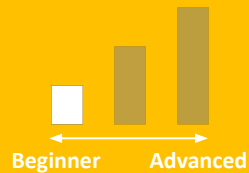




Power BI



Download Slide:
<https://bit.ly/3jgGZIV>





รัญญิรณวัชร ปรางค์อมรกุล (ชู)



KMITT
Bsc. Computer Science



THAMMASAT
Msc. Management Information System



NIDA
Mini Business Analysis & Data Science



DPU (Studying)
Phd. Information Technology



AIS
IT Specialist



DTAC
Asst. Manager, Customer Insight



SCB
Head of Analytics Development



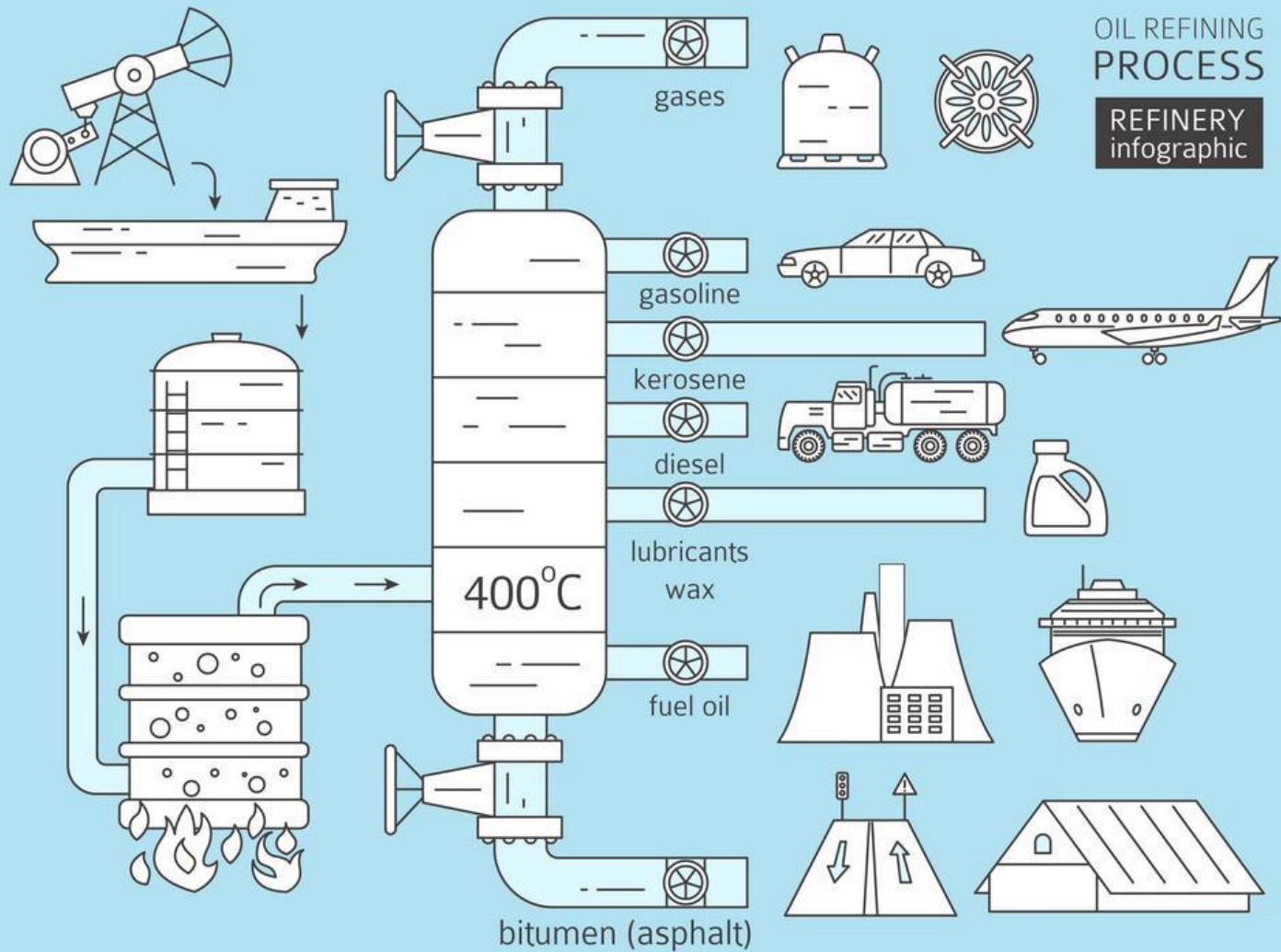
Deloitte
Associate Director,
Financial Advisory, Data Analytics

What's BI?



Data is the
new **oil** of the
21st century

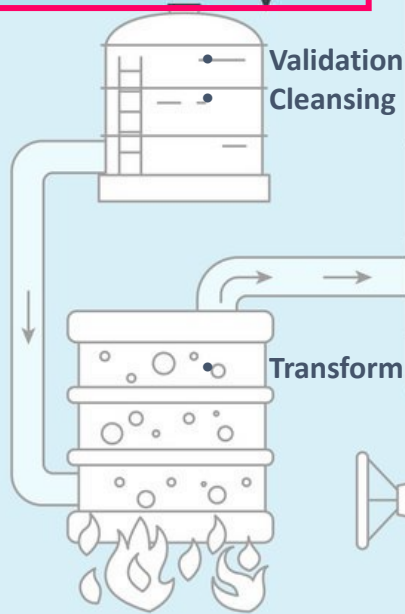




Input



Process



Validation
Cleansing

Transform

400°C

bitumen (asphalt)

gases

gasoline

kerosene

diesel

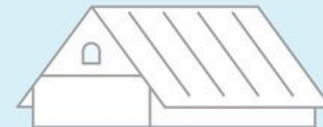
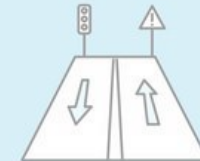
lubricants
wax

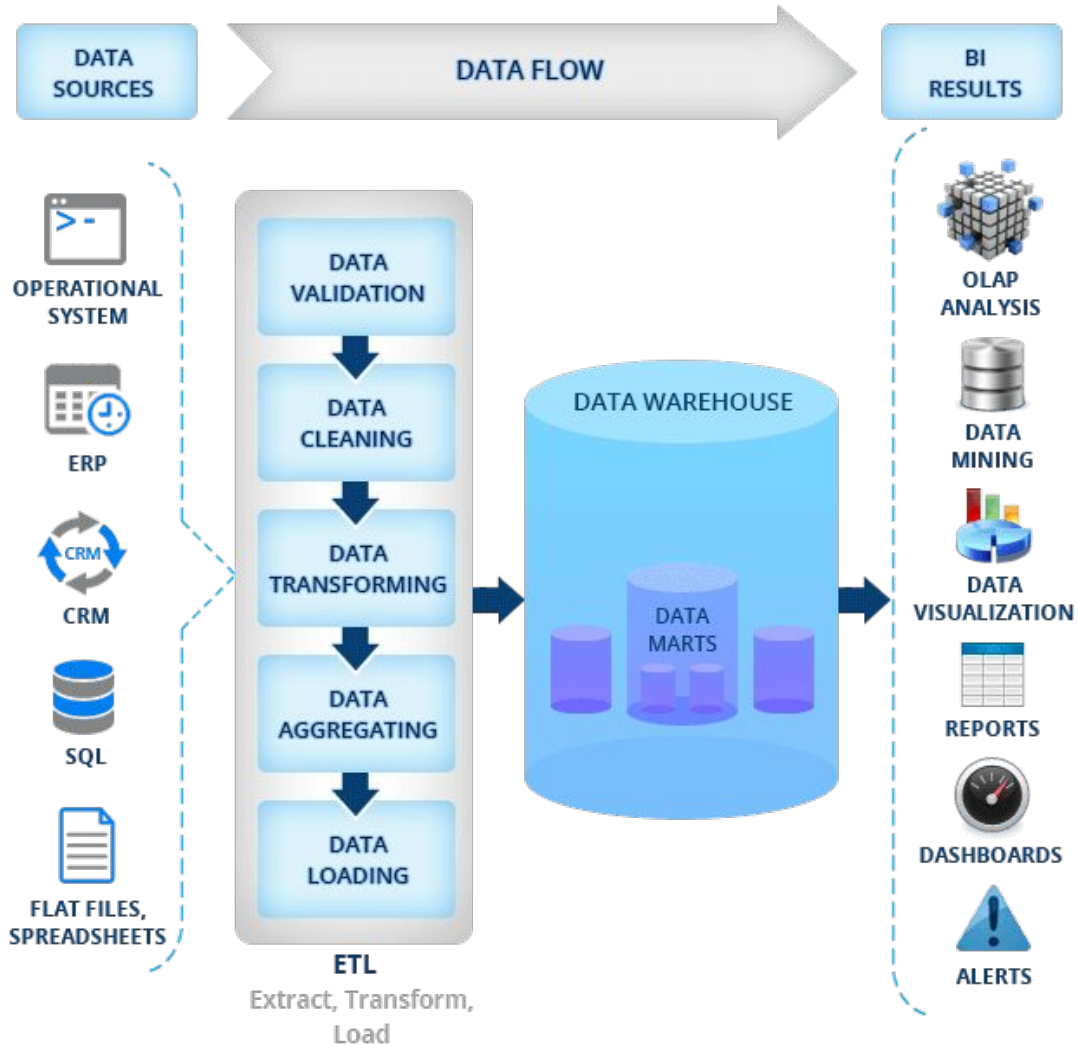
fuel oil

OIL REFINING
PROCESS

REFINERY
infographic

Output





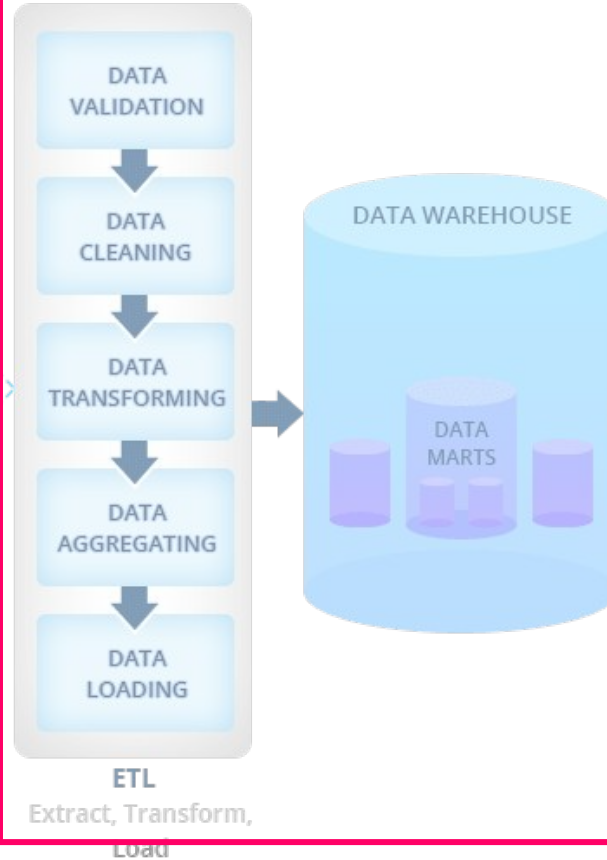
Input

DATA
SOURCES



DATA FLOW

Process



Output

BI
RESULTS



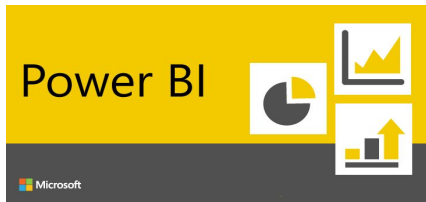
“Business intelligence (BI)

leverages software and services to transform data into actionable insights that inform an organization’s strategic and tactical business decisions.”



Howard Dresner, Gartner Analyst, 1989

A new generation of BI



3rd wave
End user BI

Analytics, Action, Automation



Everyone

2nd wave
Self-service BI

Why did it happen?



Analyst to end user

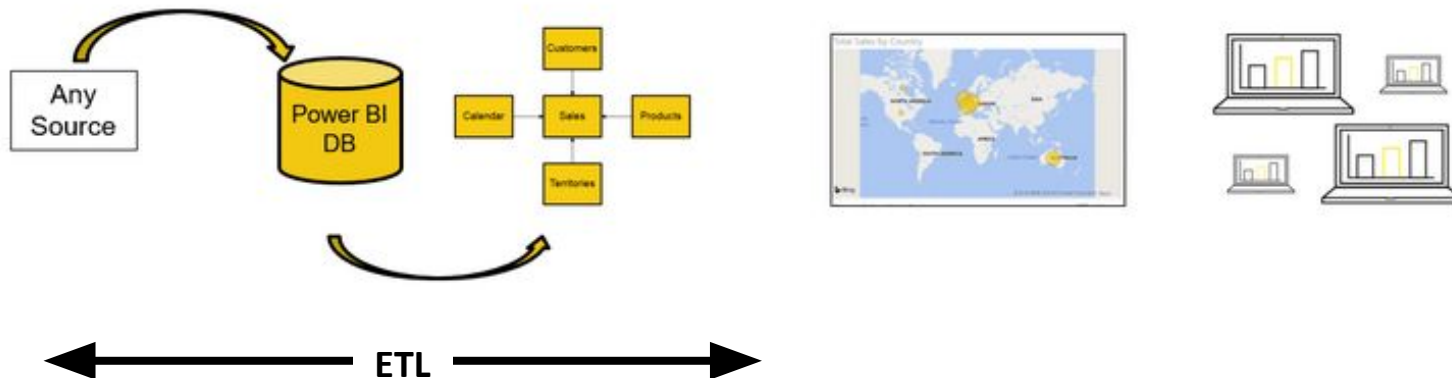
1st wave
Technical BI

What happened report?

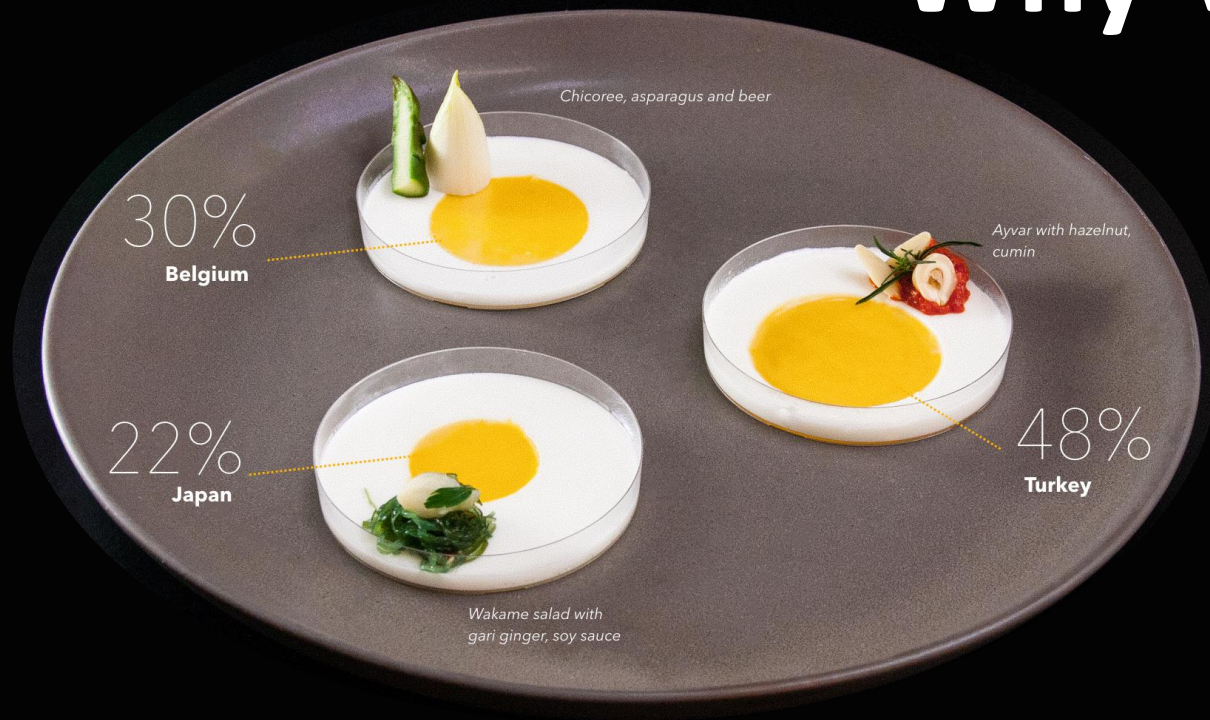


IT to end user

Step of Power BI



Why Visualize?



6 9 6

6 6 9

9 6 8

Where's 9?

6 9 6

6 6 9

9 6 8

Where's 9?

6 9 6 6 6 8 9 8 8 6 9 6 6 8 9 9 8 6 6 6
6 6 9 8 8 6 6 9 6 8 6 6 9 9 8 6 6 8 9 8
9 6 8 6 8 6 6 6 6 6 8 6 6 8 6 8 8 8 8 8
6 8 6 8 8 8 8 8 6 6 6 8 8 8 8 6 8 6 8 6
6 8 8 8 6 8 6 6 6 8 8 6 8 8 6 6 6 8 6 8
8 8 8 9 8 8 8 8 8 8 8 8 8 8 8 9 8 8 8 8
6 8 6 8 6 8 6 6 8 8 6 8 6 8 6 8 8 8 8 6
8 8 8 8 8 8 8 8 6 6 8 8 8 8 8 6 6 8 6 8
8 8 8 8 9 8 8 8 6 6 9 6 8 8 8 6 8 8 6 8
9 8 6 8 8 8 6 8 8 6 8 8 6 6 8 6 8 6 6 6
8 8 6 6 6 8 9 8 6 6 8 8 6 8 8 6 8 8 6 8
9 8 8 8 6 8 8 8 6 8 6 8 6 6 8 6 6 6 8 8
8 8 8 9 8 8 6 8 8 8 8 8 6 8 6 8 8 8 8 6
8 8 6 8 6 6 6 8 8 8 8 9 8 8 6 8 8 6 8 6
8 8 6 8 8 8 9 8 6 8 8 8 8 8 6 6 8 8 8 6
8 8 8 8 8 8 8 8 6 6 8 8 8 8 8 6 8 6 8 8
9 8 6 8 6 8 6 6 8 6 6 8 6 8 6 6 8 6 8 6
8 8 8 8 8 9 6 8 8 6 8 8 8 8 8 8 8 6 8 8
8 6 6 6 6 8 8 6 6 8 8 6 6 6 8 9 8 8 6 8
8 8 8 9 6 6 6 8 6 8 8 8 8 8 9 6 6 6 8 8

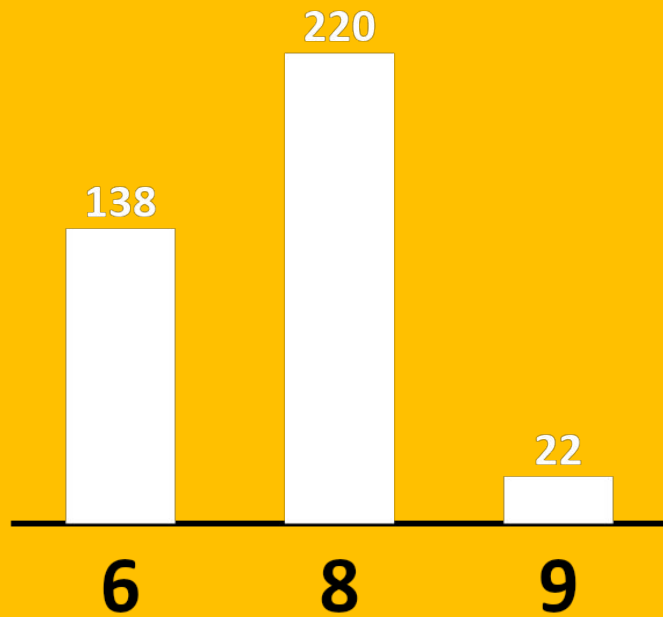
Where's 9?

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 6 | 6 | 6 | 6 | 8 | 9 | 8 | 8 | 6 | 9 | 6 | 6 | 8 | 6 | 9 | 8 | 6 | 6 | 6 |
| 6 | 6 | 9 | 8 | 8 | 6 | 6 | 6 | 6 | 8 | 6 | 6 | 9 | 6 | 8 | 6 | 6 | 8 | 9 | 8 |
| 9 | 6 | 8 | 6 | 8 | 6 | 6 | 6 | 6 | 6 | 8 | 6 | 6 | 8 | 6 | 8 | 8 | 8 | 8 | 8 |
| 6 | 8 | 6 | 8 | 8 | 8 | 8 | 8 | 6 | 6 | 6 | 8 | 8 | 8 | 8 | 6 | 8 | 6 | 8 | 6 |
| 6 | 8 | 8 | 8 | 6 | 8 | 6 | 6 | 6 | 8 | 8 | 6 | 8 | 8 | 6 | 6 | 6 | 8 | 6 | 8 |
| 8 | 8 | 8 | 9 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 9 | 8 | 8 | 8 | 8 |
| 6 | 8 | 6 | 8 | 6 | 8 | 6 | 6 | 8 | 8 | 6 | 8 | 6 | 8 | 6 | 8 | 8 | 8 | 8 | 6 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 6 | 6 | 8 | 8 | 8 | 8 | 8 | 6 | 6 | 8 | 6 | 8 |
| 8 | 8 | 8 | 8 | 9 | 8 | 8 | 8 | 6 | 6 | 9 | 6 | 8 | 8 | 8 | 6 | 8 | 8 | 6 | 8 |
| 9 | 8 | 6 | 8 | 8 | 8 | 6 | 8 | 8 | 6 | 8 | 8 | 6 | 6 | 8 | 6 | 8 | 6 | 6 | 6 |
| 8 | 8 | 6 | 6 | 6 | 8 | 9 | 8 | 6 | 6 | 8 | 8 | 6 | 8 | 8 | 6 | 8 | 8 | 6 | 8 |
| 9 | 8 | 8 | 8 | 6 | 8 | 8 | 8 | 6 | 8 | 6 | 8 | 6 | 6 | 8 | 6 | 6 | 6 | 8 | 8 |
| 8 | 8 | 8 | 9 | 8 | 8 | 6 | 8 | 8 | 8 | 8 | 8 | 6 | 8 | 6 | 8 | 8 | 8 | 8 | 6 |
| 8 | 8 | 6 | 8 | 6 | 6 | 6 | 8 | 8 | 8 | 8 | 9 | 8 | 8 | 6 | 8 | 8 | 6 | 8 | 6 |
| 8 | 8 | 6 | 8 | 8 | 8 | 9 | 8 | 6 | 8 | 8 | 8 | 8 | 8 | 6 | 6 | 8 | 8 | 8 | 6 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 6 | 6 | 8 | 8 | 8 | 8 | 8 | 6 | 8 | 6 | 8 | 8 |
| 9 | 8 | 6 | 8 | 6 | 8 | 6 | 6 | 8 | 6 | 6 | 8 | 6 | 8 | 6 | 6 | 8 | 6 | 8 | 6 |
| 8 | 8 | 8 | 8 | 8 | 9 | 6 | 8 | 8 | 6 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 6 | 8 | 8 |
| 8 | 6 | 6 | 6 | 6 | 8 | 8 | 6 | 6 | 8 | 8 | 6 | 6 | 6 | 8 | 9 | 8 | 8 | 6 | 8 |
| 8 | 8 | 8 | 9 | 6 | 6 | 6 | 8 | 6 | 8 | 8 | 8 | 8 | 8 | 9 | 6 | 6 | 6 | 8 | 8 |

Where's 9?

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 8 | 8 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 9 | 9 |
| 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |

Where's 9?

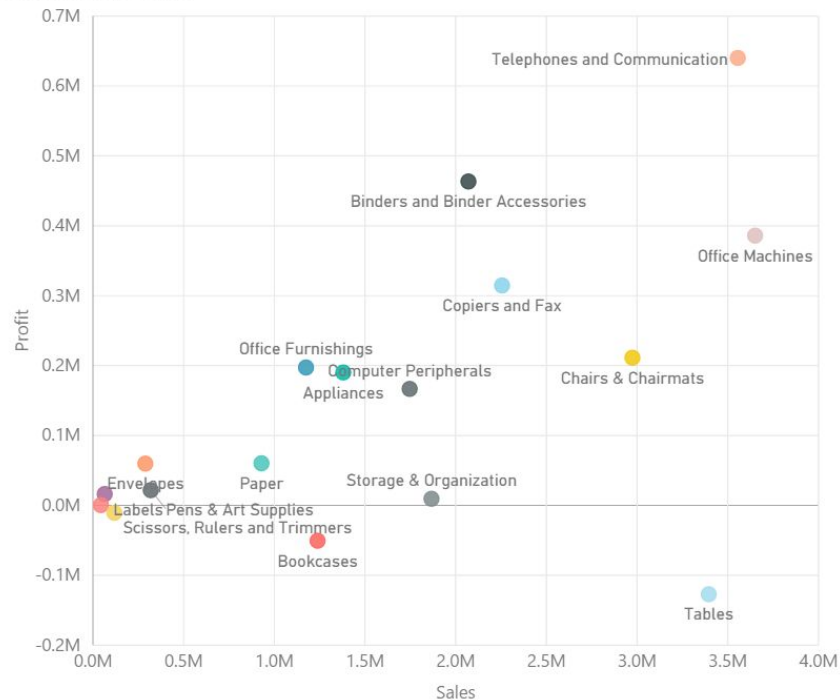


Where's 9?

Why visualization?

| Category | Sales | Profit |
|--------------------------------|--------------|-------------|
| Appliances | 1,380,025.62 | 190,138.91 |
| Binders and Binder Accessories | 2,069,940.09 | 463,321.64 |
| Bookcases | 1,238,471.60 | -50,614.13 |
| Chairs & Chairmats | 2,974,242.23 | 211,188.01 |
| Computer Peripherals | 1,746,036.45 | 166,603.07 |
| Copiers and Fax | 2,255,437.19 | 314,610.14 |
| Envelopes | 288,668.60 | 59,707.80 |
| Labels | 64,716.32 | 16,211.12 |
| Office Furnishings | 1,174,637.73 | 197,218.55 |
| Office Machines | 3,650,587.36 | 385,906.40 |
| Paper | 928,997.06 | 60,214.44 |
| Pens & Art Supplies | 318,489.07 | 21,680.74 |
| Rubber Bands | 43,513.44 | 322.49 |
| Scissors, Rulers and Trimmers | 117,802.18 | -10,590.34 |
| Storage & Organization | 1,866,441.74 | 9,420.00 |
| Tables | 3,395,153.29 | -127,160.04 |
| Telephones and Communication | 3,555,295.50 | 640,058.07 |

Sales and Profit by Category



Data Types

Quantitative - Anything that has exact numbers or measurement.

For example, Effort in points: 0, 1, 2, 3, 5, 8, 13.

Duration in days: 1, 4, 666.

Qualitative / Ordered - Anything that can be compared and ordered.

User Story Priority: Must Have, Great, Good, Not Sure.

Days: Mon, Tue, Wed, Thu, Fri, Sat, Sun.

Categorical - Everything else.

Entity types: Bugs, Stories, Features, Test Cases.

Fruits: Apples, Oranges, Plums.

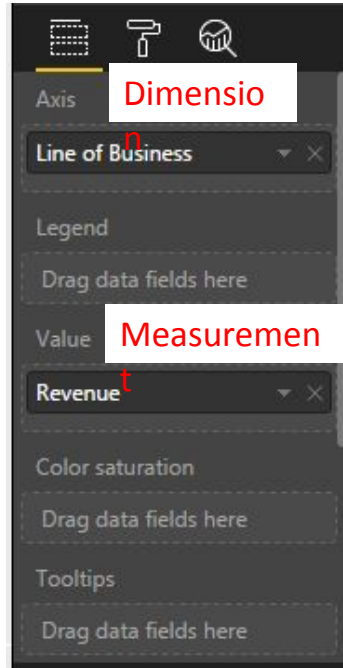
Dimension & Measurement

| | Dimension | Measurement | |
|-----------------------------------|--------------------------------|--------------|-------------|
| | Category | Sales | Profit |
| Fact Row <input type="checkbox"/> | Appliances | 1,380,025.62 | 190,138.91 |
| Fact Row <input type="checkbox"/> | Binders and Binder Accessories | 2,069,940.09 | 463,321.64 |
| Fact Row <input type="checkbox"/> | Bookcases | 1,238,471.60 | -50,614.13 |
| . | Chairs & Chairmats | 2,974,242.23 | 211,188.01 |
| . | Computer Peripherals | 1,746,036.45 | 166,603.07 |
| . | Copiers and Fax | 2,255,437.19 | 314,610.14 |
| | Envelopes | 288,668.60 | 59,707.80 |
| | Labels | 64,716.32 | 16,211.12 |
| | Office Furnishings | 1,174,637.73 | 197,218.55 |
| | Office Machines | 3,650,587.36 | 385,906.40 |
| | Paper | 928,997.06 | 60,214.44 |
| | Pens & Art Supplies | 318,489.07 | 21,680.74 |
| | Rubber Bands | 43,513.44 | 322.49 |
| | Scissors, Rulers and Trimmers | 117,802.18 | -10,590.34 |
| | Storage & Organization | 1,866,441.74 | 9,420.00 |
| | Tables | 3,395,153.29 | -127,160.04 |
| | Telephones and Communication | 3,555,295.50 | 640,058.07 |

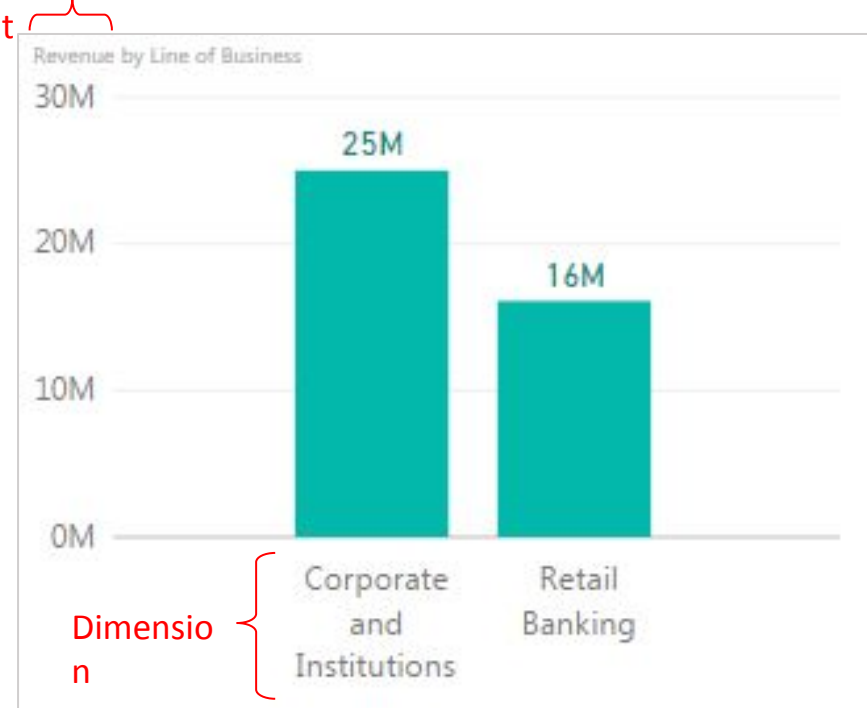
Dimension & Measurement

Dimension Measurement

| A ^B _C Line of Business | | 1.2 Revenue |
|--|--|-------------|
| Corporate and Institutions | | 29585.76 |
| Corporate and Institutions | | 22971.12 |
| Corporate and Institutions | | 24268.48 |
| Retail Banking | | 20327.71 |
| Retail Banking | | 24139.15 |
| Corporate and Institutions | | 20755.84 |
| Corporate and Institutions | | 19159.61 |
| Corporate and Institutions | | 17784.39 |
| Retail Banking | | 21316.97 |
| Corporate and Institutions | | 20848.67 |
| Corporate and Institutions | | 19111.28 |
| Corporate and Institutions | | 20455.65 |
| Corporate and Institutions | | 17306.88 |
| Corporate and Institutions | | 16356.98 |
| Corporate and Institutions | | 16999.75 |
| Corporate and Institutions | | 17390.55 |
| Corporate and Institutions | | 17904.86 |



Measurement



Acquisition

- Data Source
- Power Query
- Data types & Category
- Data Extracting (Split, Extract, Merge, Join, etc.)
- Data Transformation (Transpose, Pivot, etc.)
- Data Cleansing (Remove dup, filter, replace, etc.)
- Data Summarization (Grouping, count rows)
- Column Calculation (Custom, conditional column)

DAX

- Calculate column
- Calculate measure
- Syntax & Operator
- Aggregate function
- Counting function
- Logical function (If, Switch)
- Text function
- Date time function
- Calendar
- Filter function

Visualization

- Dashboard Design
- Types of Visualization
- Data Hierarchy (Drill down, up)
- Condition Formatting
- Advance filtering (Top-N)
- Slicer
- Advanced Analytics (trendline, forecast)
- Drill through
- Visual Interaction

Data Model

- Data Model / Schema
- Table Relationship
- Database Normalization

Sharing

- Publish
- Role Management
- Power BI Services
- Schedule Refresh
- Mobile view

Dashboard Design

2015



2016

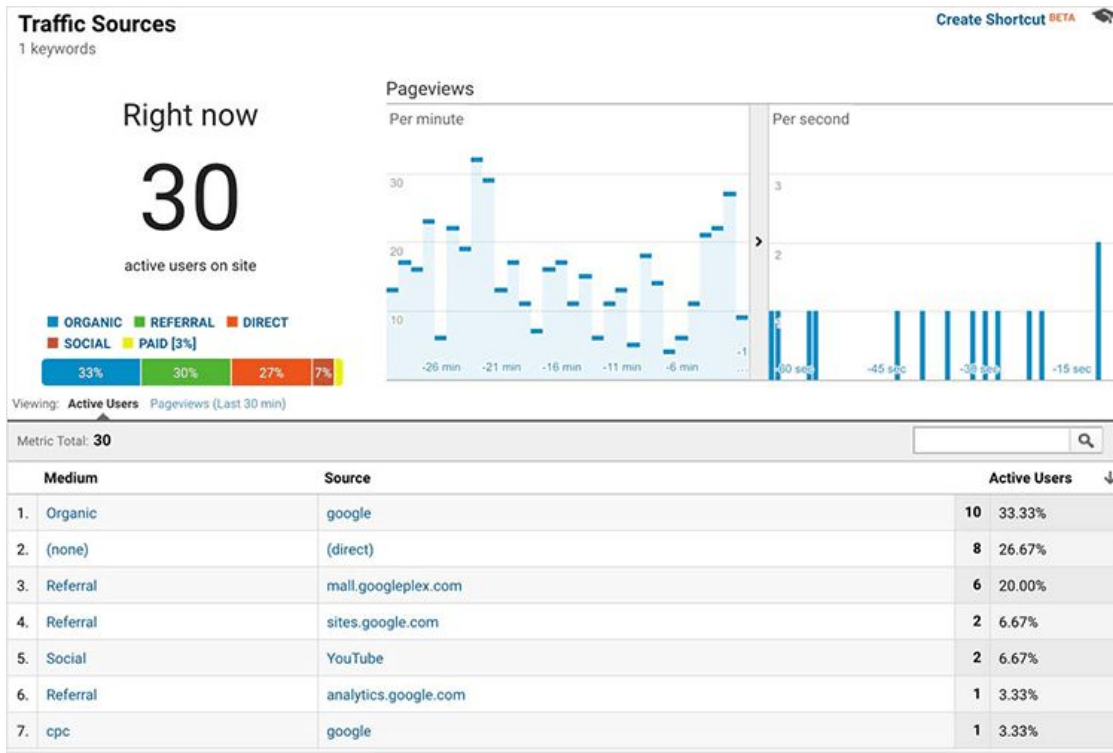


Future

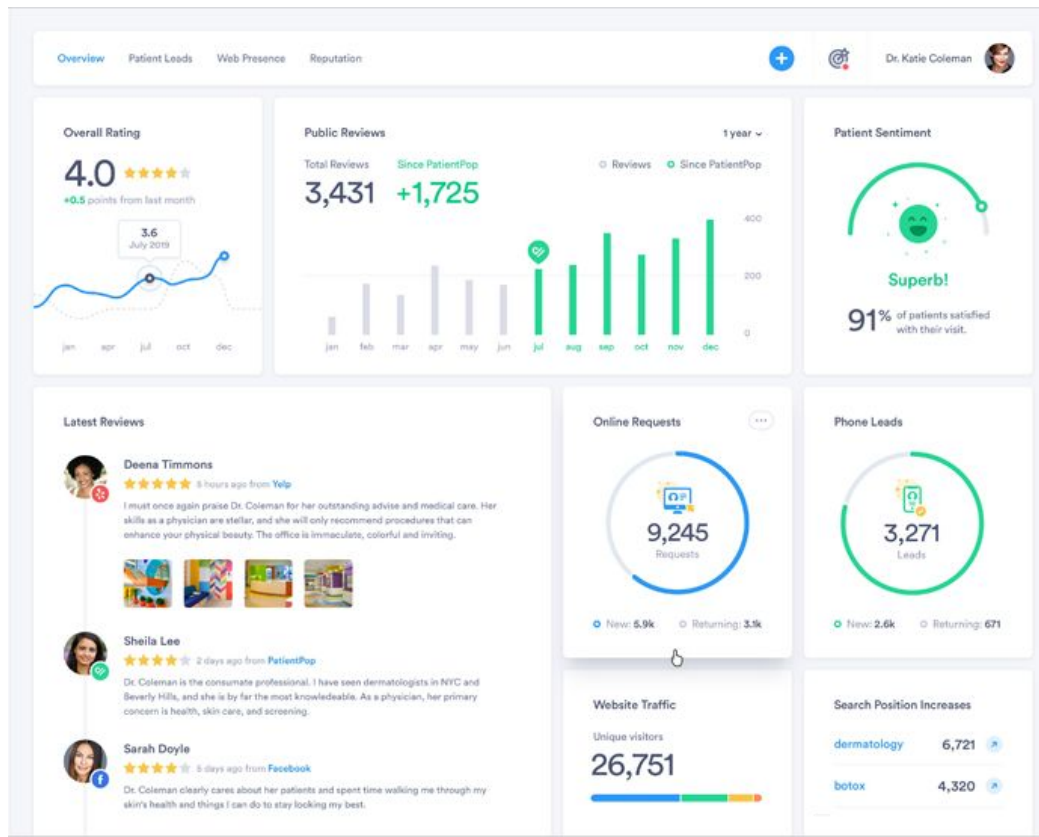


1. Define the purpose

Operational Dashboard



Analytics Dashboard



2. Chose the right visual

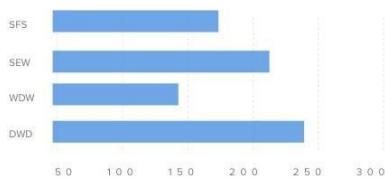
Compare

Static

Column chart



Bar chart



Over Time

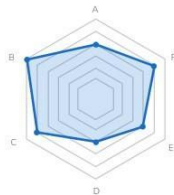
Line chart



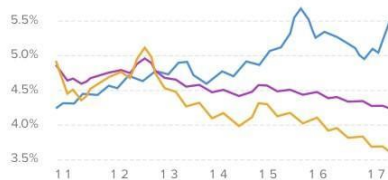
Column overlap chart



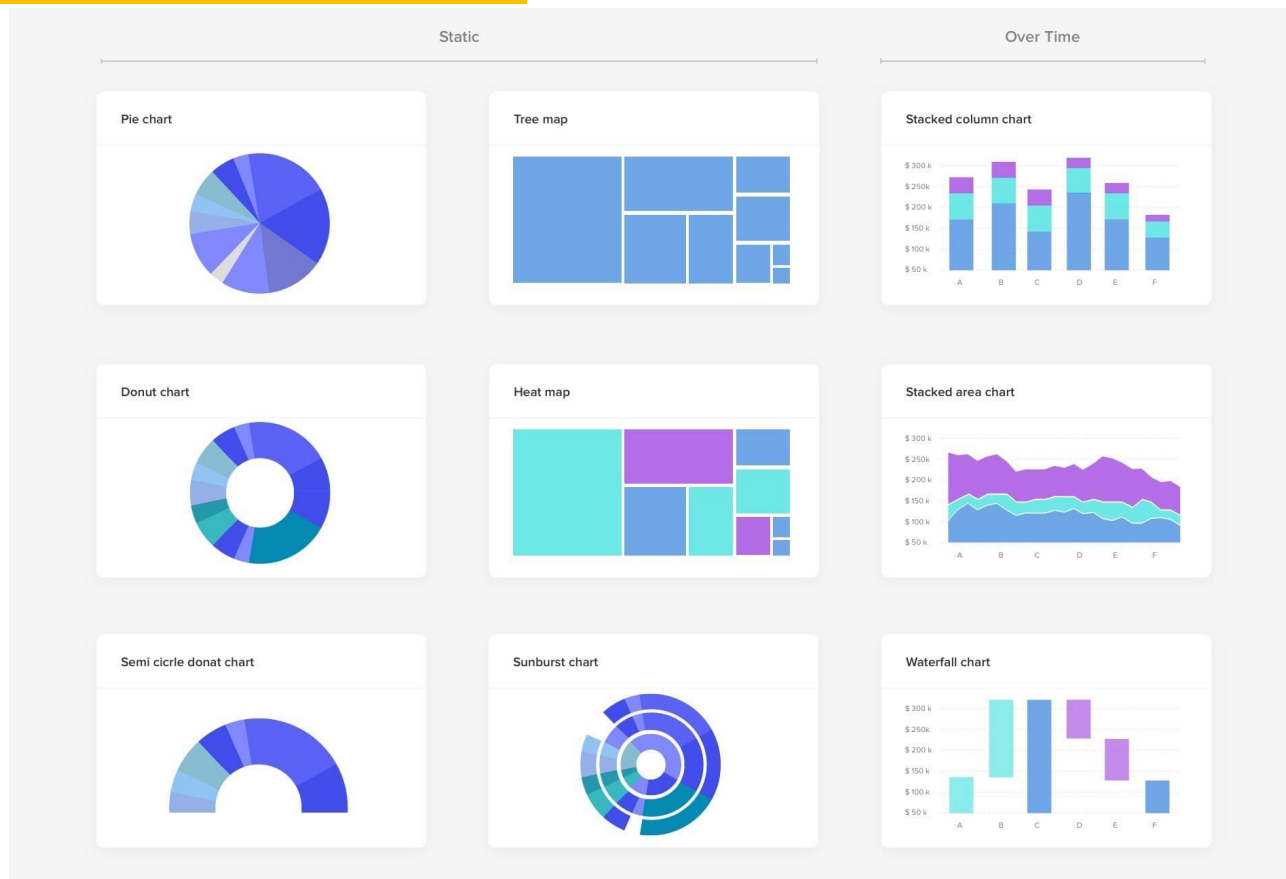
Circular area chart



Line chart (several items)



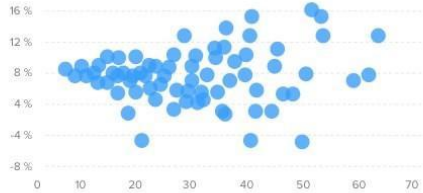
See parts of the whole



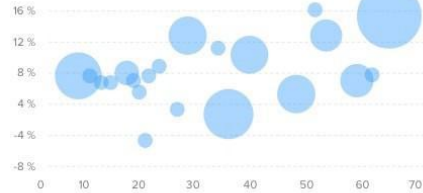
See relationship

Static

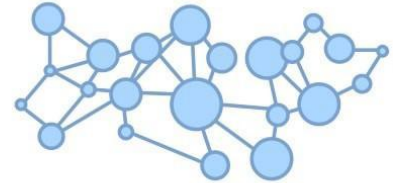
Scatter chart



Bubble chart



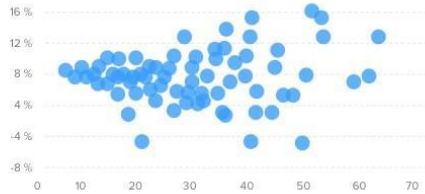
Network Diagram



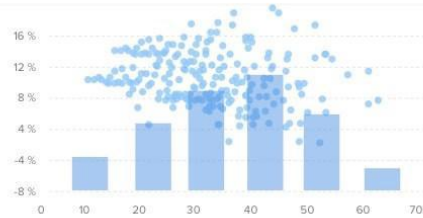
Distribution

Static

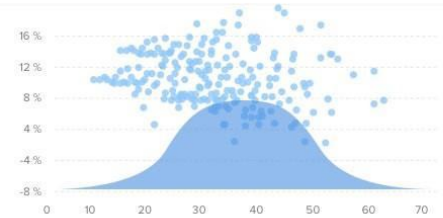
Scatter chart



Histogram chart

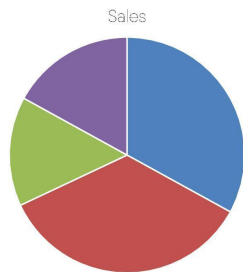


Bell curve



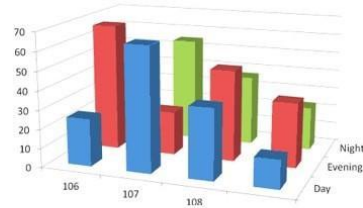
Don't

Don't



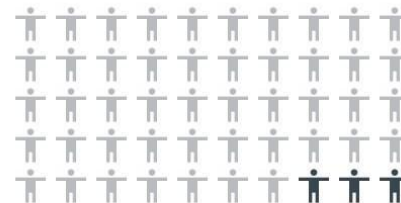
Don't

3D charts



Don't

?????????



Relationship

Static



Scatter chart



Bubble chart



Network Diagram

Comparison

Static



Column chart



Bar chart



Column overlap chart



Circular area chart

Over Time



Line chart

Composition

Static



Pie/Donut chart



Tree map



Heat map



Sunburst chart

Over Time



Stacked column chart



Stacked area chart



Waterfall chart

Distribution

Static



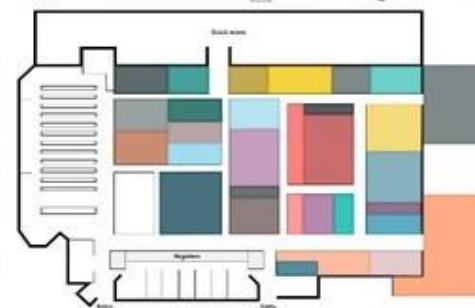
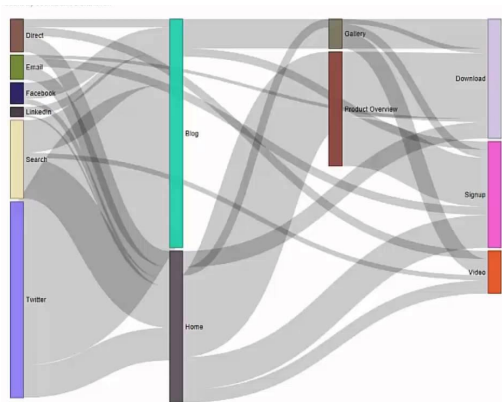
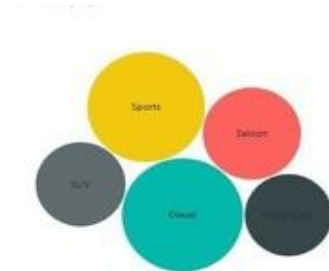
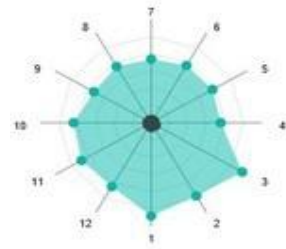
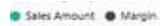
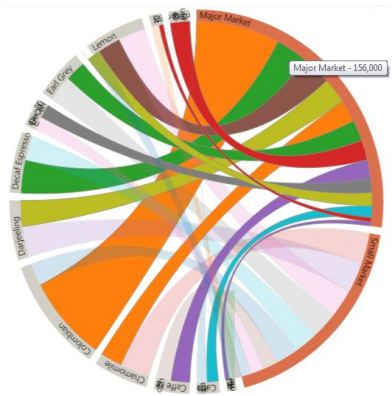
Scatter chart



Histogram chart



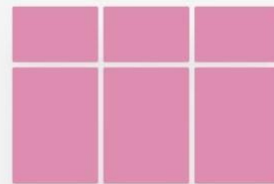
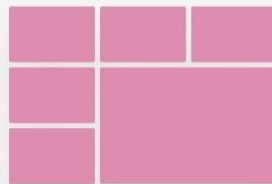
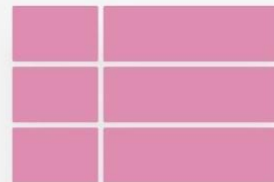
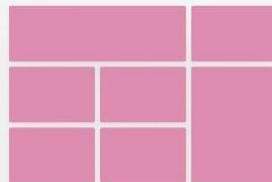
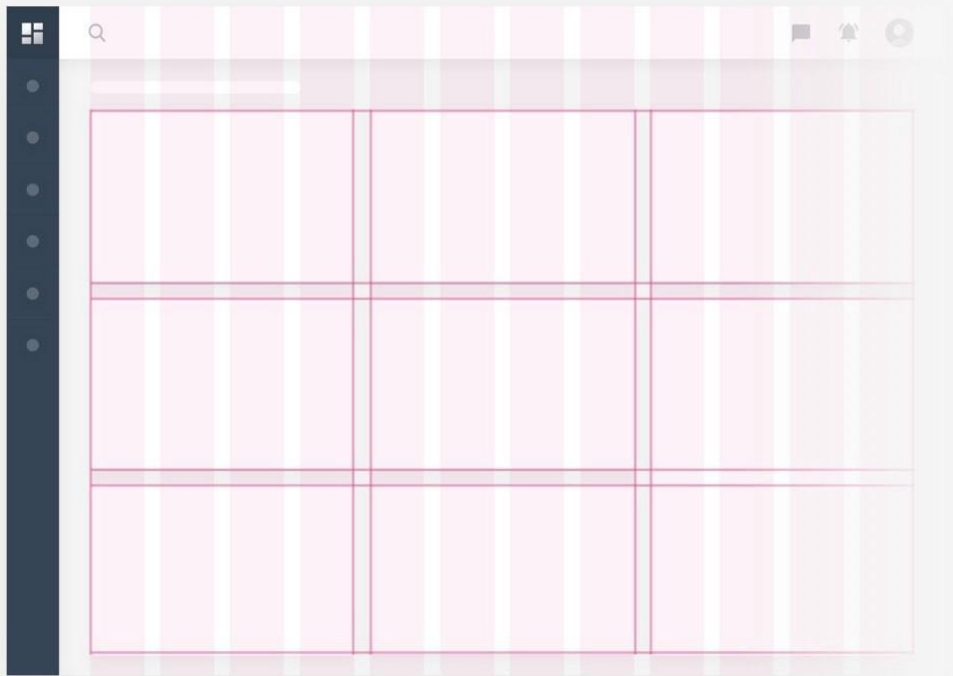
Bell curve



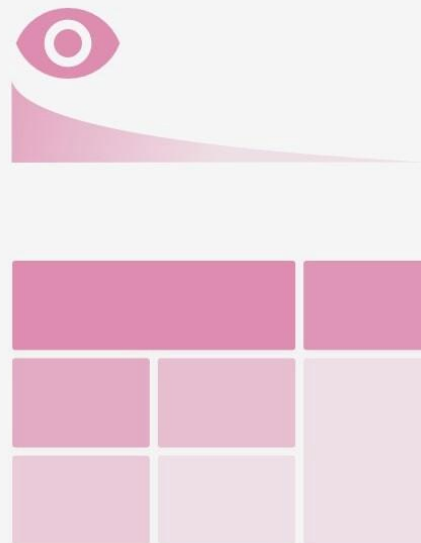
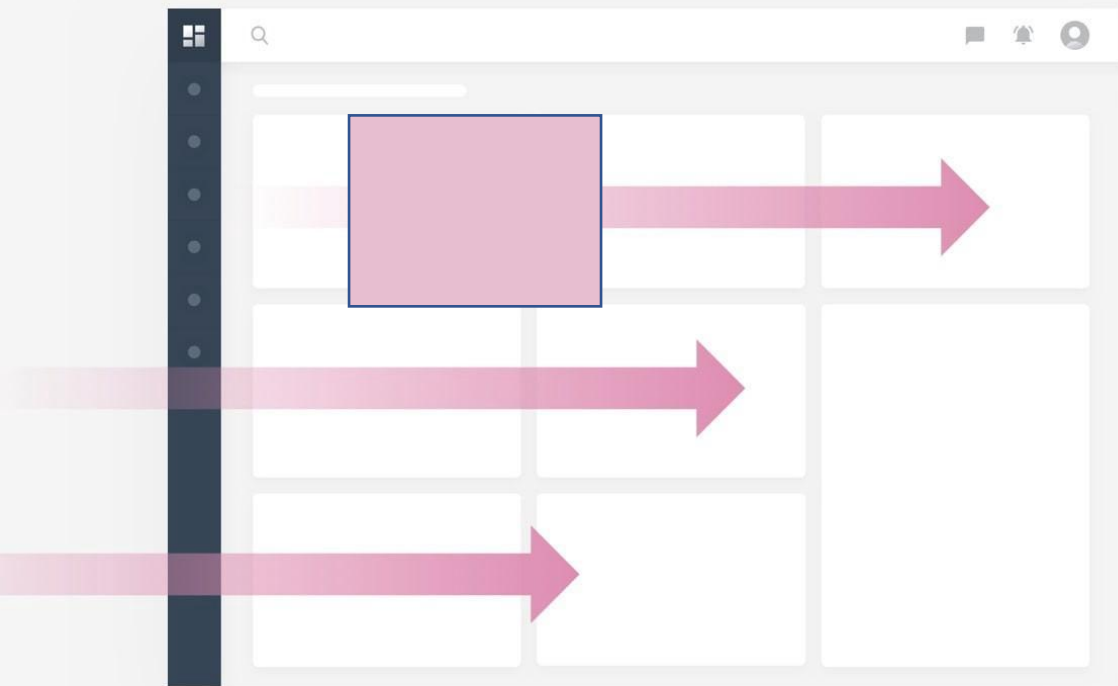
**3. Clear and consistent naming
conversions, data formatting,
truncate large values.**

**4. Define the layout and flow,
prioritize.**

Follow layout

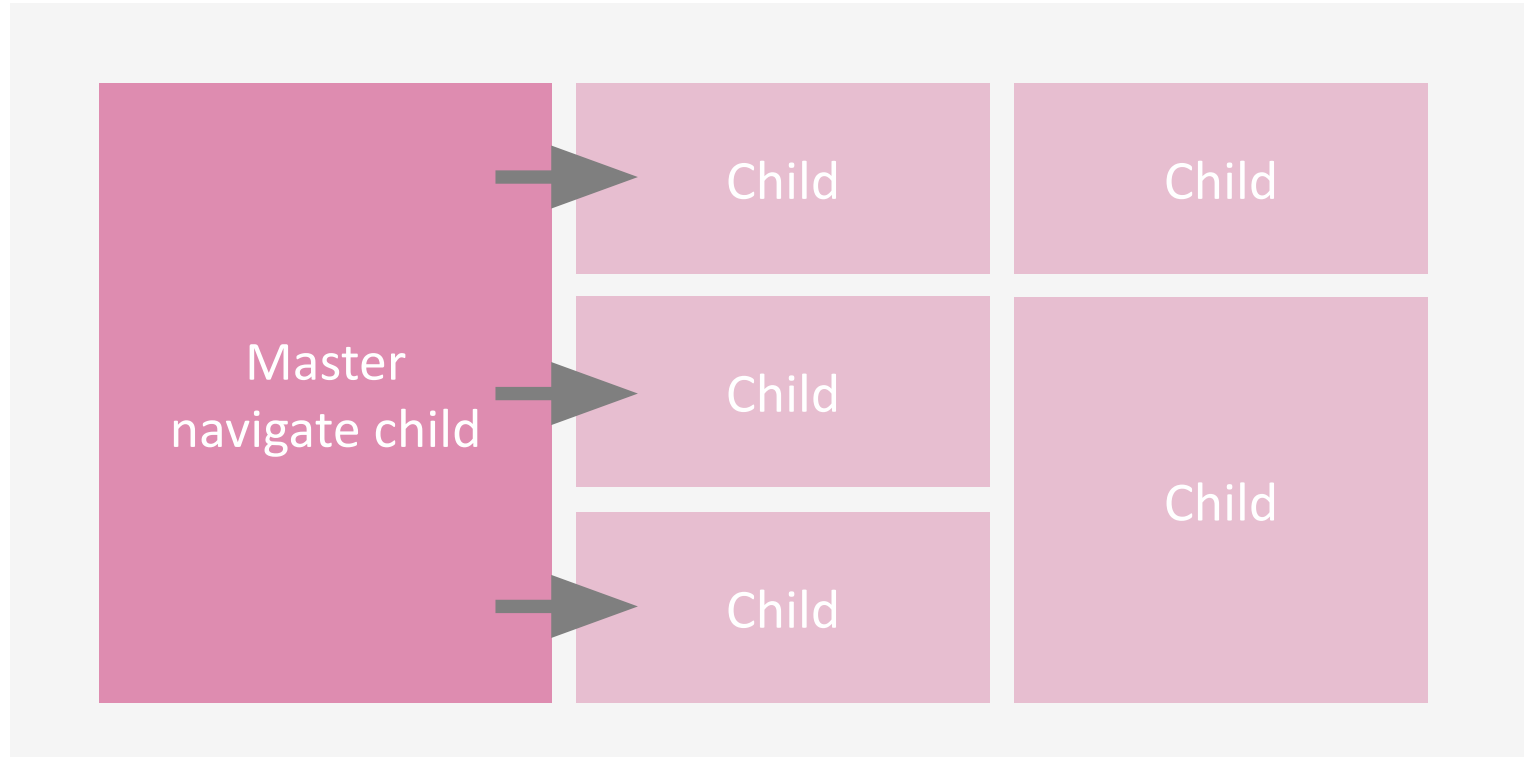


Eye movement

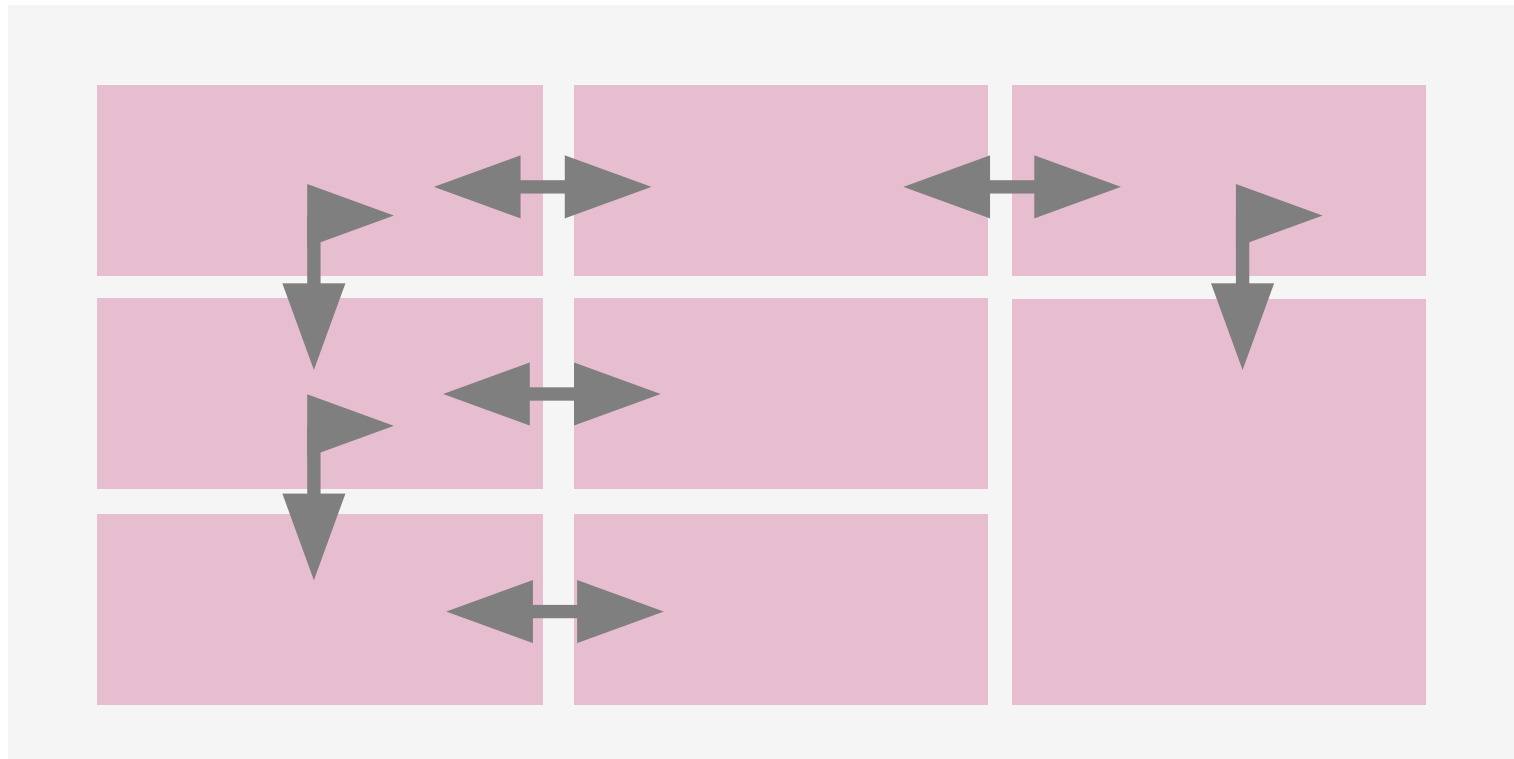


5. Design dashboard

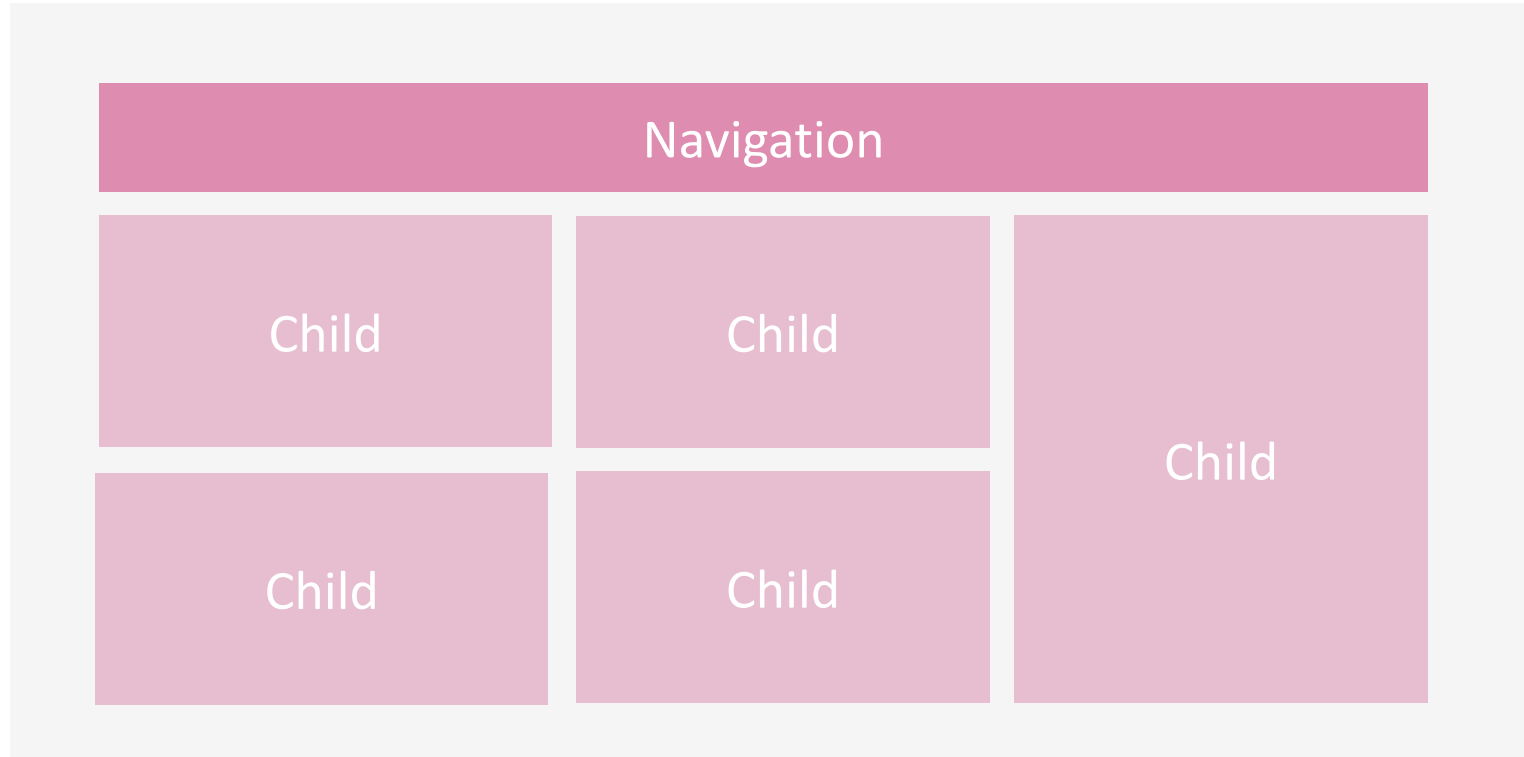
Master-Child design



Multi-action design



Navigation design



Q&A

80
miles



400
miles



7000
miles



21000
miles



Get Data



<https://bit.ly/3wWswJV>