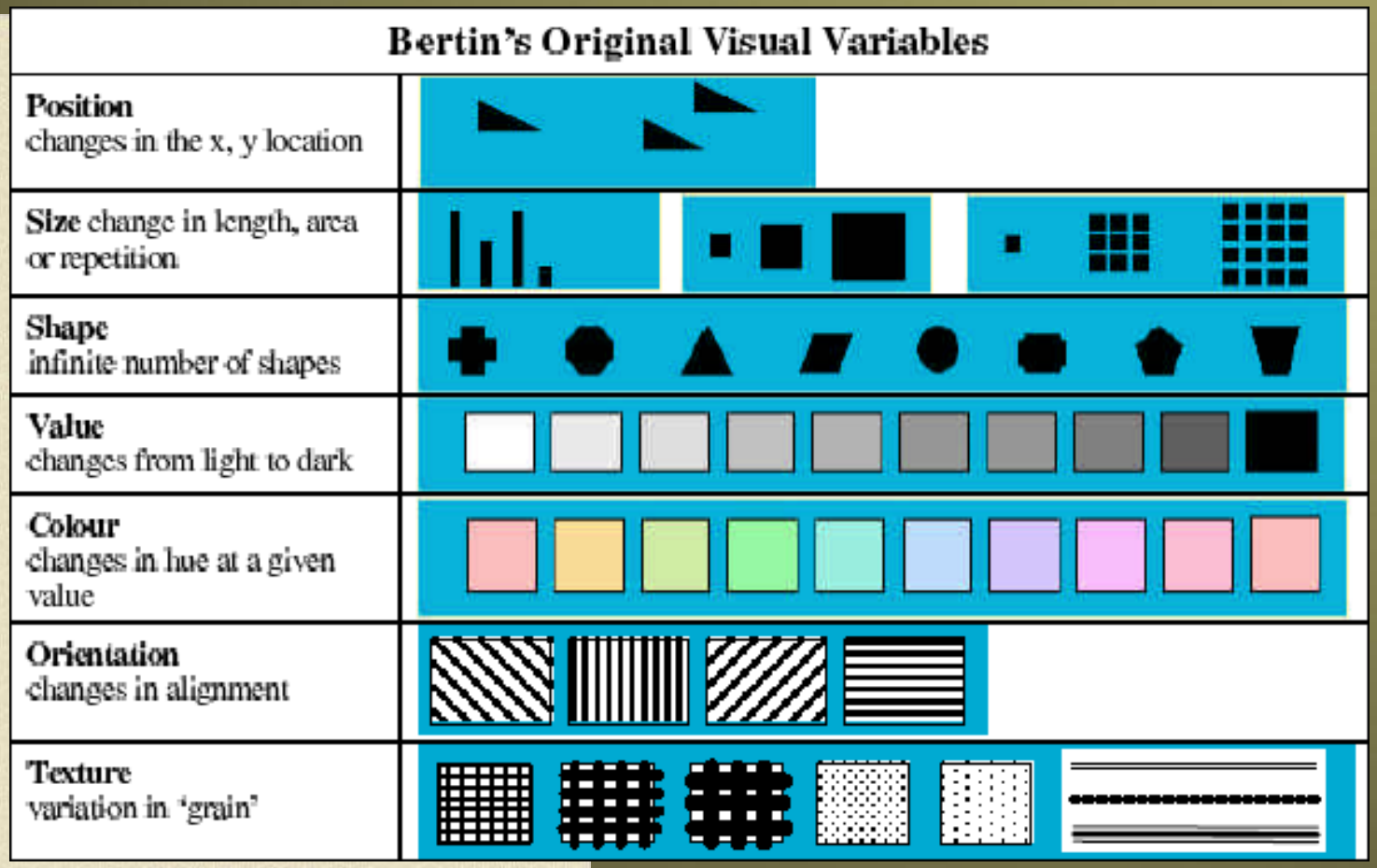
- Commonsensical advice
- Invented box plot
- Worked for various US government agencies



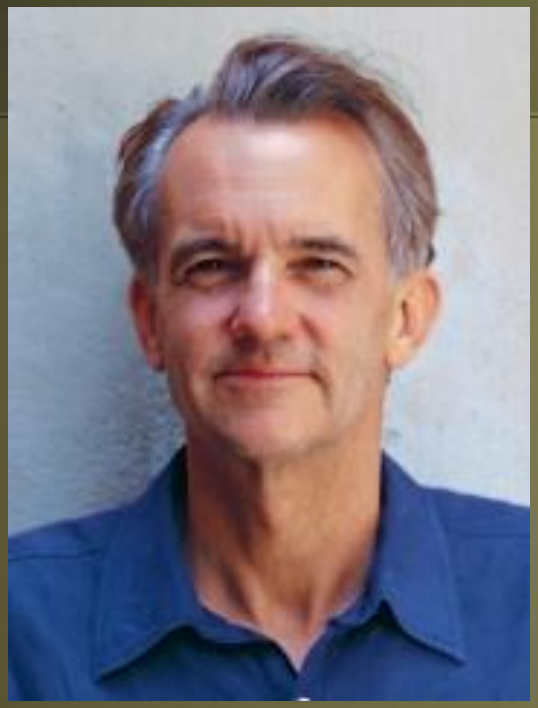
Jacques Bertin 1967

- Principle of expressiveness:
  - Say everything you want to say — no more, no less
  - Don’t mislead
- Principle of effectiveness:
  - Use the best method available for showing your data
- Cartographer

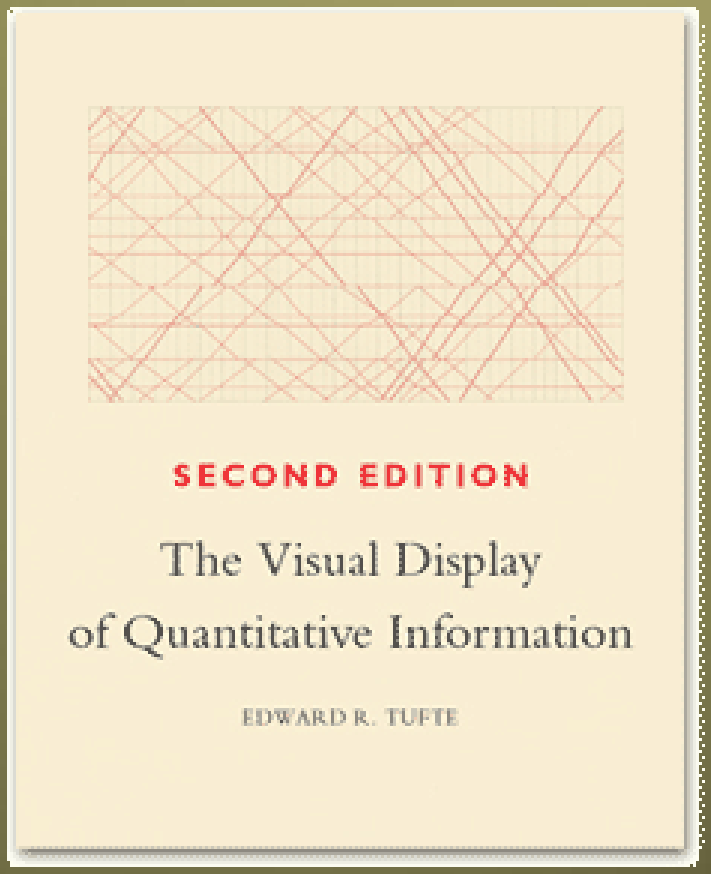
Jacques Bertin
Seven Visual Variables



Edward Tufte
1983 -



- Disciplined design principles
- Minimalist approach
- Professor emeritus at Yale University



Jock Mackinlay
1986 -

- Automatically encode data with software
- Enable people to focus on ideas, concepts
- Added eighth variable to Bertin's list: motion
- VP of Research and Design, Tableau Software

When a Chart hits our Eyes

1. Visuals aren't read in a predictable, linear way
   - Create charts spatially, from the visual outward
2. We
   - W
3. We
   - Pl
4. We
   - Re
5. We
   - Er

CORVELLE CONSULTING

Example: USA Energy Resources

SAS Visual Analytics

Search

SAS Demo User

US Energy Resources

US Petroleum Pipelines | US Crude Oil Pipelines | US Powerplants | NC Powerplants

Data

Objects

Outline

Source: 1572(from_id)
Target: 1573(from_id)
Operator: MIDSTREAM PARTNERS
ID: 1572_1573
Pipe Length: 7

Volume

79
86
179
6
0
174
134
289
400
356
418
1,036
14
367
795
373
2
1,496
230
324
588

Options

Roles

Actions

Rules

Filters

Ranks

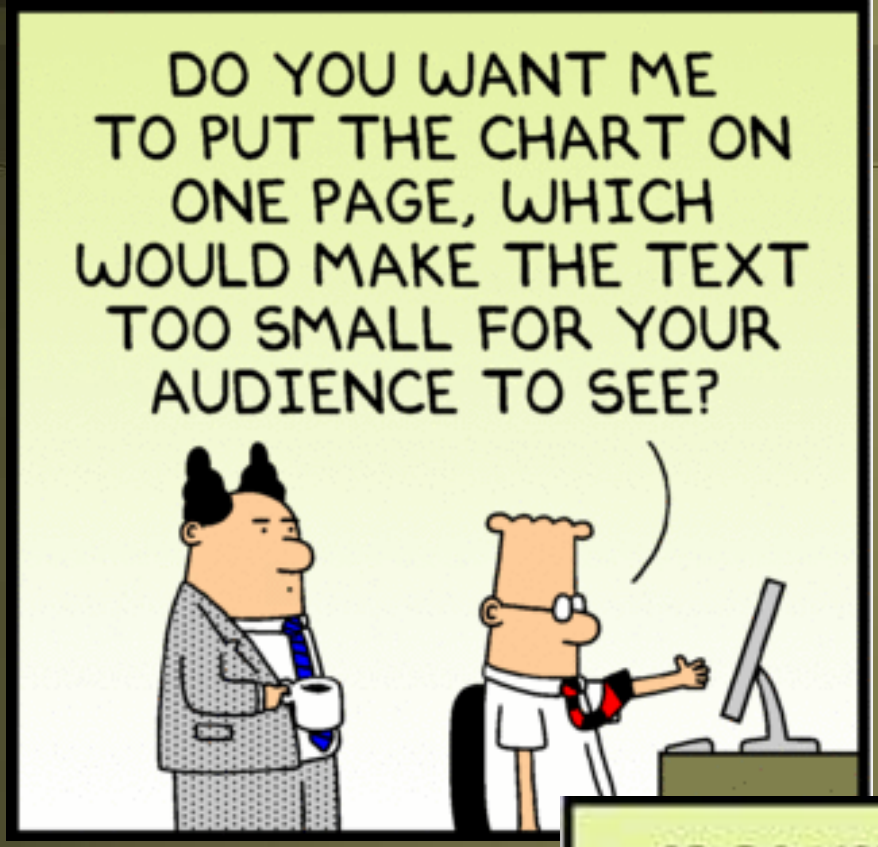
Pipe Length

25
0

Operator

BUCKEYE PARTNERS
CHS ENERGY
DUKE ENERGY
ENTERPRISE
EXXONMOBIL
MARATHON PIPE LINE
NUSTAR ENERGY
PLAINS ALL AMERICAN PIPELINE
TAMPA AIRPORT PIPELINE CORPORATION
WEST SHORE PIPELINE CO
CHEVRON PIPE LINE CO
COLONIALPIPELINE CO
ENBRIDGE
EXPLORER PIPELINE
KINDER MORGAN
MIDSTREAM PARTNERS
PHILLIPS 66 PIPELINE
SUNOCO
UNEV PIPELINE
WOLVERINE PIPELINE CO

Alternative Charts



Create Visualizations

What kind of visual communication do you want to create?

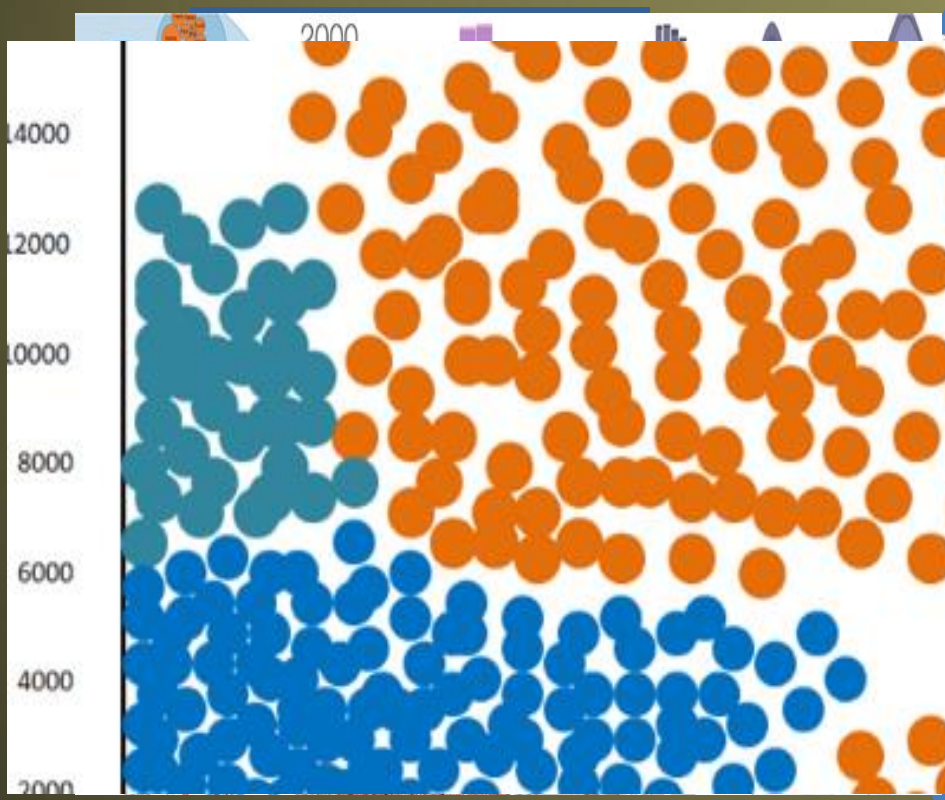
Better Charts in an Hour

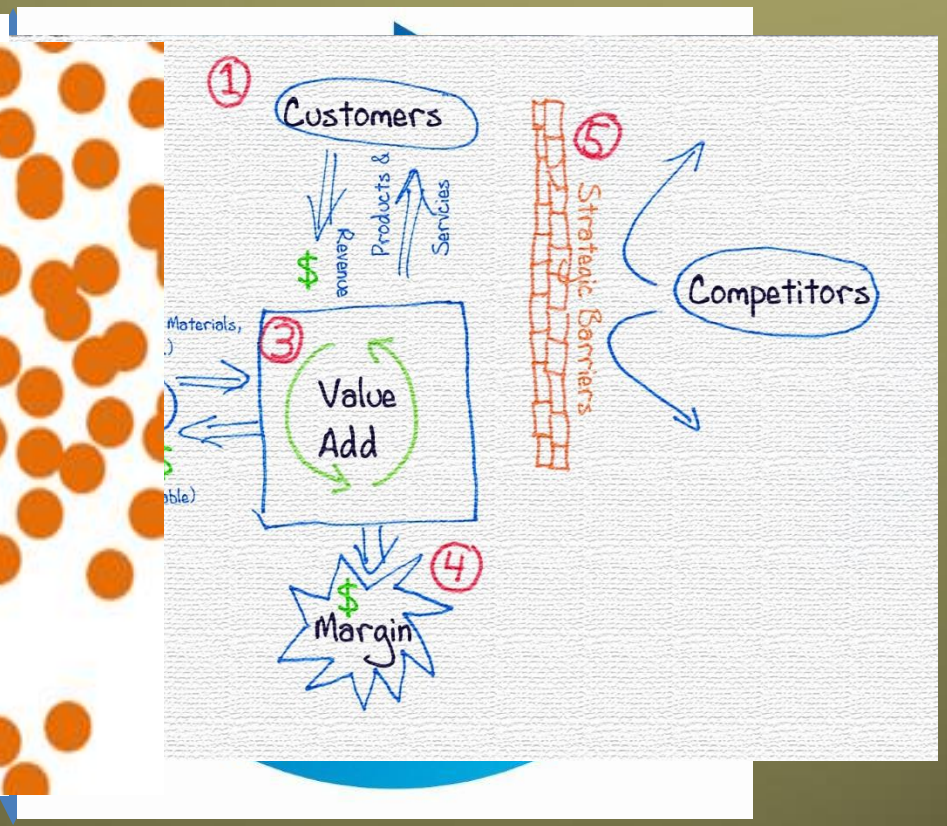
What kind of visual communication do you want to create?

1. Is my information conceptual or data-driven?
   - Con
   - Dat
2. Are r e or expl
   - A d ent
   - An ideas

Four Types of Visualizations

Declarative





Exploratory

1. Better Charts in an Hour
Preparation: 5 minutes

- Create a workspace
- Put aside your data
- Write down basics as constant reminders

2. Better Charts in an Hour
Talk and listen: 15 minutes

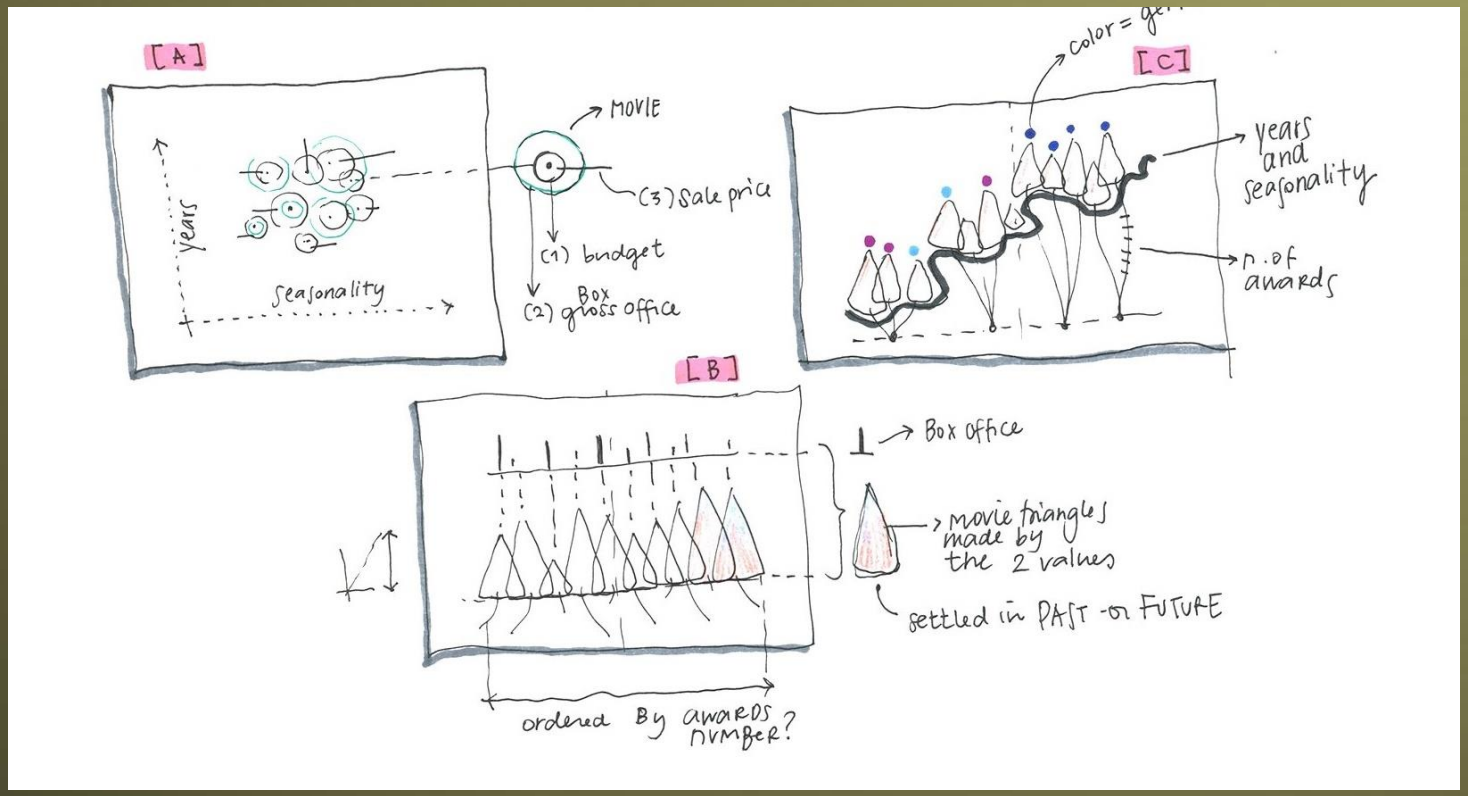
- Enlist a colleague
- Capture words, phrases, and statements

3. Better Charts in an Hour Sketch: 20 minutes

- Match keywords to chart types
- Start sketching, try out multiple visuals

4. Better Charts in an Hour Prototype: 20 minutes

- Prototype approach



Example: Capital Exposure and Risk

SAS® Visual Analytics - Report Viewer

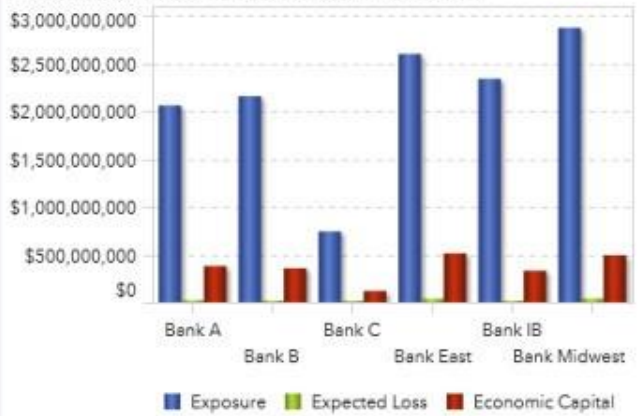
Search | Jacques

Capital Exposure and Risk Sample - Enterprise Capital Exposure | Close

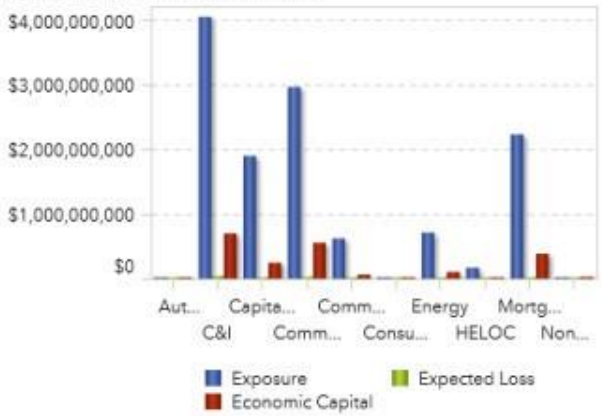
1st quarter 2013

CLICK HERE FOR MORE INFO ON THIS SECTION

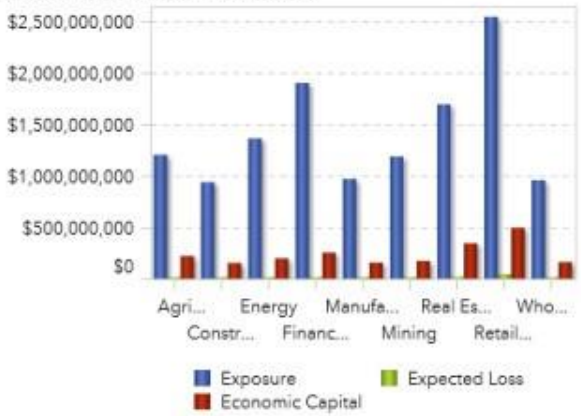
Exposure & Allocated Capital by Business Unit ($B)



Exposure by Line of Business ($B)

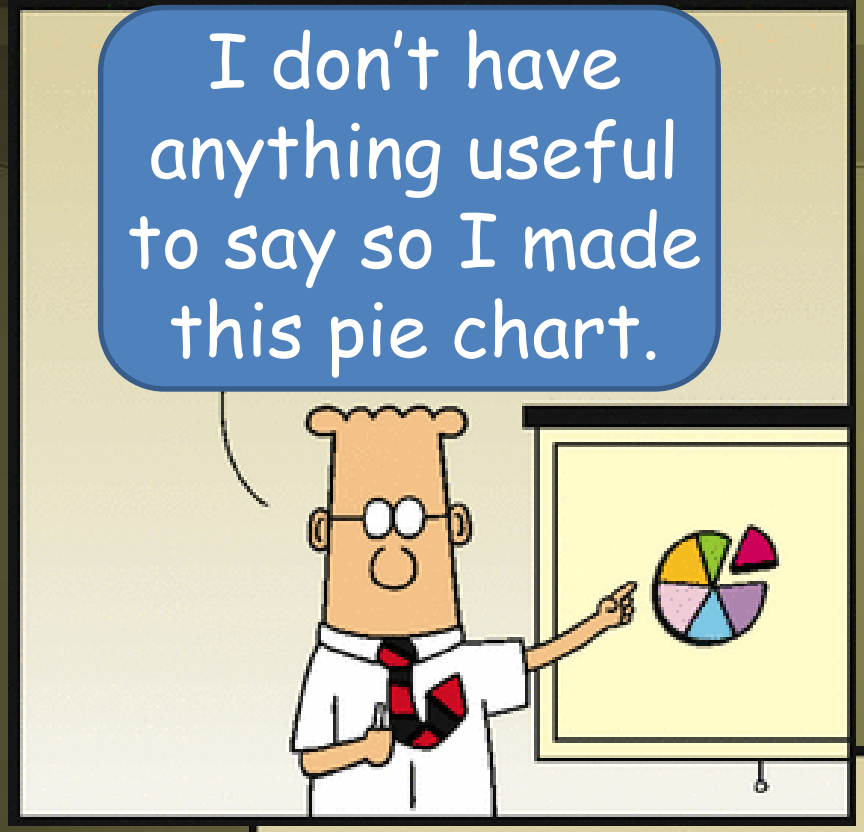


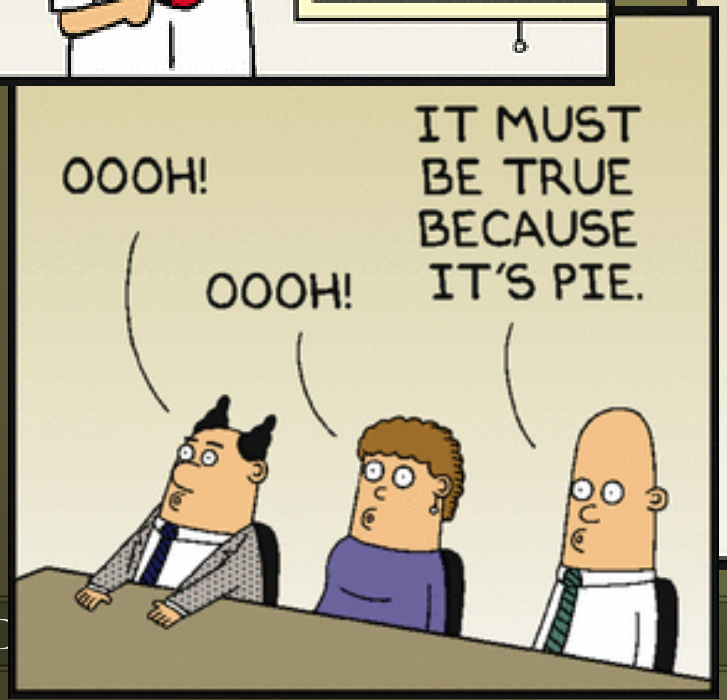
Capital Exposure by Industry ($B)



Profit Center	Line of Business	Counterparty	Capital Used	Return Percent	RAROC	Utilization
Commercial	Commercial Loan	BB	$315,629,826	19.16%	63%	93.00%
Commercial	C&I	C&IBB	$247,573,581	8.82%	23%	97.00%
Commercial	C&I	C&IAA	$146,664,777	3.80%	27%	97.00%
Commercial	C&I	C&IB	$133,281,012	10.46%	23%	97.00%
Consumer	Mortgage	Pool5	$132,385,407	15.17%	50%	99.00%
Commercial	Commercial Loan	AA	$102,226,098	8.37%	69%	93.00%

Identify a Valuable Message





Refine Visualizations

Refine to Impress
Refine to Persuade
Persuasion or Manipulation?

Refine to Impress

Creating that sense of good design

1. Focus on design structure and hierarchy:
   - Include: title, subtitle, visual field, source line
   - Align elements
2. Focus on design clarity
   - Make all elements support visual
   - Remove ambiguity
   - Use conventions and metaphors
3. Focus on design simplicity
   - Show only what's needed
   - Minimize the number of colors

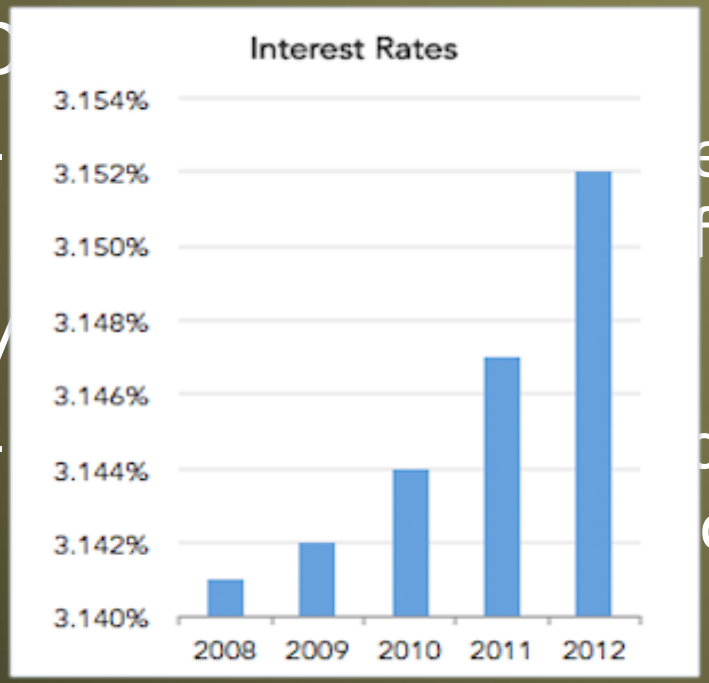
Refine to Persuade

Making an accurate chart not enough

1. Hone the main idea
   - Start by saying I need to convince the audience that . . .
2. Make main idea stand out
   - Use simple design techniques to reinforce your main idea
   - Emphasize the main idea
   - Isolate the main idea
3. Adjust what's around main idea
   - Manipulate variables that complement main point
   - Eliminate data that distracts or dilutes
   - Add data to expose hidden context
   - Change data to create new context

Persuasion or Manipulation?

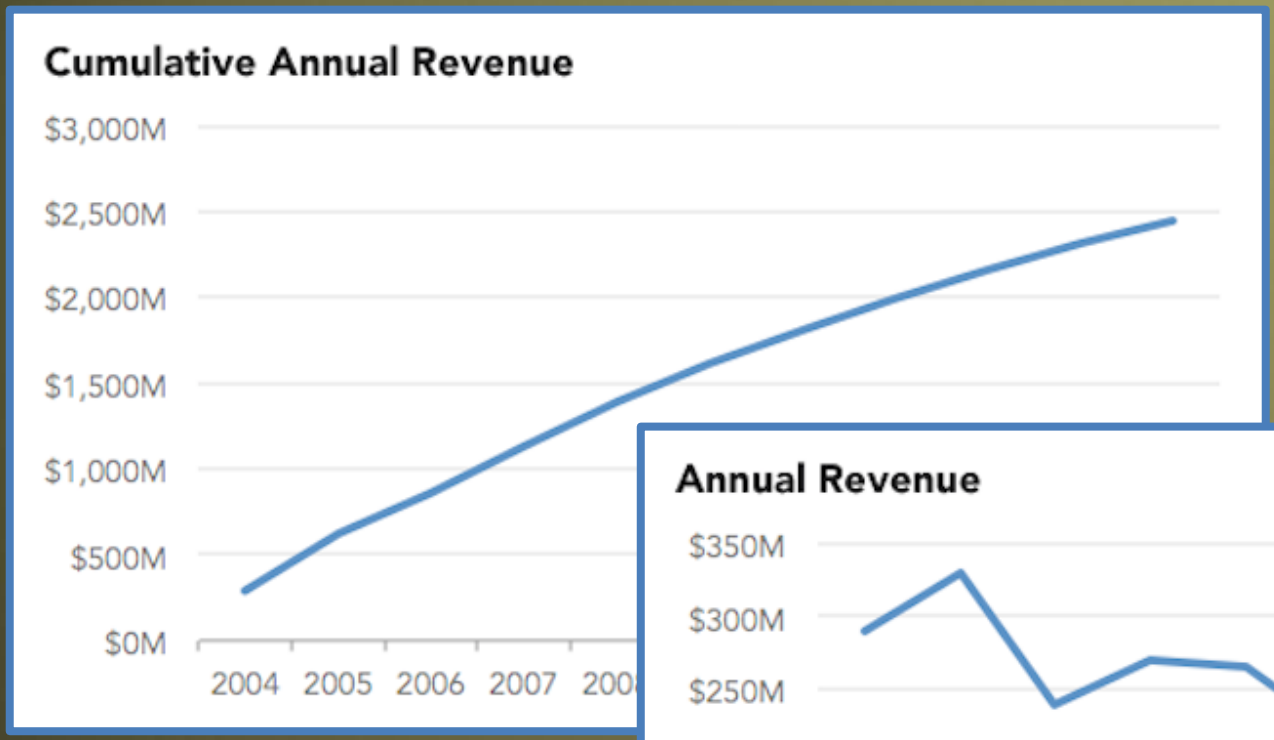
1. Truncated Y-axis
   - A chart removes valid value ranges from the y-axis, thereby removing data from the visual field
2. D
   - e
   - nt
   - f
3. M
   - c
   - o

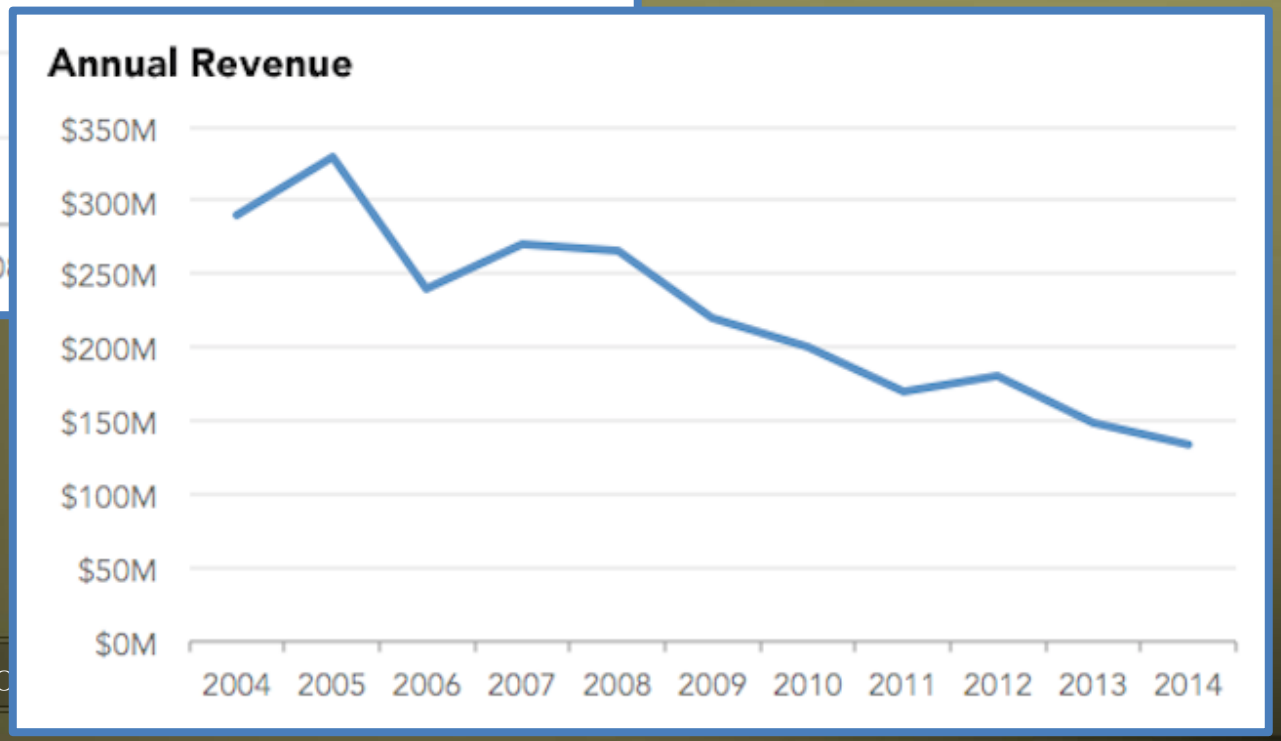


Crossing the Line between Persuasion and Manipulation

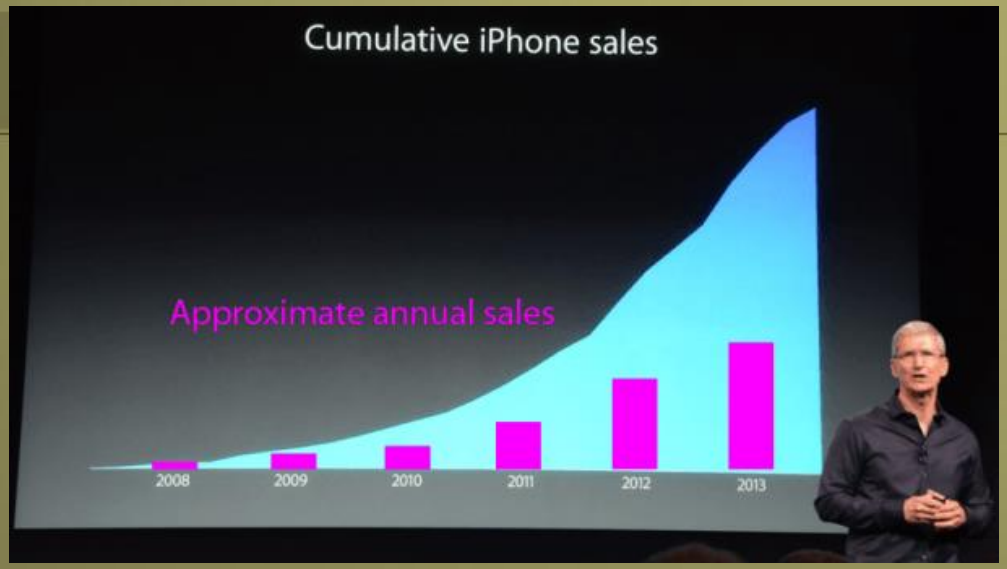
- Does my chart make it easier to see the idea, or is it actively changing the idea?
- Does the new idea contradict or fight with the idea in the less persuasive chart?
- Does eliminating information hide something that would challenge the idea I'm showing?
- Would I feel duped if someone else presented me with a chart like this?

Example: Charting the Wrong Variable





"We're out of crayons . . ."



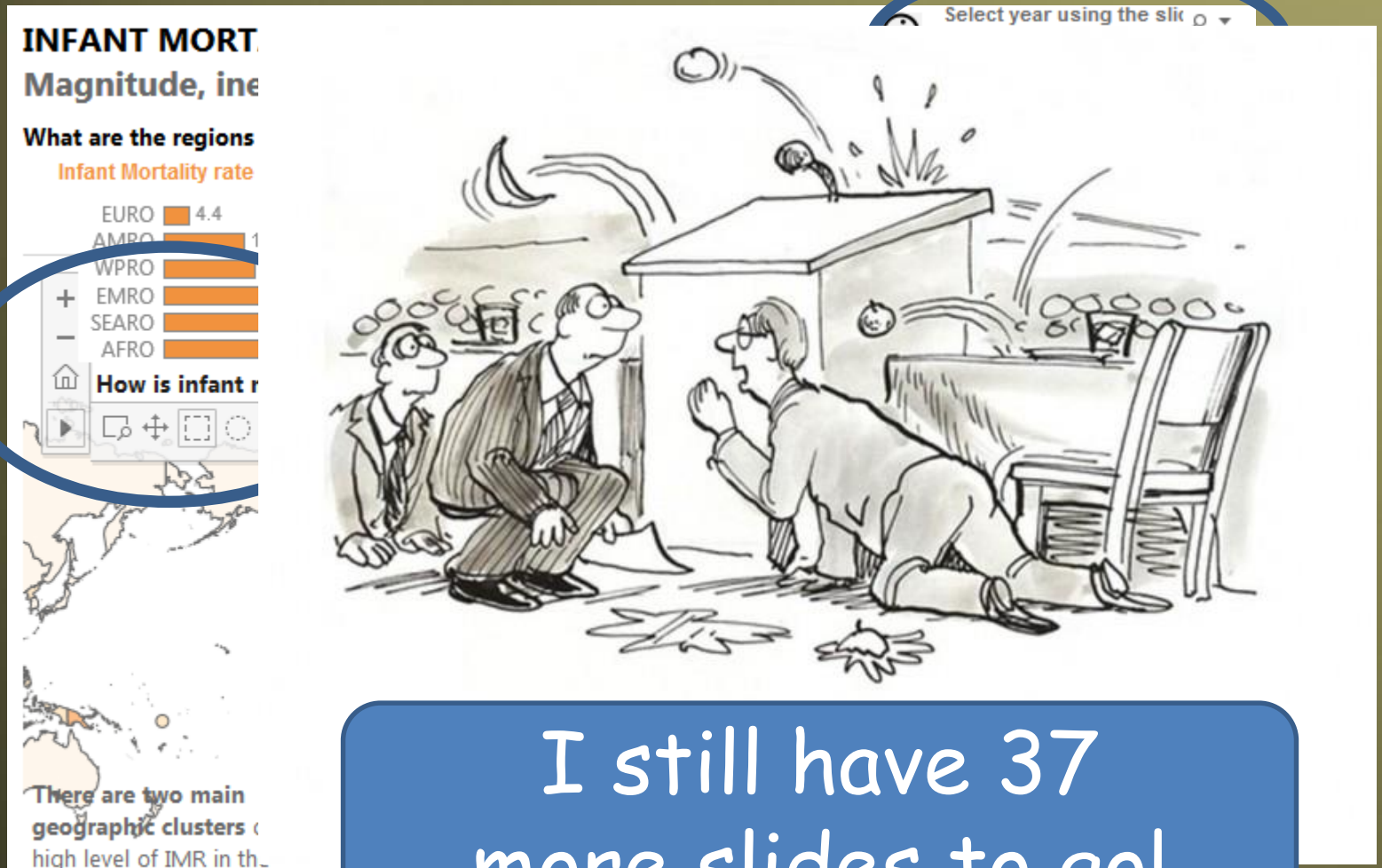
Present and Practice Visualizations

Present to Persuade
Visual Critique

Present to Persuade
Presentation Tips

- Show the chart and stop talking
- Ta
- Gu ms
- Us
- Tu hing im
- Sh

Present to Persuade Engagement Tips



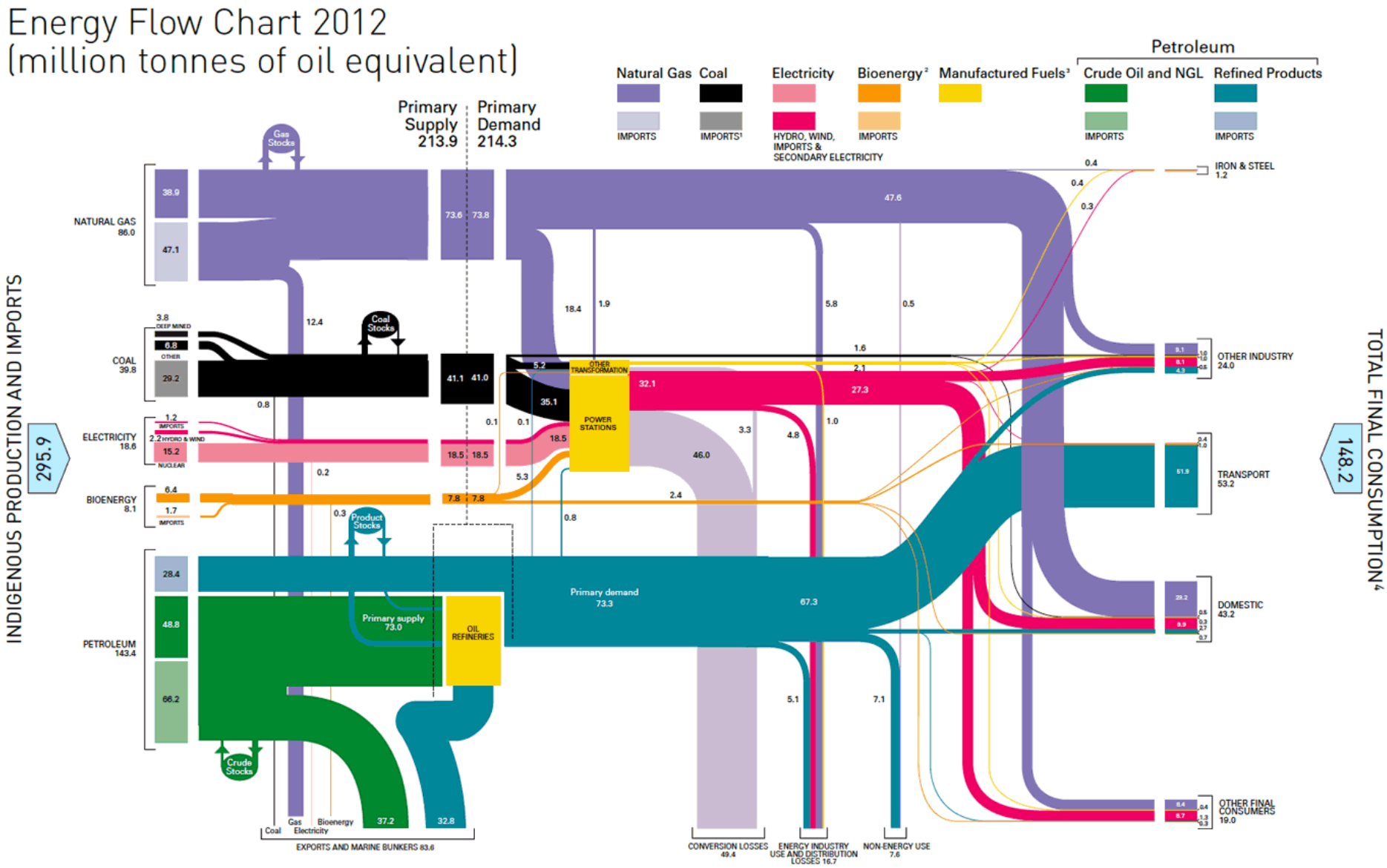
I still have 37 more slides to go!

CORVELLE CONSULTING

Visual Critique

- Make a note of the first few things you see
- Mak in you
- Mak -saws
- Finc
- Sket and criti

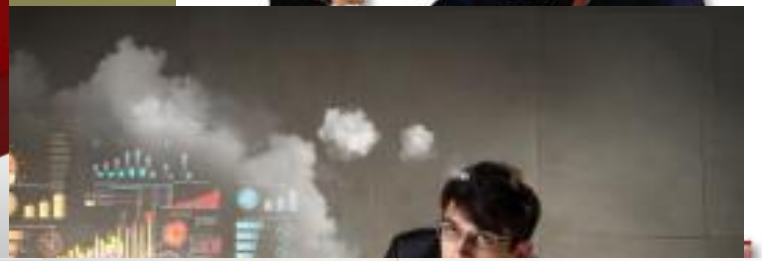
Example: Energy Flow

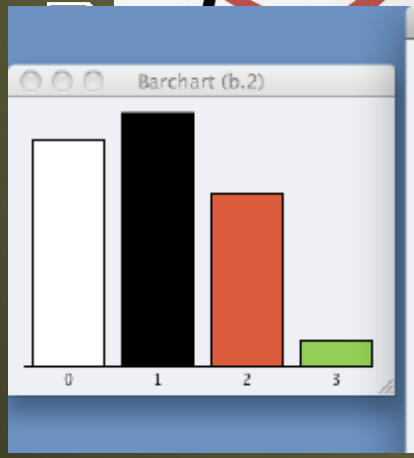


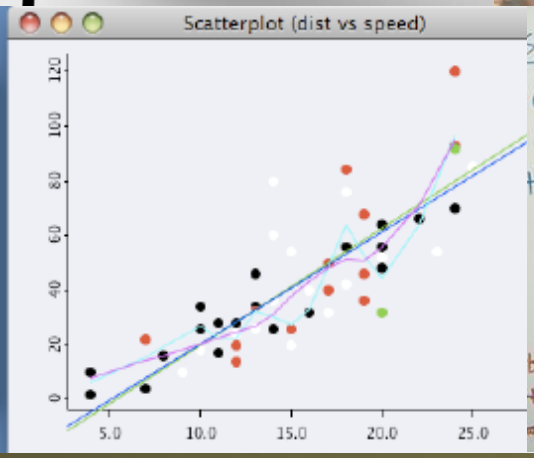
Not so Effective Design

Recommendations

- Understand visualizations
  - Enhance your understanding o







Questions & Discussion

Please fill out evaluation form

Creating Powerful Visualizations

Yogi Schulz

Corvelle Consulting

Information technology related management consulting

Microsoft Canada columnist & CBC Radio host

Industry presenter

Former PPDM Association board member

Corvelle Consulting

300, 400 - 5 Ave. S. W.

Calgary, Alberta T2P 0L6

Phone: (403) 860-5348

E-mail: YogiSchulz@corvelle.com

Web: www.corvelle.com

Corvelle Bibliography - 1

- Analytics time has come, so learn how your business can unlock the value
  - http://www.itworldcanada.com/blog/analytics-time-has-come-so-learn-how-your-business-can-unlock-the-value/394348
- Analytics trends for 2016
  - https://www.corvelle.com/analytics-trends-for-2016/
- Big data is useless without visual analytics
  - http://www.itworldcanada.com/blog/big-data-is-useless-without-visual-analytics/386943
- Business Intelligence – experiencing more hype than value?
  - http://www.corvelle.com/business-intelligence-experiencing-more-hype-than-value/
- Business value of data modeling
  - http://www.itworldcanada.com/blog/business-value-of-data-modeling/380574
- Can visual analytics be the savior of the oil and gas industry?
  - https://www.corvelle.com/can-visual-analytics-be-the-savior-of-the-oil-and-gas-industry/
- Channeling the cynicism of BI practitioners
  - http://www.itworldcanada.com/blog/channeling-the-cynicism-of-bi-practitioners/389882

Corvelle Bibliography - 2

- Do you need big data big results?
  - http://www.corvelle.com/do-you-need-big-data-for-big-results/
- How Project Management is Shaping the Future Of Visual Analytics
  - https://www.corvelle.com/how-project-management-is-shaping-the-future-of-visual-analytics/
- Is data modelling really dead?
  - http://www.corvelle.com/is-data-modelling-really-dead/
- Is your company data-driven?
  - http://www.itworldcanada.com/blog/is-your-company-data-driven/385732
- What data can't be expected to do
  - http://www.itworldcanada.com/blog/what-data-cant-be-expected-to-do/389498
- Why you need visual analytics
  - http://www.corvelle.com/resources/articles/it-world-canada/why-you-need-visual-analytics/

Bibliography

- A Good Example of Misleading Visualization
  - http://spatial.ly/2009/09/a-good-example-of-misleading-visualization/
- The analysis of visual variables for use in the cartographic design of point symbols for mobile Augmented Reality applications
  - Łukasz Halik, Adam Mickiewicz University Poznan
  - http://www.iag-aig.org/attach/30dee1f85f7bd479367f1f933d48b701/V61N1_2FT.pdf
- The Benefits and Future of Data Visualization
  - StatSilk founder Frank van Cappelle
  - https://www.statsilk.com/blog/benefits-and-future-data-visualization
- Charting Statistics
  - Mary Eleanor Spear
  - https://archive.org/details/ChartingStatistics
- Color Brewer
  - http://colorbrewer2.org/#type=sequential&scheme=BuGn&n=3
- Data: The language of modern business leaders
  - Steve Proctor, March 17, 2017
  - http://www.itbusiness.ca/sponsored/data-the-language-of-modern-business-leaders

Bibliography

- Data Visualization: The future of data visualization
  - Will Towler, January/February 2015
  - http://analytics-magazine.org/data-visualization-the-future-of-data-visualization
- Data-Driven Design: Dare to Wield the Sword of Data – Part I
  - Brent Dykes, December 4, 2012
  - http://www.analyticshero.com/2012/12/04/data-driven-design-dare-to-wield-the-sword-of-data-part-i/
- Diverging color schemes: Showing good data isn't enough; you need to show it well
  - Alberto Cairo, June 26, 2016
  - http://www.thefunctionalart.com/2016/06/diverging-color-schemes-showing-good_26.html

Bibliography

- 8 Horrible Data Visualizations That Make No Sense
  - Eric Limer, September 02, 2013
  - http://gizmodo.com/8-horrible-data-visualizations-that-make-no-sense-1228022038
- 55 Striking Data Visualization and Infographic Poster Designs
  - Igor Ovsyannykov, May 16, 2011
  - http://inspirationfeed.com/inspiration/infographics/55-striking-data-visualization-and-infographic-poster-designs/
- The Future of Data Visualization, According to a Computer Science Professor
  - March 26, 2015
  - https://visage.co/the-future-of-data-visualization-according-to-a-computer-science-professor/
- Future of visualization
  - Jeffrey Heer, computer science professor and co-founder of Trifacta
  - https://flowingdata.com/2015/03/23/future-of-visualization-2/
- Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations
  - Scott Berinato, 2016
  - https://hbr.org/product/good-charts-the-hbr-guide-to-making-smarter-more-persuasive-data-visualizations/15005-PBK-ENG

Bibliography

- Graphic Methods for Presenting Facts
  - Willard C. Brinton, 1914
  - First business book about visualization
  - http://www.aviz.fr/wiki/uploads/Bertifier/brinton-graphicMethods-1914.pdf
- Grid lines: chart junk or visual aids?
  - Shilpi Choudhury, June 19, 2014
  - https://www.fusioncharts.com/charts/
  - https://www.fusioncharts.com/blog/grid-lines-chart-junk-or-visual-aids/
- How The Rainbow Color Map Misleads
  - Robert Kosara, July 7, 2013
  - https://eagereyes.org/basics/rainbow-color-map
- How to Lie With Data Visualization
  - http://gizmodo.com/how-to-lie-with-data-visualization-1563576606
- How to Lie with Maps
  - Mark Monmonier
  - https://www.amazon.com/How-Lie-Maps-2nd-Edition/dp/0226534219

Bibliography

- Improving data visualisation for the public sector
  - http://www.improving-visualisation.org/
- Infographics Lie. Here's How To Spot The B.S.
  - Infographics are all over the place nowadays. How do you know which ones to trust? Follow these three easy steps to save yourself from getting duped.
  - https://www.fastcodesign.com/3024273/infographics-lie-heres-how-to-spot-the-bs
- Lane Harrison
  - Assistant Professor, Department of Computer Science, Worcester Polytechnic Institute
  - http://web.cs.wpi.edu/~ltharrison/
  - http://codementum.org/
- Misleading Language Maps on the Internet
  - Martin W. Lewis, July 10, 2012
  - http://www.geocurrents.info/cultural-geography/linguistic-geography/misleading-language-maps-on-the-internet
- Misleading graph
  - https://en.wikipedia.org/wiki/Misleading_graph

Bibliography

- Misleading with pictures: The pitfalls of data visualization
  - Rectangles and rainbows may not be the best way to visualize scientific data. Scientists and communicators are changing their thinking about the most appropriate way to represent data without bias.
  - Ian C. Campbell
  - https://figureoneblog.wordpress.com/2014/03/12/misleading-with-pictures-the-pitfalls-of-data-visualization/
- Publication-quality Graphing for Scientists and Engineers
  - http://www.originlab.com/
- Ronald Rensink
  - Associate Professor, Departments of Psychology and Computer Science, UBC
  - http://psych.ubc.ca/persons/ronald-rensink/
- Remove Your Rose Tinted Glasses: Data Visualizations Designed to Mislead
  - Agata Kwapien in Data Visualization, December 2, 2015
  - http://www.datapine.com/blog/misleading-data-visualization-examples/
- Teaching Students to Lie, Manipulate, and Mislead with Information Visualizations
  - Libby Hemphill, September 27, 2014
  - https://www.slideshare.net/libbyh/teaching-students-to-lie-manipulate-and-mislead-with-information-visualizations

Bibliography

- 10 Ways To Create Powerful Infographics & Data Visualizations
  - Lisa Dzera, April 19, 2016
  - https://www.linkedin.com/pulse/10-ways-create-powerful-infographics-data-lisa-dzera
- The 12 Data Visualization Books That Should Be on Your Bookshelf
  - Heiko Tröster in Data Visualization, August 23, 2016
  - http://www.datapine.com/blog/top-12-data-visualization-books/
- Understanding Uncertainty
  - Winton programme for the public understanding of risk
  - Statistical Laboratory in the University of Cambridge
  - https://understandinguncertainty.org/
- Visual Variables
  - http://www.infovis-wiki.net/index.php?title=Visual_Variables
- When Infographics Go Bad Or How Not To Design Data Visualization
  - http://www.designyourway.net/blog/inspiration/when-infographics-go-bad-or-how-not-to-design-data-visualization/
- When Maps Lie
  - Andrew Wiseman, June 25, 2015
  - http://www.citylab.com/design/2015/06/when-maps-lie/396761/
- Why “Simple” Websites Are Scientifically Better
  - May 8, 2017
  - https://conversionxl.com/blog/why-simple-websites-are-scientifically-better/