

Lesson 10: Information Dashboard Design

Dr. Kam Tin Seong
Assoc. Professor of Information Systems

School of Computing and Information Systems,
Singapore Management University

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- Introducing information dashboard
- Information dashboard design best practices
- Common mistakes in dashboard design
- Ideal graphs for information dashboard
 - Bullet graph
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Introducing information dashboard

A visual display

of

**the most important information needed to
achieve one or more objectives**

that have been

consolidated on a single computer screen

so it can be

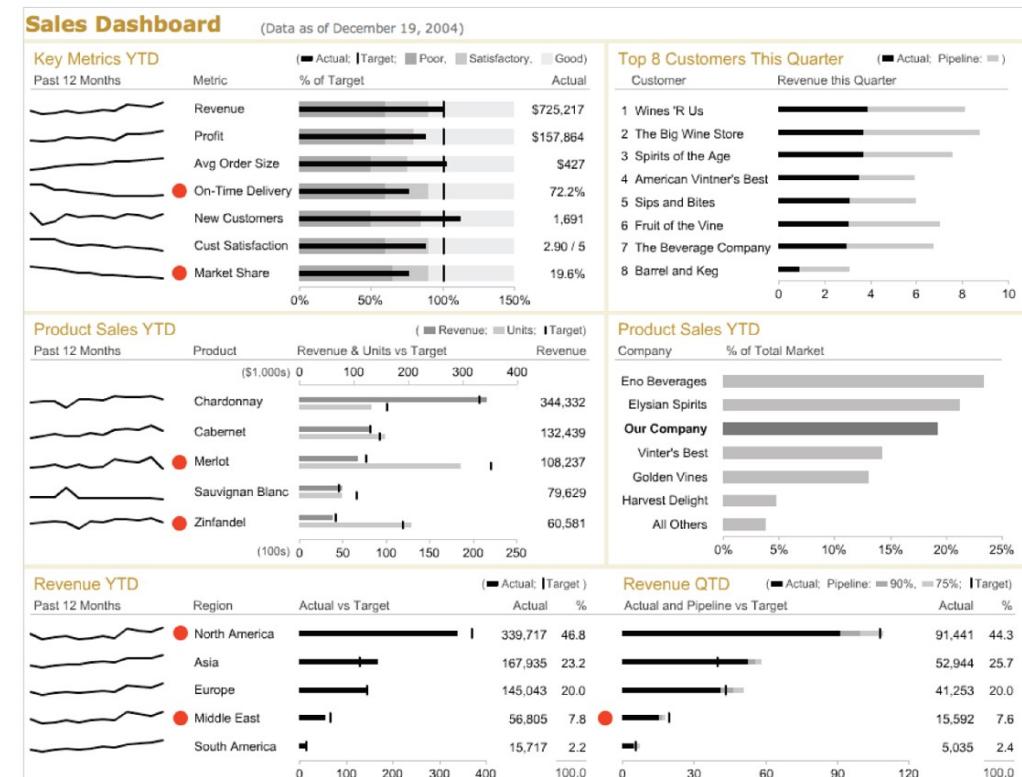
monitored at a glance

Source: Stephen Few (2006) Information Dashboard Design

Introducing information dashboard

Why are dashboards so important?

- A well-designed performance dashboard helps you to see more clearly by helping you to understand each fact more quickly so you can find patterns in the storm.



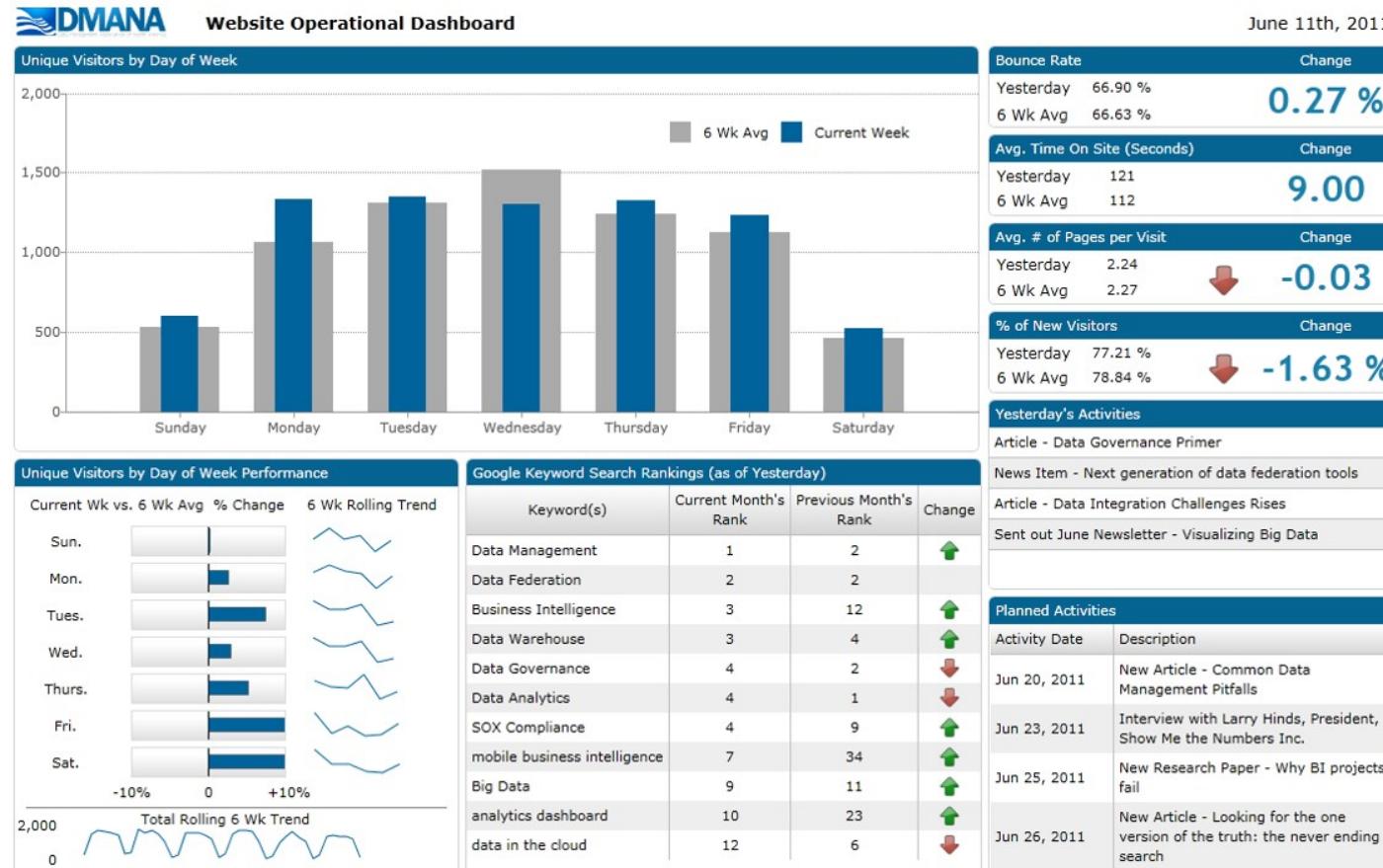
Introducing information dashboard

Classifying Dashboards by Role

- Dashboards for strategic purpose
- Dashboards for operational purpose
- Dashboards for analytics purpose

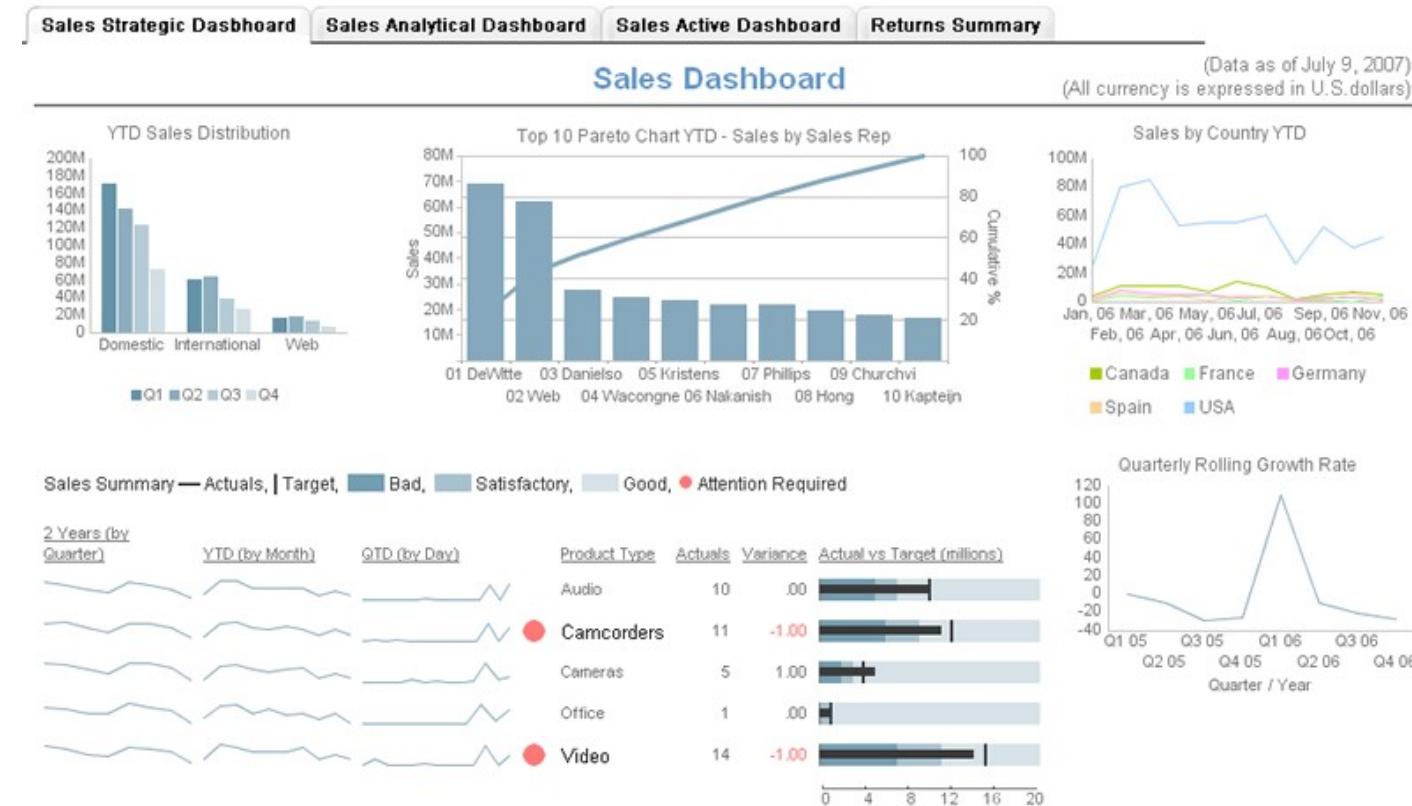
Introducing information dashboard

Dashboards for operational purpose



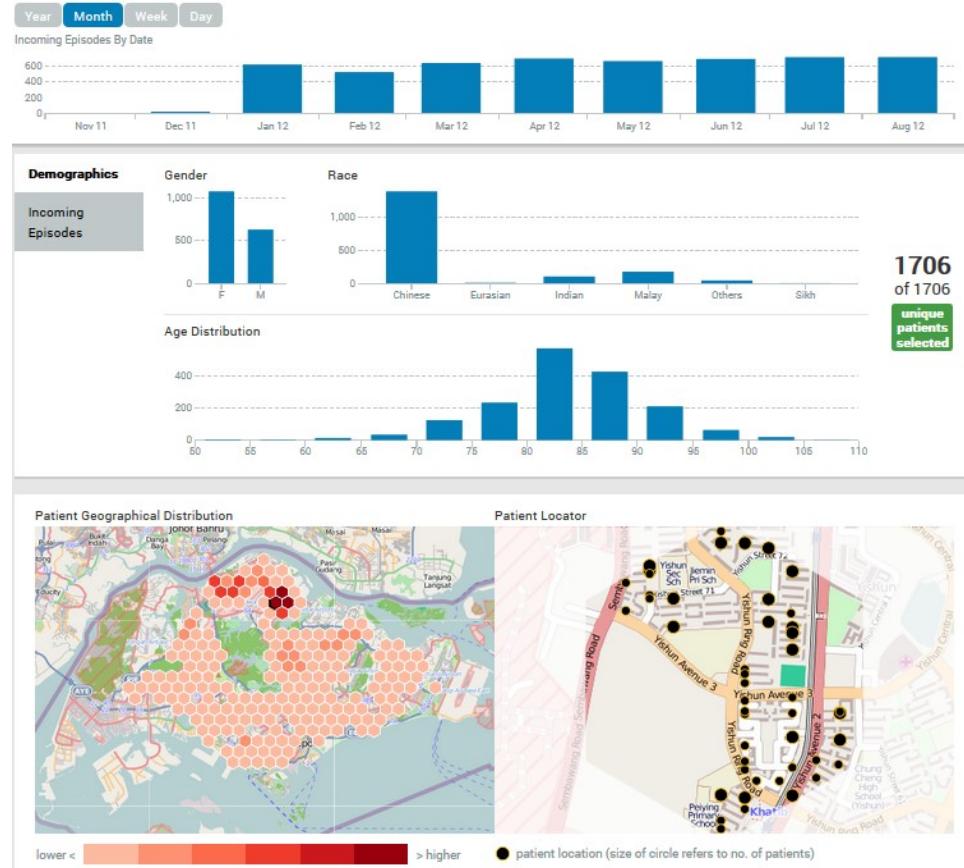
Introducing information dashboard

Dashboards for strategic purpose



Introducing information dashboard

Dashboards for analytics purpose

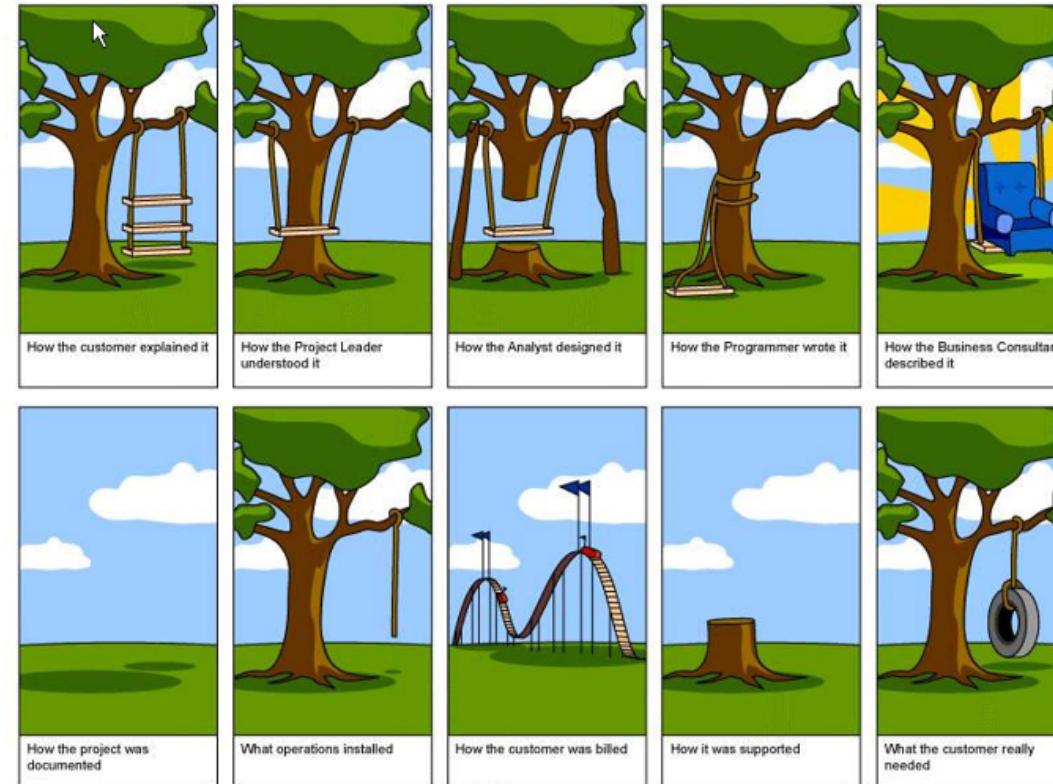


Best Practices for Dashboard Design

- Preparing stage
 - Target the user
 - Know what value your dashboard will add
 - Display only actionable information
- Design stage
 - Right tool for the right job
 - Context
 - Layout and clarity
 - Visual aesthetics

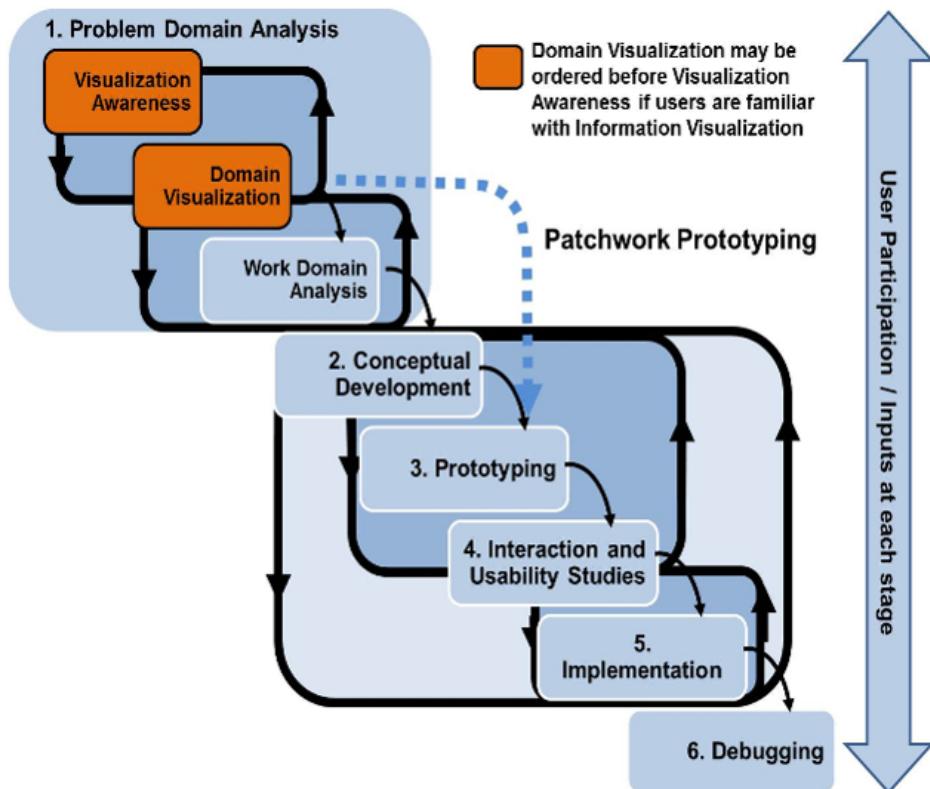
Best Practices for Dashboard Design

Preparing stage: Target the user



Best Practices for Dashboard Design

Preparing stage: User-centered Design Process



Reference: Developing and Applying a User-Centered Model for the Design and Implementation of Information Visualisation
(https://ink.library.smu.edu.sg/sis_research/1479/)

Best Practices for Dashboard Design

Preparing stage: A User-Centric Dashboard Design Guide



- Who is my target audience?



- What value will the dashboard add?



- What type of dashboard am I creating?

Best Practices for Dashboard Design

Preparing stage: A User-Centric Dashboard Design Guide

Who is my target audience?

	Questions	Implication
Role	What decisions do they make? What questions do they need answered?	Structure the information to make it super easy to answer high priority questions.
Work flow	In what context will they be reviewing the dashboard? What information are they using on a daily basis? How much time do they have to review the numbers?	The form and information display needs to fit into an existing work flow.
Data comfort and skills	How sophisticated are they with using data? Are they proficient in Excel? Do they enjoy digging into the numbers?	The dashboard level of detail and analytical capability should match the audiences' comfort zones.
Business and data expertise	How familiar are they with the key performance metrics? Do they understand where the data comes from? Are they familiar with internal company or industry terminology?	This determines the need for embedded explanations and use of natural language.

Best Practices for Dashboard Design

Preparing stage: A User-Centric Dashboard Design Guide

What value will the dashboard bring?

- Help management define what is important.
- Educate people in the organization about the things that matter.
- Set goals and expectations for specific individuals or groups.
- Help executives sleep at night because they know what's going on.
- Encourage specific actions in a timely manner.
- Highlight exceptions and provide alerts when problems occur.
- Communicate progress and success.
- Provide a common interface for interacting with and analysing important business data.

Best Practices for Dashboard Design

Preparing stage: A User-Centric Dashboard Design Guide

What type of dashboard am I creating?

Scope	<input type="checkbox"/> Broad: Displaying information about the entire organization	<input type="checkbox"/> Specific: Focusing on a specific function, process, product, etc.		
Business role	<input type="checkbox"/> Strategic: Provides a high-level, broad, and long-term view of performance	<input type="checkbox"/> Operational: Provides a focused, near-term, and tactical view of performance		
Time horizon	<input type="checkbox"/> Historical: Looking backwards to track trends	<input type="checkbox"/> Snapshot: Showing performance at a single point in time	<input type="checkbox"/> Real-time: Monitoring activity as it happens	<input type="checkbox"/> Predictive: Using past performance to predict future performance
Customization	<input type="checkbox"/> One-size-fits-all: Presented as a single view for all users	<input type="checkbox"/> Customizable: Functionality to let users create a view that reflects their needs		
Level of detail	<input type="checkbox"/> High: Presenting only the most critical top-level numbers	<input type="checkbox"/> Drillable: Providing the ability to drill down to detailed numbers to gain more context		
Point of view	<input type="checkbox"/> Prescriptive: The dashboard explicitly tells the user what the data means and what to do about it	<input type="checkbox"/> Exploratory: User has latitude to interpret the results as they see fit		

Best Practices for Dashboard Design

Preparing stage: A User-Centric Dashboard Design Guide

Information Discrimination

- Find the core
- Ask a better question
- Push to the appendix
- Reporting vs exploration

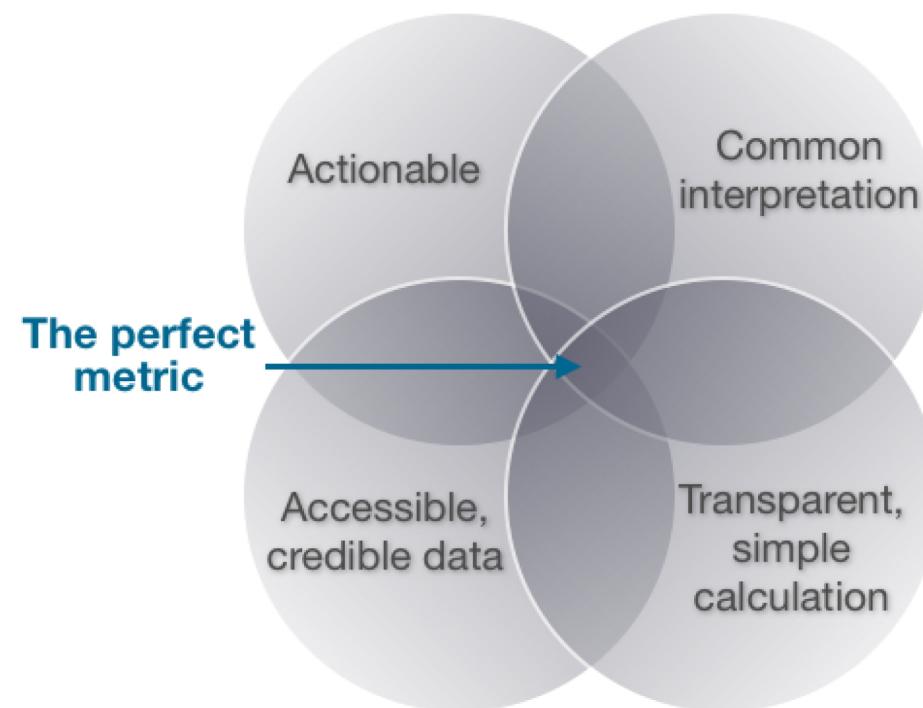
*“Data isn’t like your kids,
you don’t have to pretend
to love them equally.”*

Amanda Cox, NY Times

Best Practices for Dashboard Design

Preparing stage: A User-Centric Dashboard Design Guide

Choosing the perfect metric



Best Practices for Dashboard Design

Preparing stage: A User-Centric Dashboard Design Guide

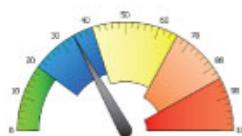
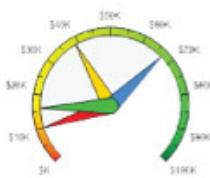
Choosing the perfect metric

	Description	Common mistakes
Actionable	It is clear the source of the problem or necessary actions when the metric goes up, down, flat or off-target	It is too broad for specific groups to impact (e.g. customer satisfaction). Focus on absolute measures rather than changes (e.g. total sales vs. change in sales)
Common interpretation	People in the organization recognize what the metric means	It uses data definitions that aren't well understood (e.g. leads vs. prospects).
Transparent, simple calculation	How the metric is generated is shared and easy to understand	Attempting to create a compound metric that combines a bunch of factors
Accessible, credible data	The data can be acquired with modest effort from a source that people trust.	Pursuing the perfect metric that is hard to gather rather than using a close proxy.

Ideal graphs for information dashboard

Right tool for the right job

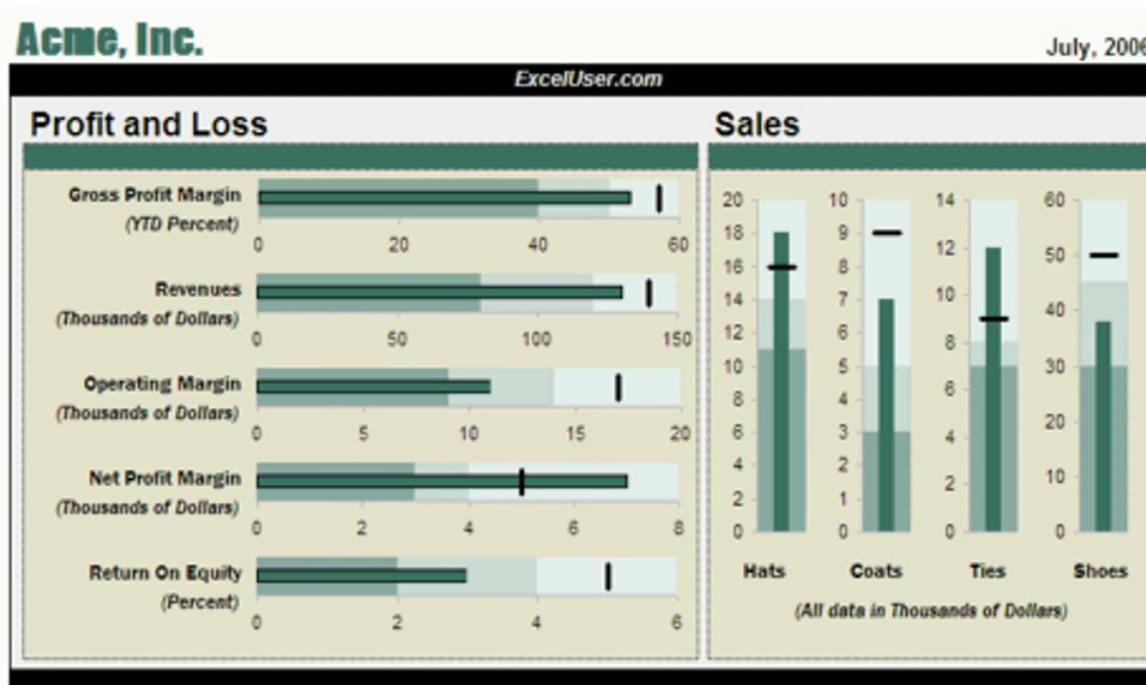
An assortment of typical dashboard gauges



Ideal graphs for information dashboard

Introduction to Bullet Graphs

Bullet graphs to replace gauges

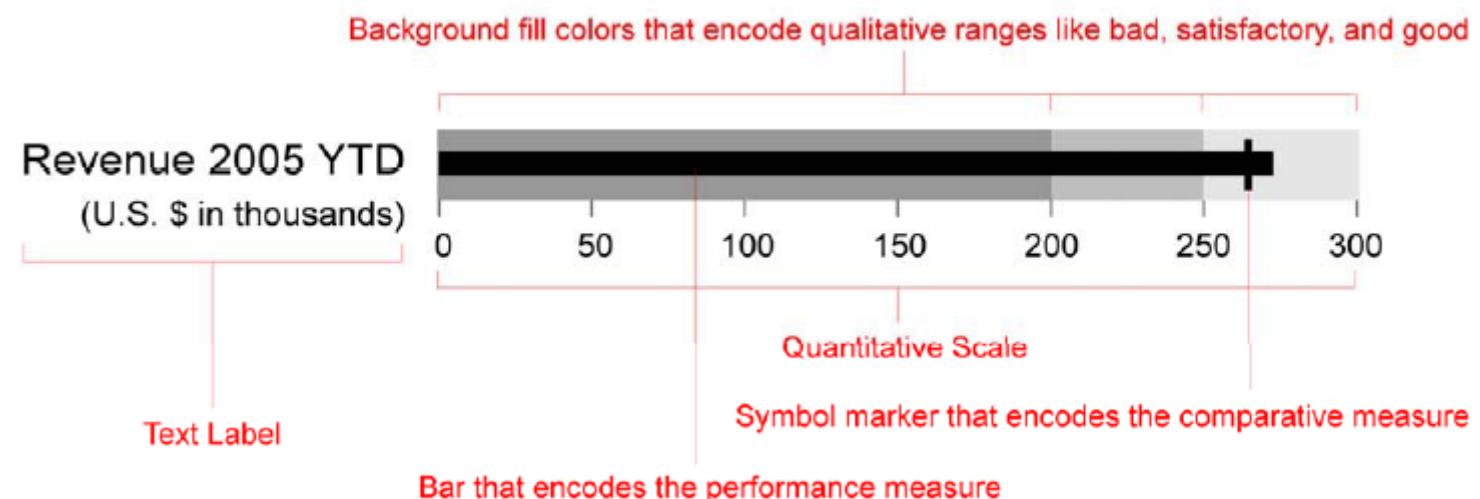


Creator of bullet graph Mr. Stephen Few. Visit [Perceptual Edge](#) for more information.

Ideal graphs for information dashboard

Introduction to Bullet Graphs

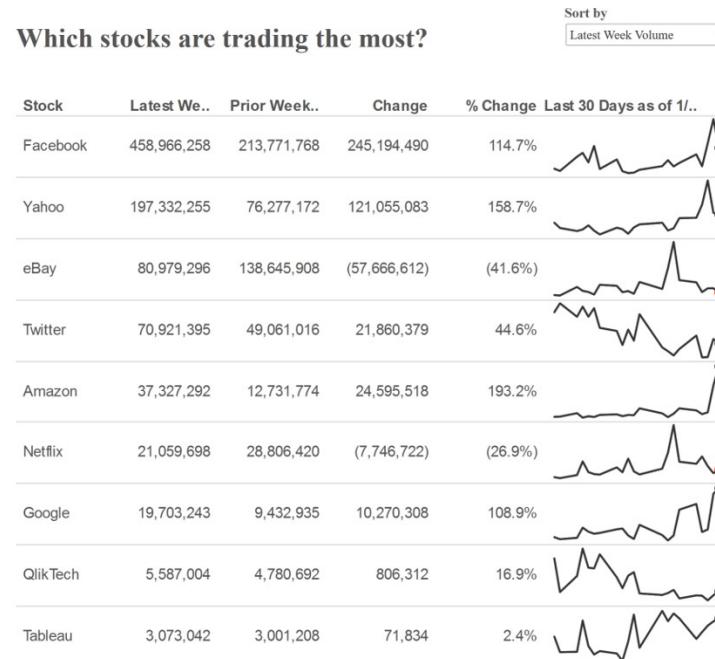
Bullet graph specifications



Ideal graphs for information dashboard

Introduction to Sparklines

- A sparkline is a very small line chart, typically drawn without axes or coordinates.



reference: https://www.edwardtufte.com/bboard/q-and-a-fetch-msg?msg_id=000AIr

Introduction to Sparklines

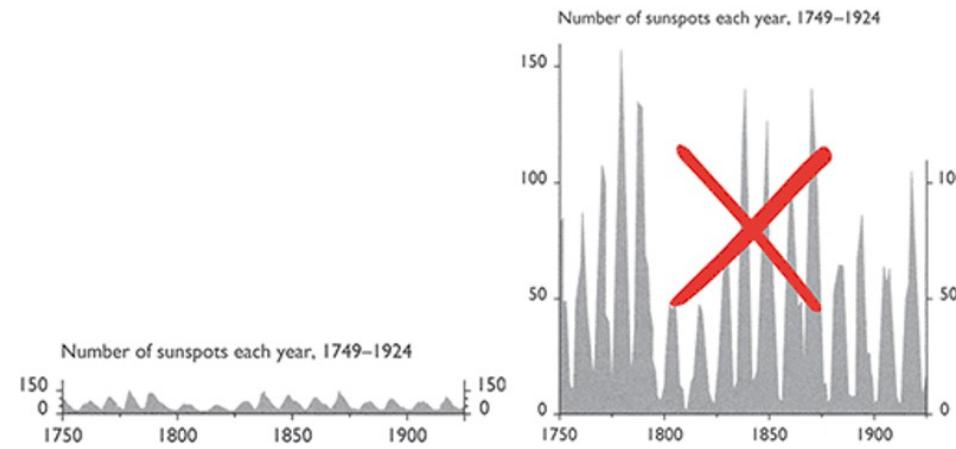
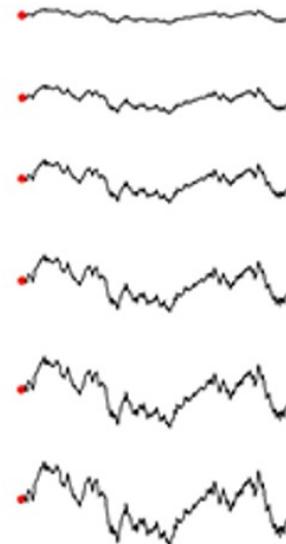
Pre-attentive with colour and symbol



Introduction to Sparklines

Aspect ratio

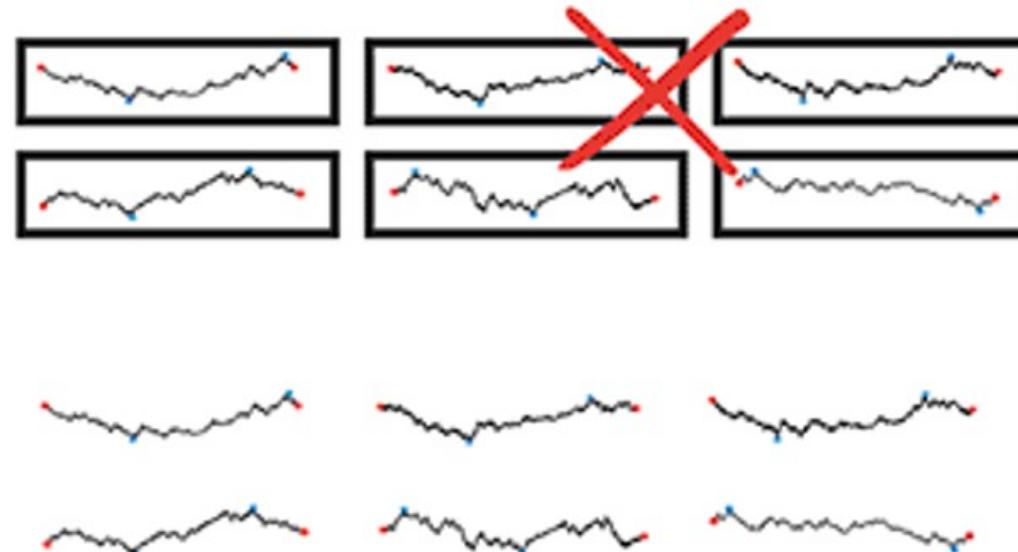
- A graphic's width/height ratio makes a big difference in displaying data.



Introduction to Sparklines

Unintentional optical clutter

- Areas surrounding data-lines may generate unintentional optical clutter. Strong frames produce melodramatic but content-diminishing visual effects.



Introduction to Sparklines

Sparklines best practice

- Enriched with context



Introduction to Sparklines

Sparklines best practice

- Use reference line to provide context

28 day summary with change over previous period

Tweets

66 ↓21.4%



Tweet impressions

1.4M ↑5.1%



Profile visits

21.9K ↓9.1%



Mentions

447 ↓9.3%



Followers

56.8K ↑1,143

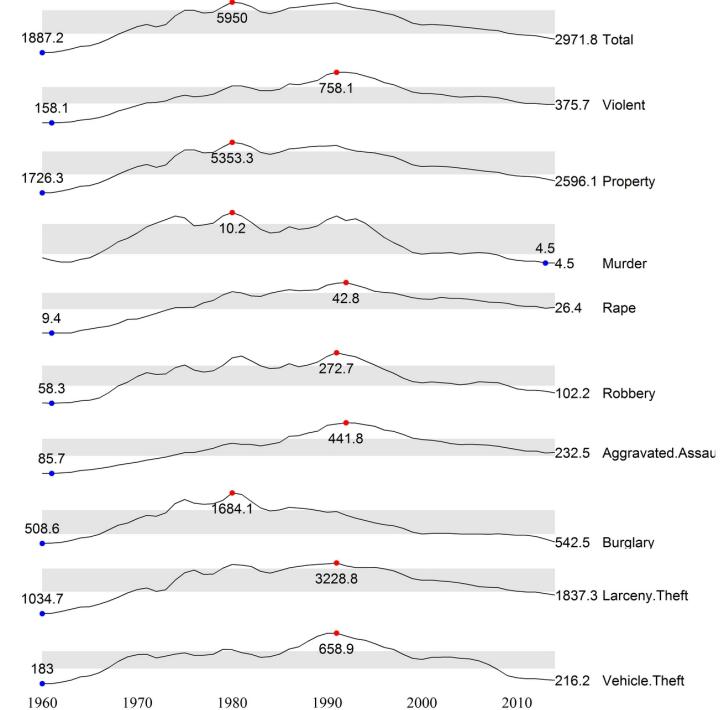


October 2015 • 3 days so far...

Introduction to Sparklines

Sparklines best practice

- Use reference region to provide context



Reference: <https://stackoverflow.com/questions/35434760/sparklines-in-ggplot2>

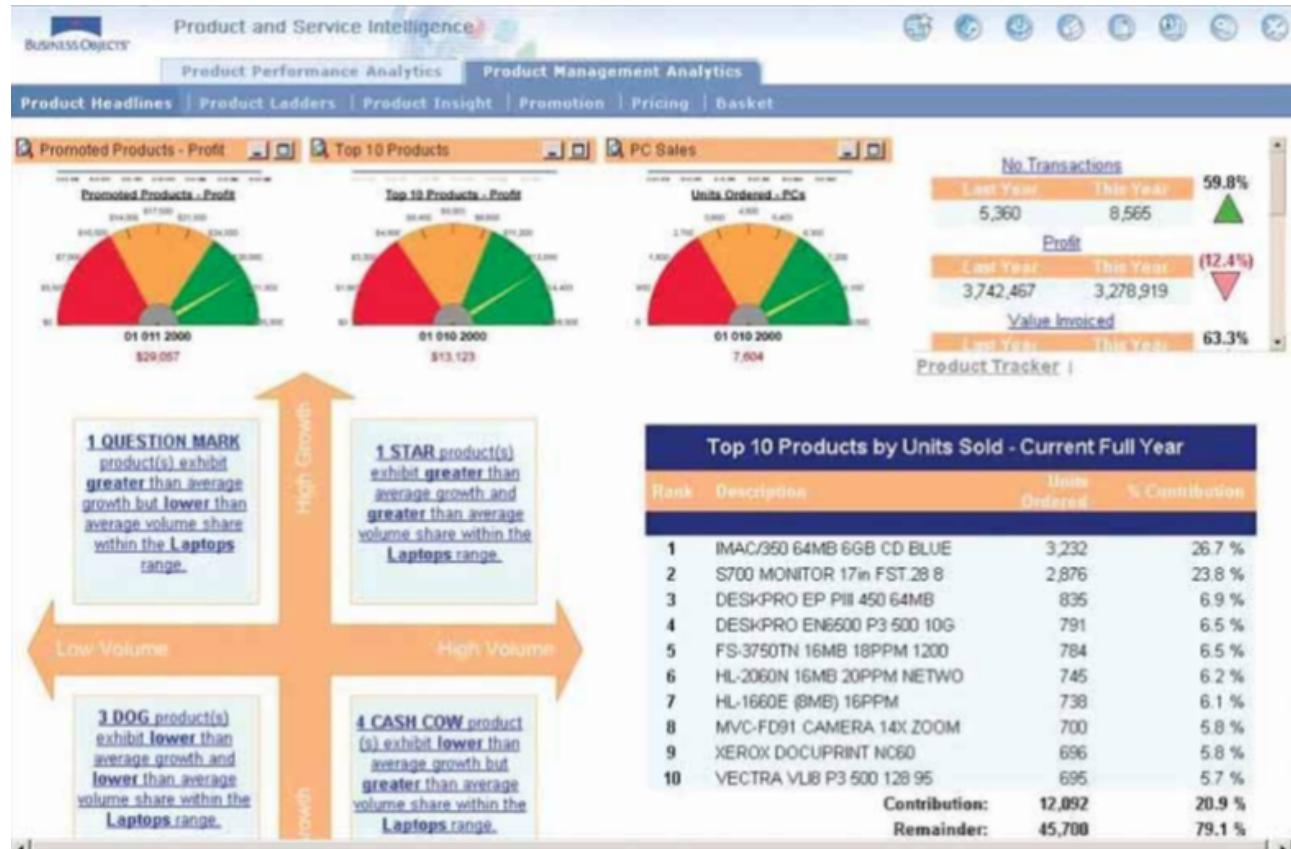
Best Practices for Dashboard Design

Common mistakes in dashboard design

- Exceeding the boundaries of a single page
- Supplying inadequate context for the data
- Displaying excessive detail or precision
- Exposing measure indirectly
- Choosing inappropriate display media
- Introducing meaningless variety
- Using poorly designed display media
- Encoding quantitative data inaccurately

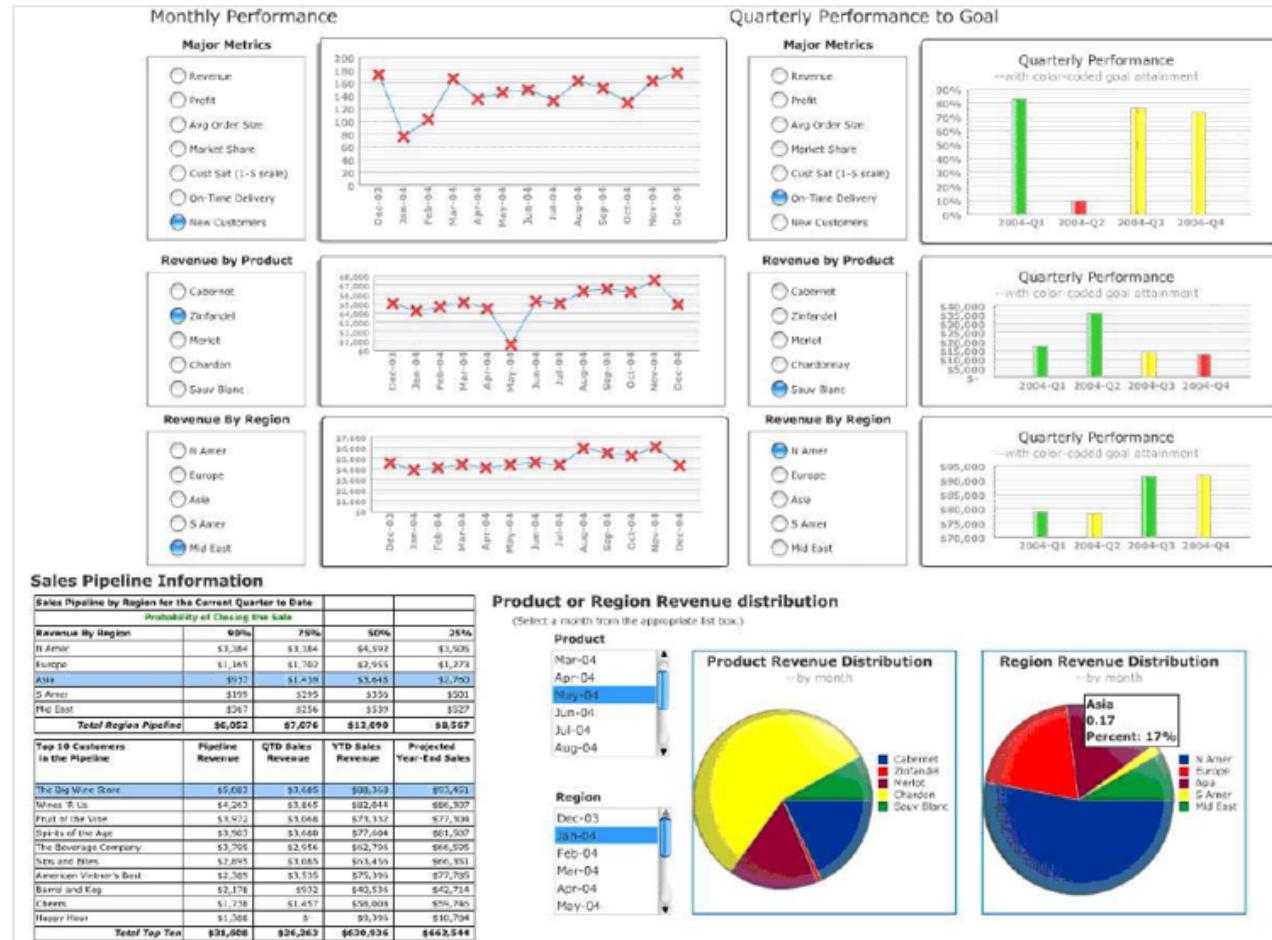
Common mistakes in dashboard design

- Exceeding the boundaries of a single page and requiring the viewer to scroll



Common mistakes in dashboard design

- Fragmenting data into separate screen



Common mistakes in dashboard design

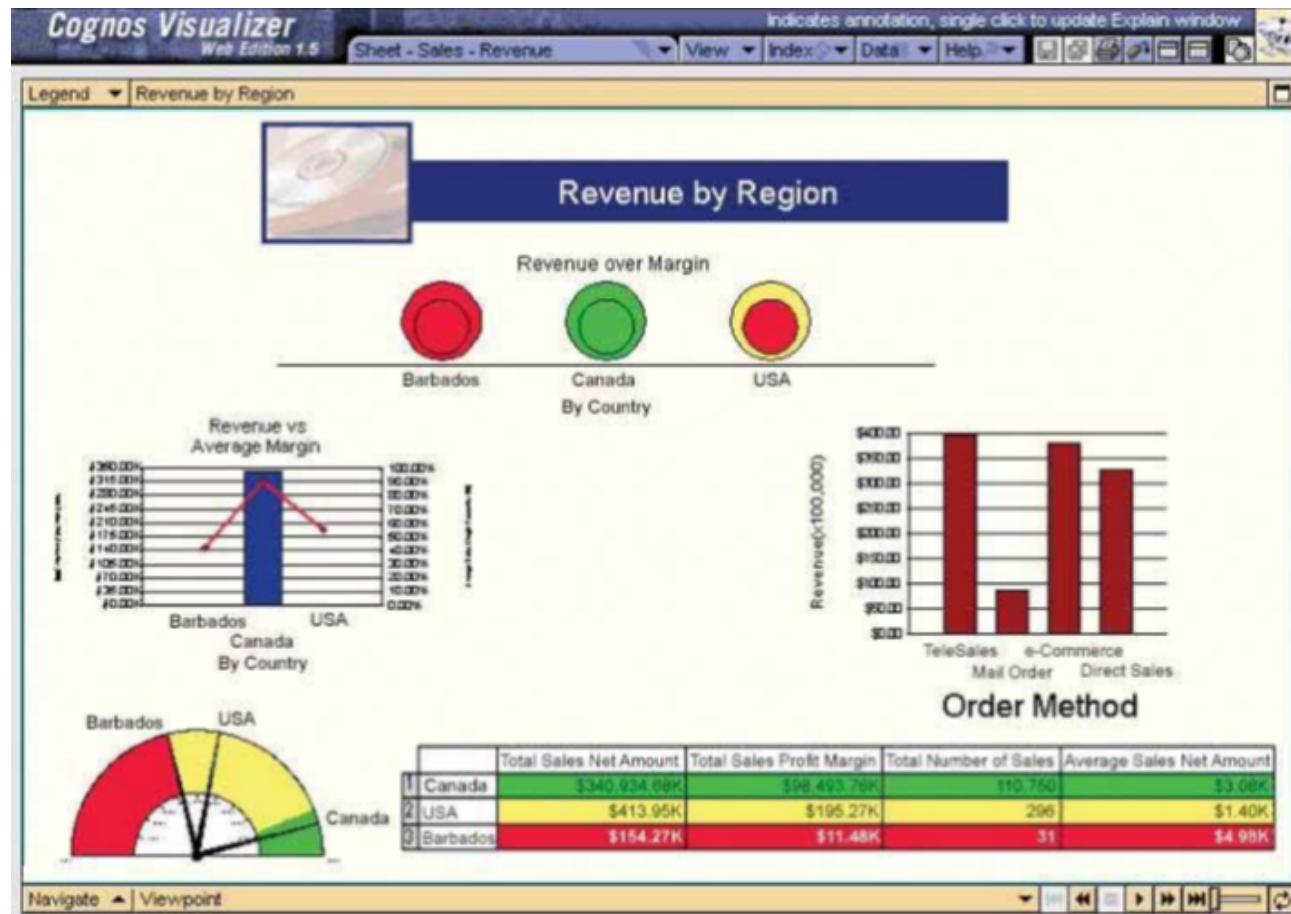
- Displaying excessive detail or precision

The screenshot displays the CELEQUEST Quality Yield Analysis dashboard. At the top, there's a navigation tree with 'Dashboards' selected, showing 'All Dashboards' and 'Bookmarked Dashboards'. The main area features several data visualizations and tables.

- Active Alert Messages:** A table listing alerts with columns for Subject, Importance, and Alert Activated. The last three rows are highlighted with red boxes: '0/16/2003 Yield Drop in ESS on 60-00...' (Normal), '0/16/2003 Yield Drop on 60-0001663...' (High), and '0/1/2003 Yield Drop in ESS on 60-000...' (Normal). The 'Alert Activated' column shows dates like '03/15/2004 17:10:08' repeated for the first two.
- Board Yield Barchart:** A bar chart comparing yield across four categories: Yield_1Yr, Yield_30Days, Yield_300Days, and Yield_Today. The Y-axis ranges from 0 to 110.
- Board Yield Change Barchart:** A bar chart showing yield change over time. The Y-axis ranges from -9 to 3.
- Tests Breakdown Pie:** A pie chart showing the distribution of test results across four categories.
- Board Yield Table Summary:** A table with columns for PRODUCT_NUM, PRODUCT_DESC, YIELD_TODAY, YIELD..., and others. The last row is highlighted with a red box: '60-000163-03 ASSY, INNER BOX W/MB, SW0600'.

Common mistakes in dashboard design

- Introducing meaningless variety



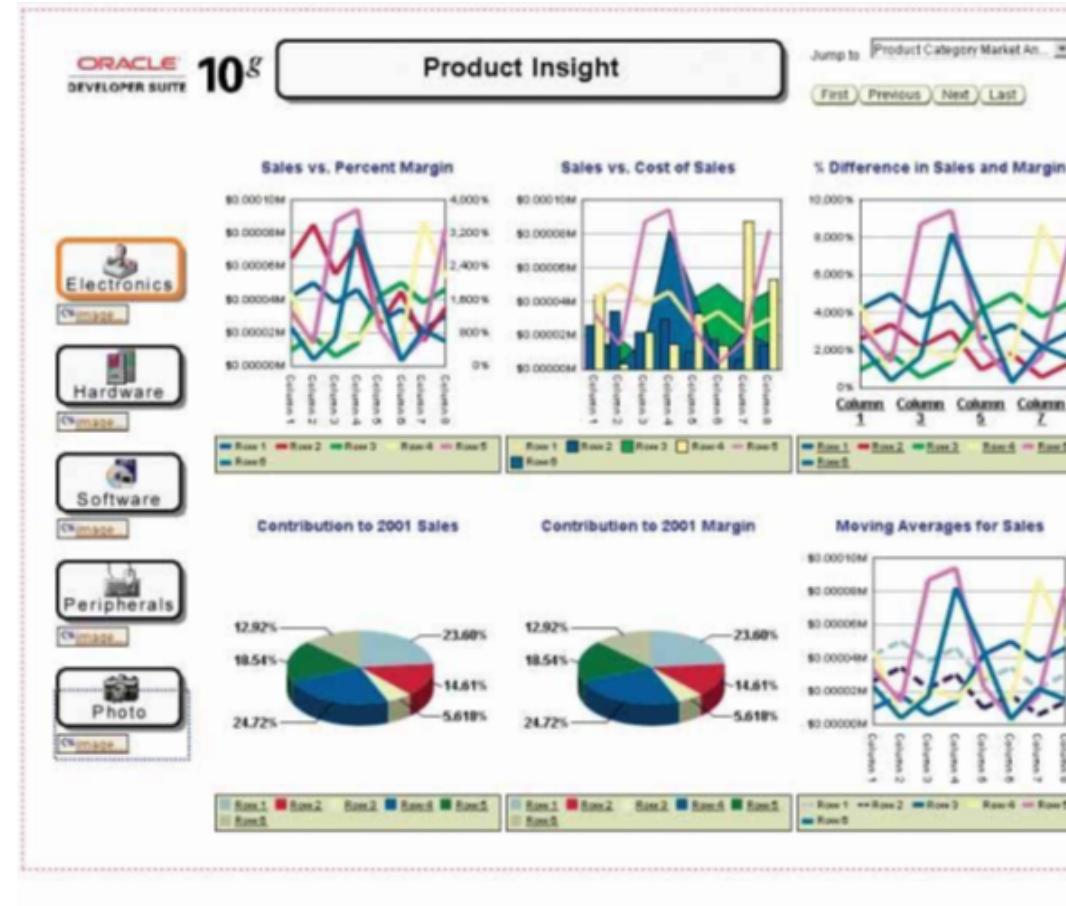
Common mistakes in dashboard design

- Arranging the data poorly



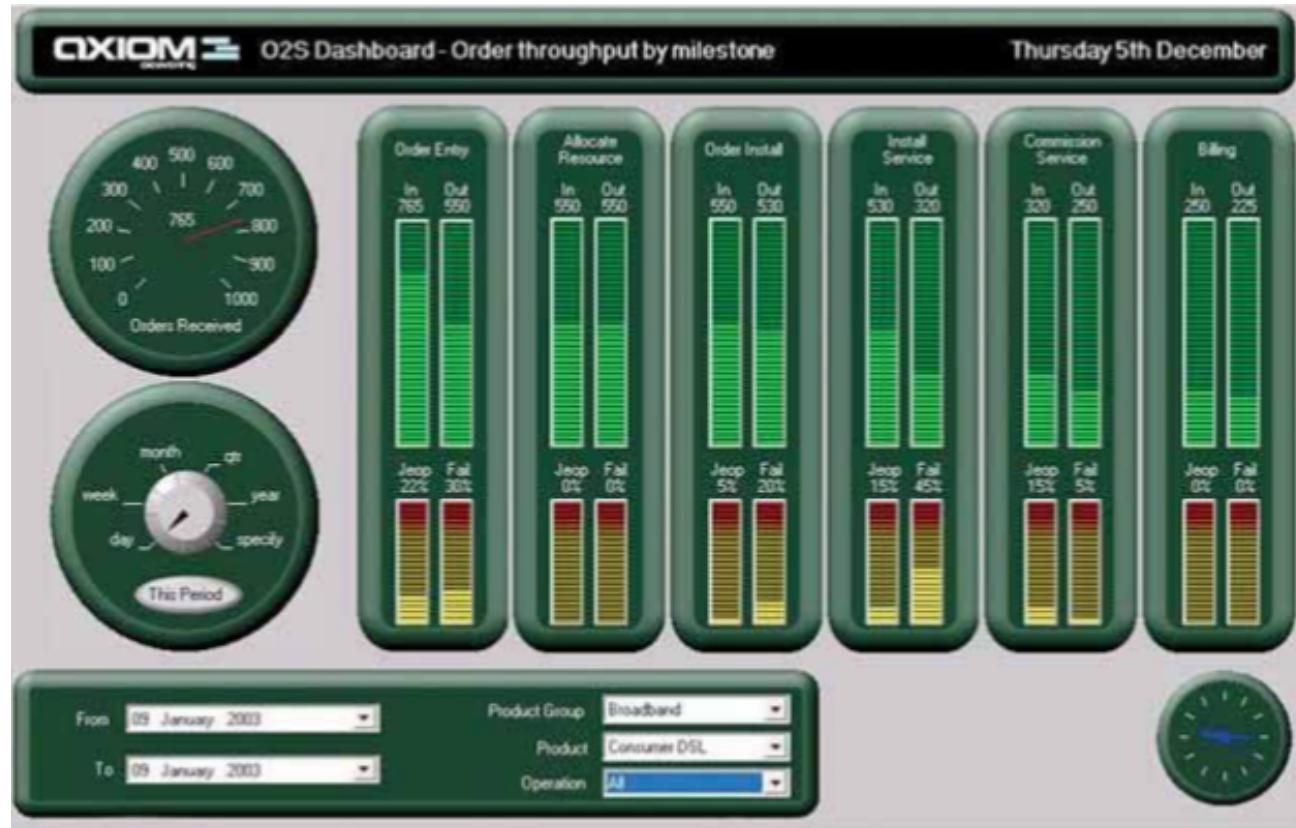
Common mistakes in dashboard design

- Highlighting important data ineffectively or not



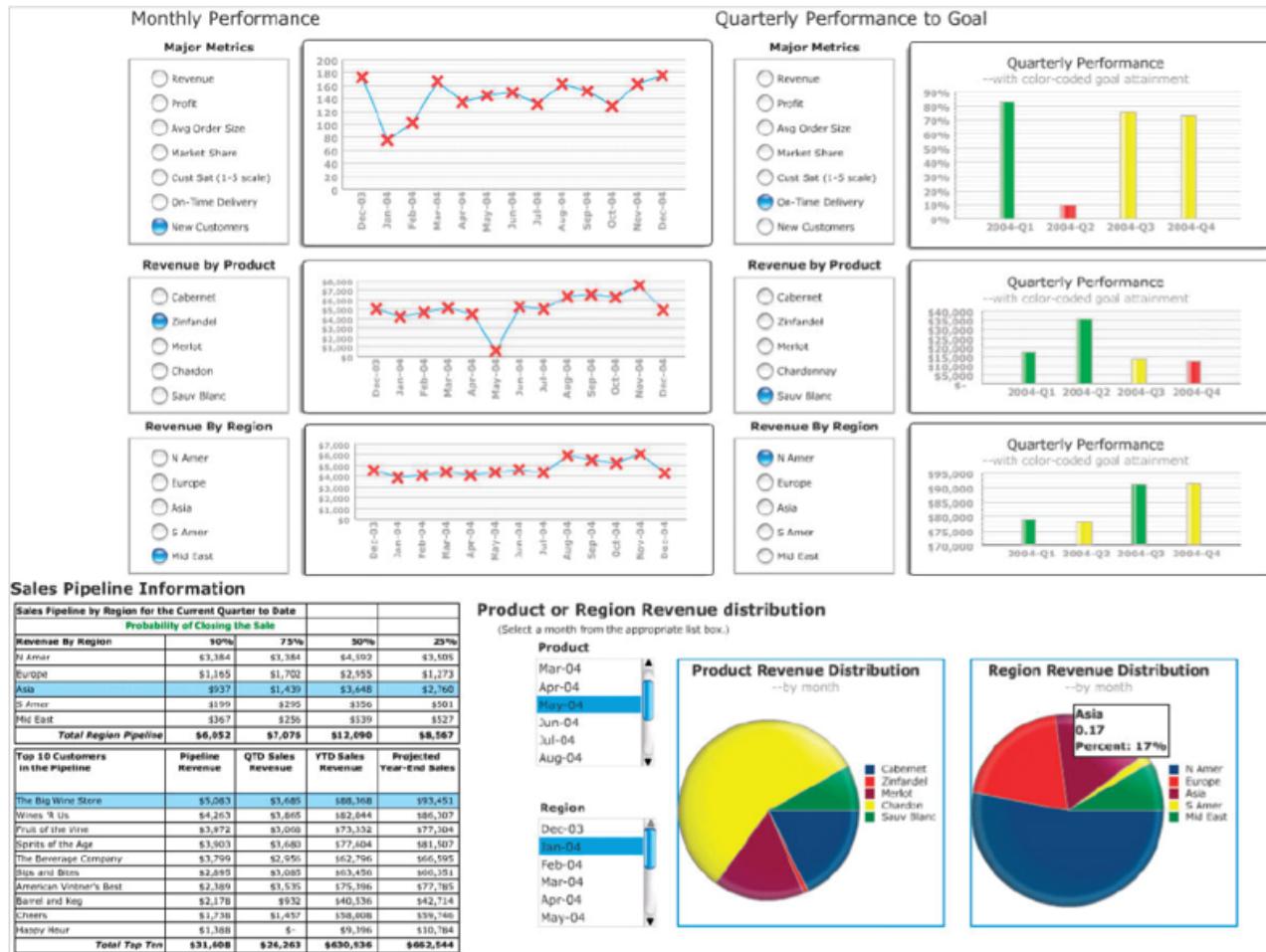
Common mistakes in dashboard design

- Cluttering the display with useless decoration



Common mistakes in dashboard design

- Misusing or overusing colour



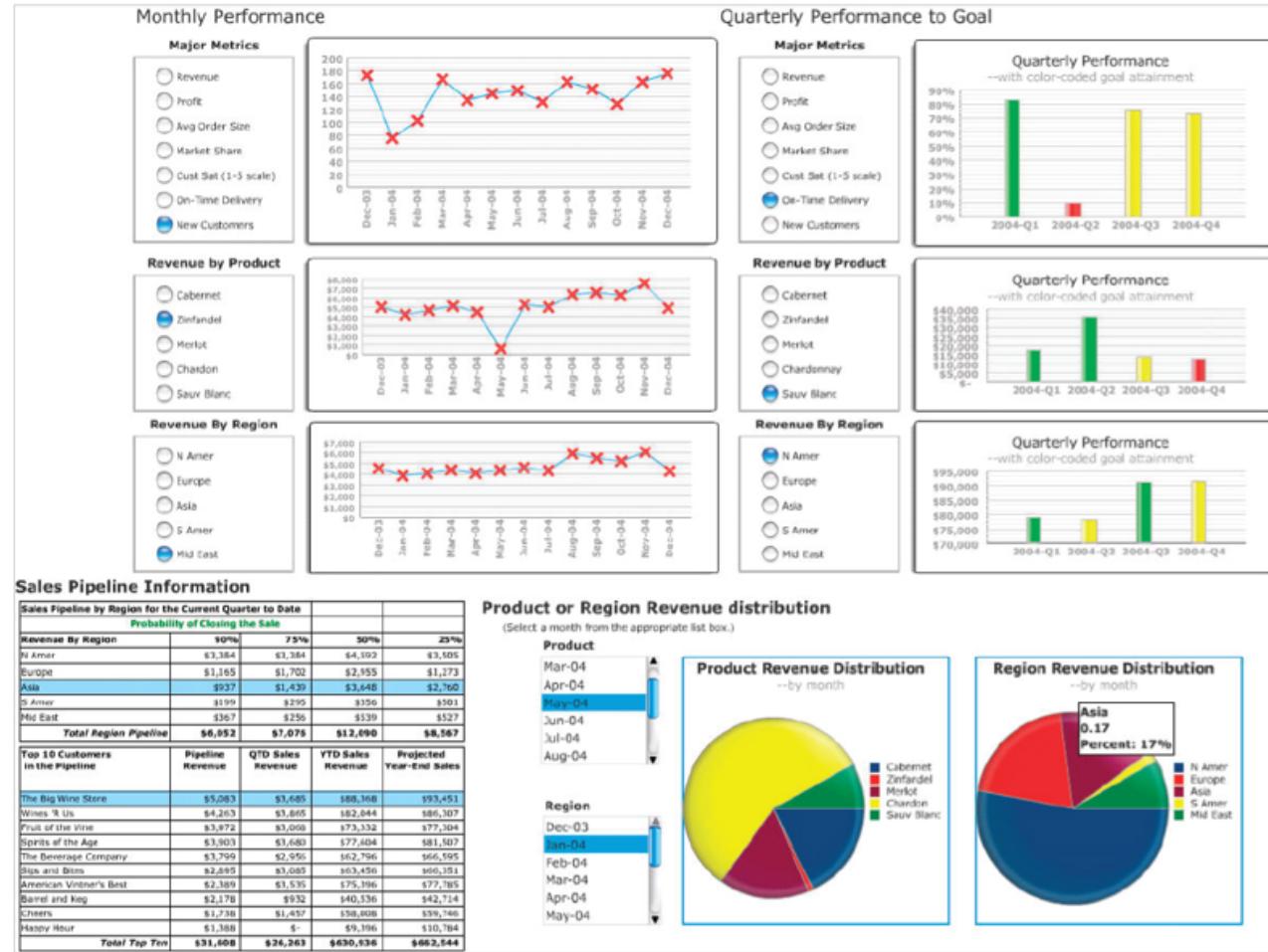
Common mistakes in dashboard design

- Designing an unattractive visual display



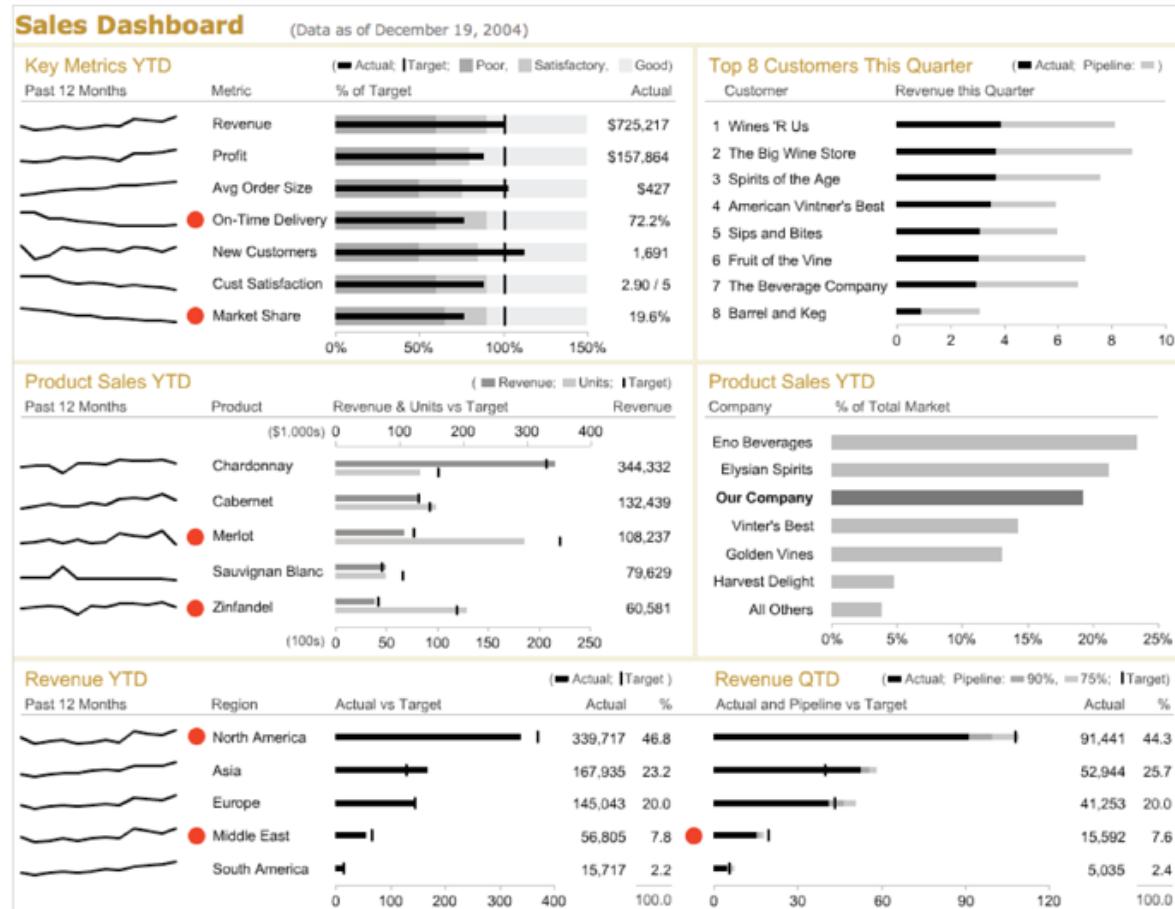
Common mistakes in dashboard design

- Design that failed to reveal KPIs effectively



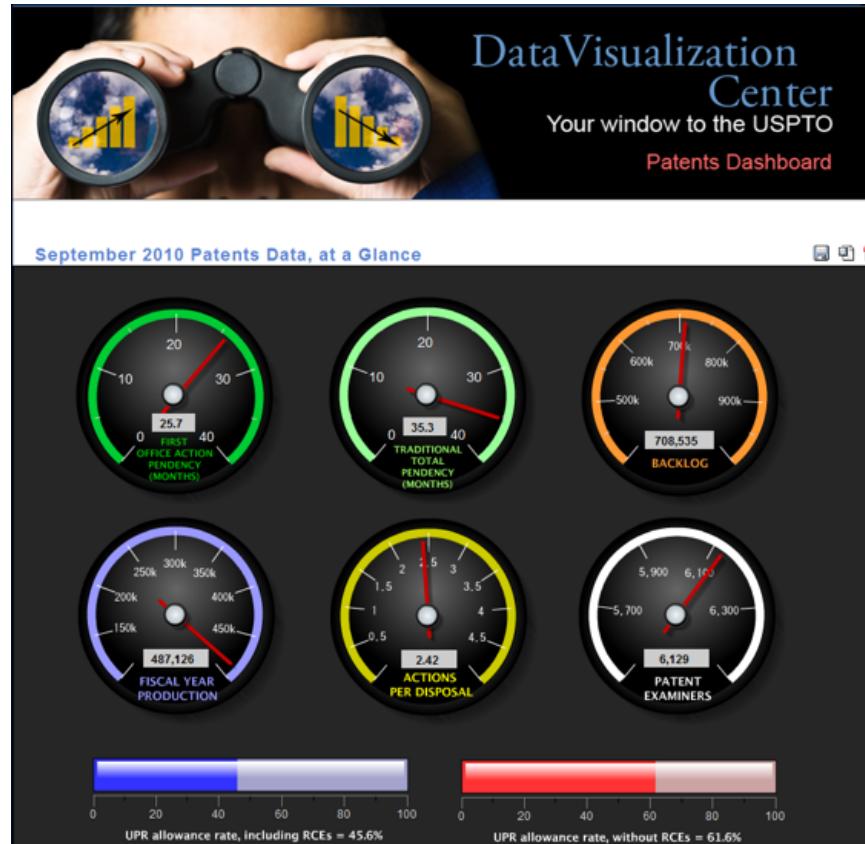
Alternative dashboard design

- Design that reveals KPIs effectively



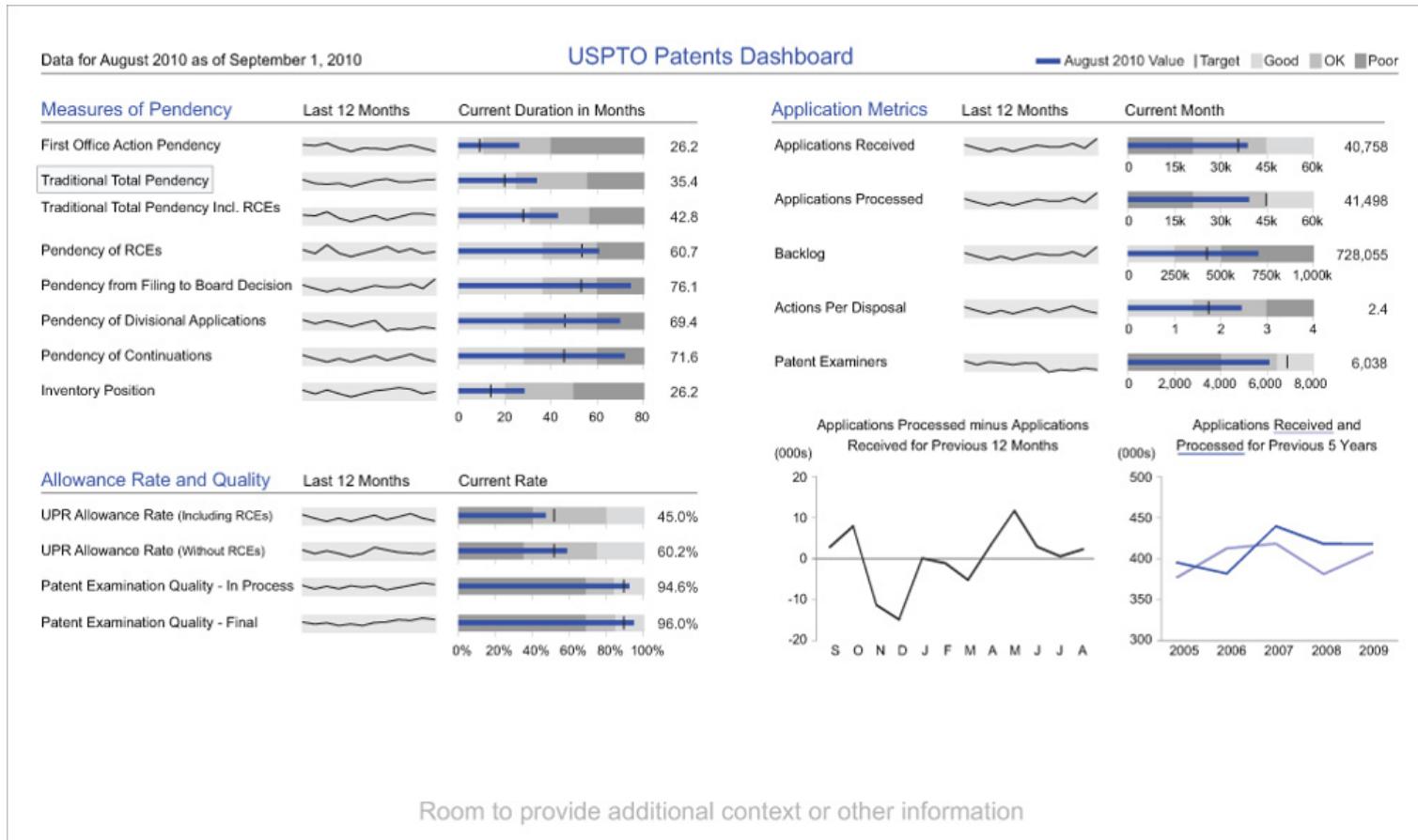
Common mistakes in dashboard design

- Design with poor layout and clarity



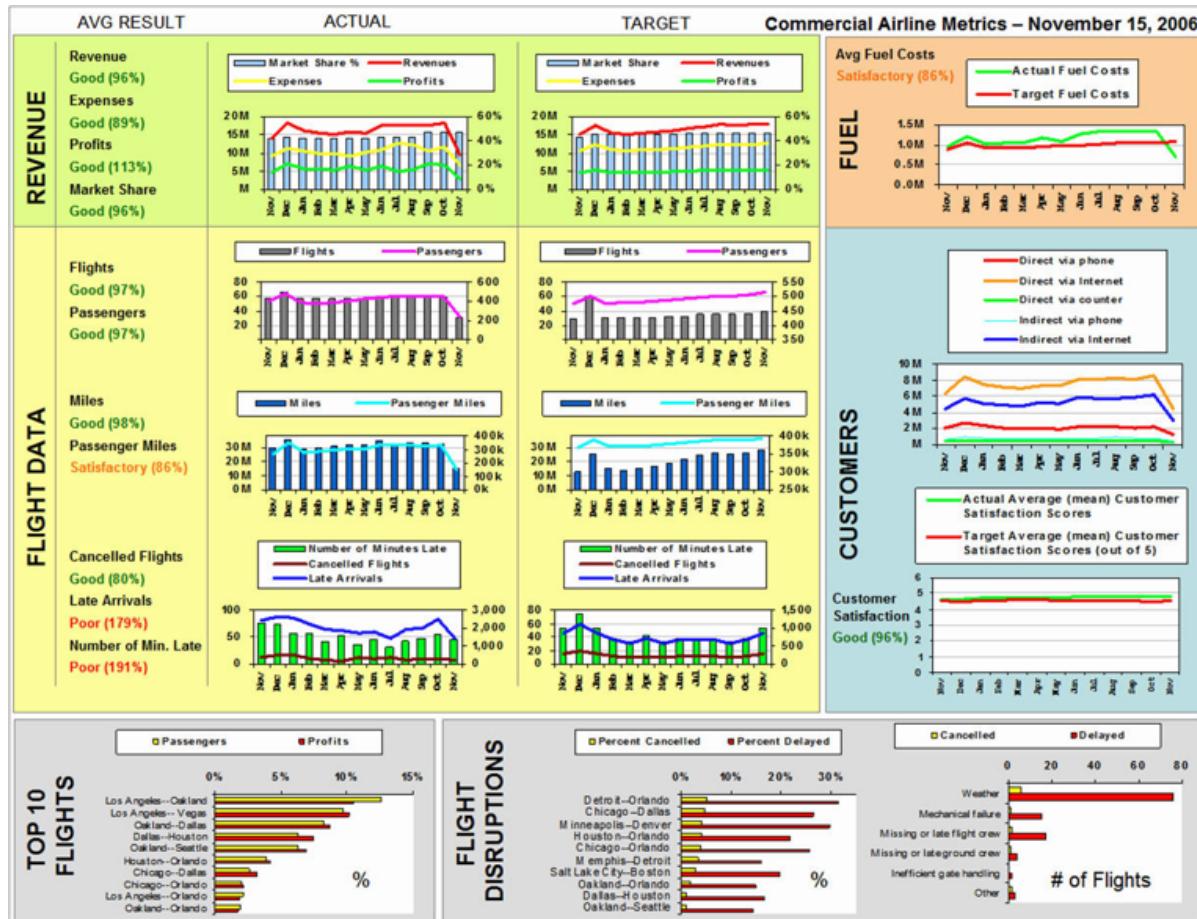
Alternative dashboard design

- Design with good layout and clarity



Common mistakes in dashboard design

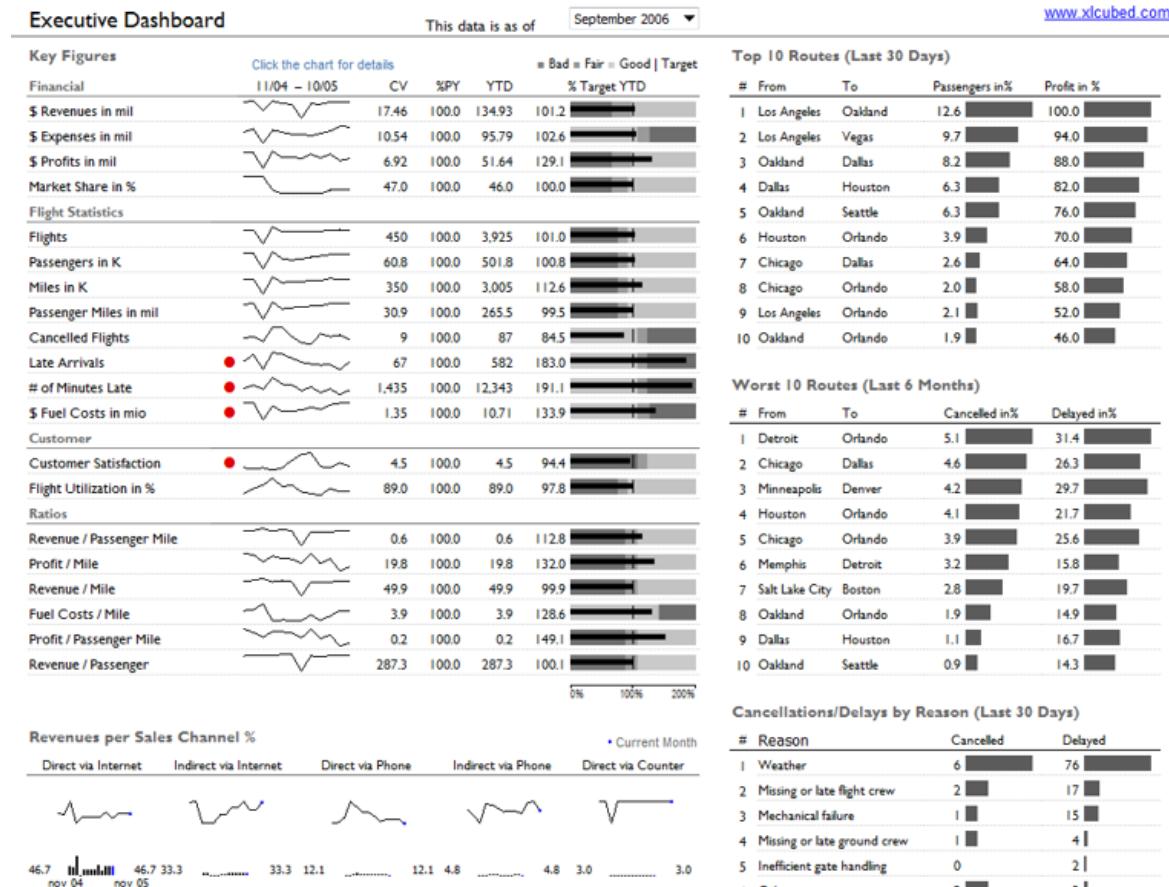
- Design with poor visual aestheticsness



Avoid This!

Alternative dashboard design

- Design with good visual aestheticsness



References

Dashboard Design

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(http://static.squarespace.com/static/52f42657e4b0b3416ff6b831/t/5310292ce4b08d35a87c9426/1393568044420/Guide_to_Creating_Dashboards.pdf)
- 5 Best Practices for Creating Effective Dashboards (<http://www.tableausoftware.com/learn/whitepapers/5-best-practices-for-effective-dashboards>)
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- Why Most Dashboards Fail (<http://www.perceptualedge.com/articles/misc/WhyMostDashboardsFail.pdf>)
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- Dashboard Design for at-a-glance monitoring (<http://courses.ischool.berkeley.edu/i247/s10/lectures/Few-Dashboards.pdf>)

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- Sparkline theory and practice (http://www.edwardtufte.com/bboard/q-and-a-fetch-msg?msg_id=0001OR)
- Best Practices for Scaling Sparklines in Dashboard
(http://www.perceptualedge.com/articles/visual_business_intelligence/best_practices_for_scaling_sparklines.pdf)
- Introducing Bandlines
(https://www.perceptualedge.com/articles/visual_business_intelligence/introducing_bandlines.pdf)