

| Data Warehouse, 2025

# Data Warehouse

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**ATVANTAGE**



| Data Warehouse, 2025

# Data Visualization

ATVANTAGE



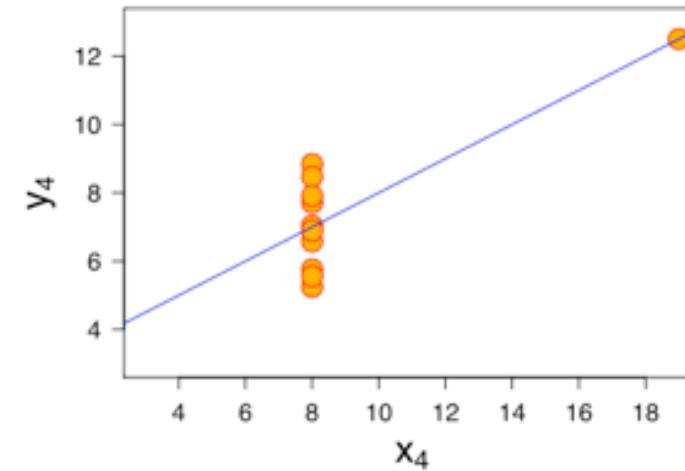
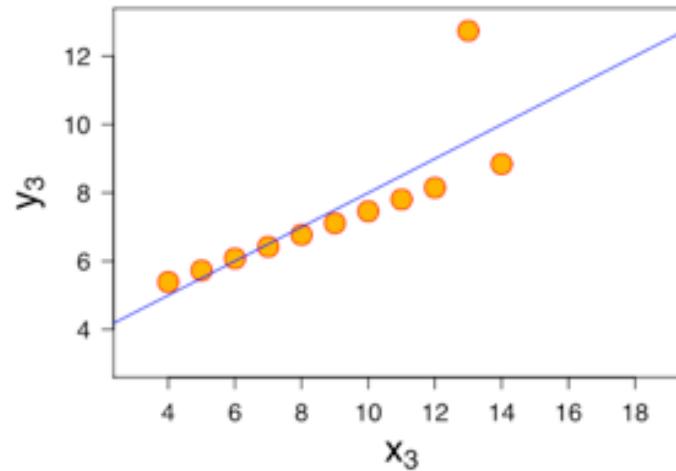
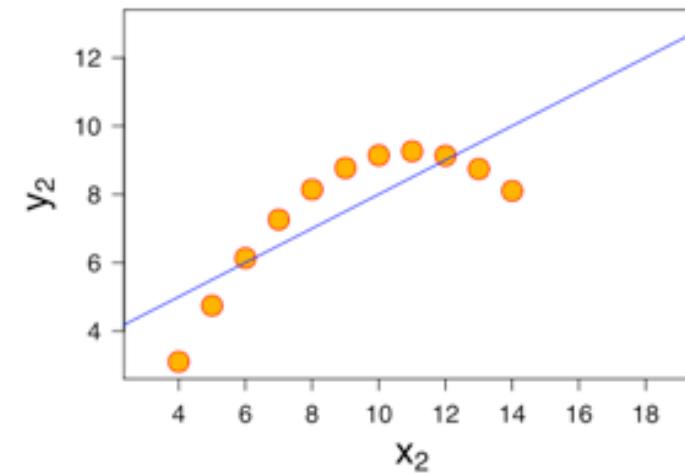
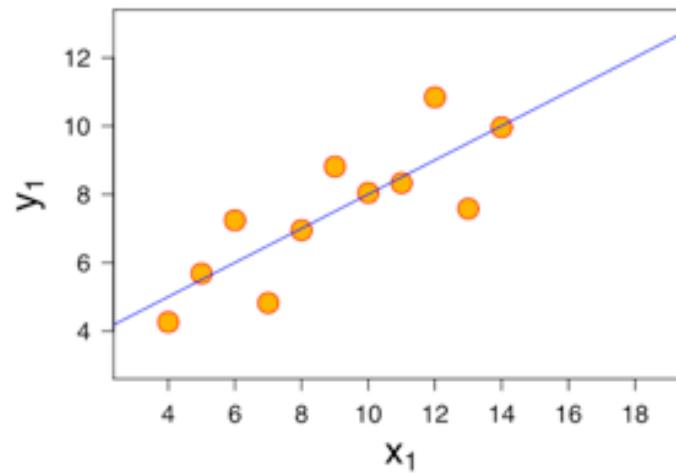
# Why Data Visualization?

**Anscombe's Quartet**

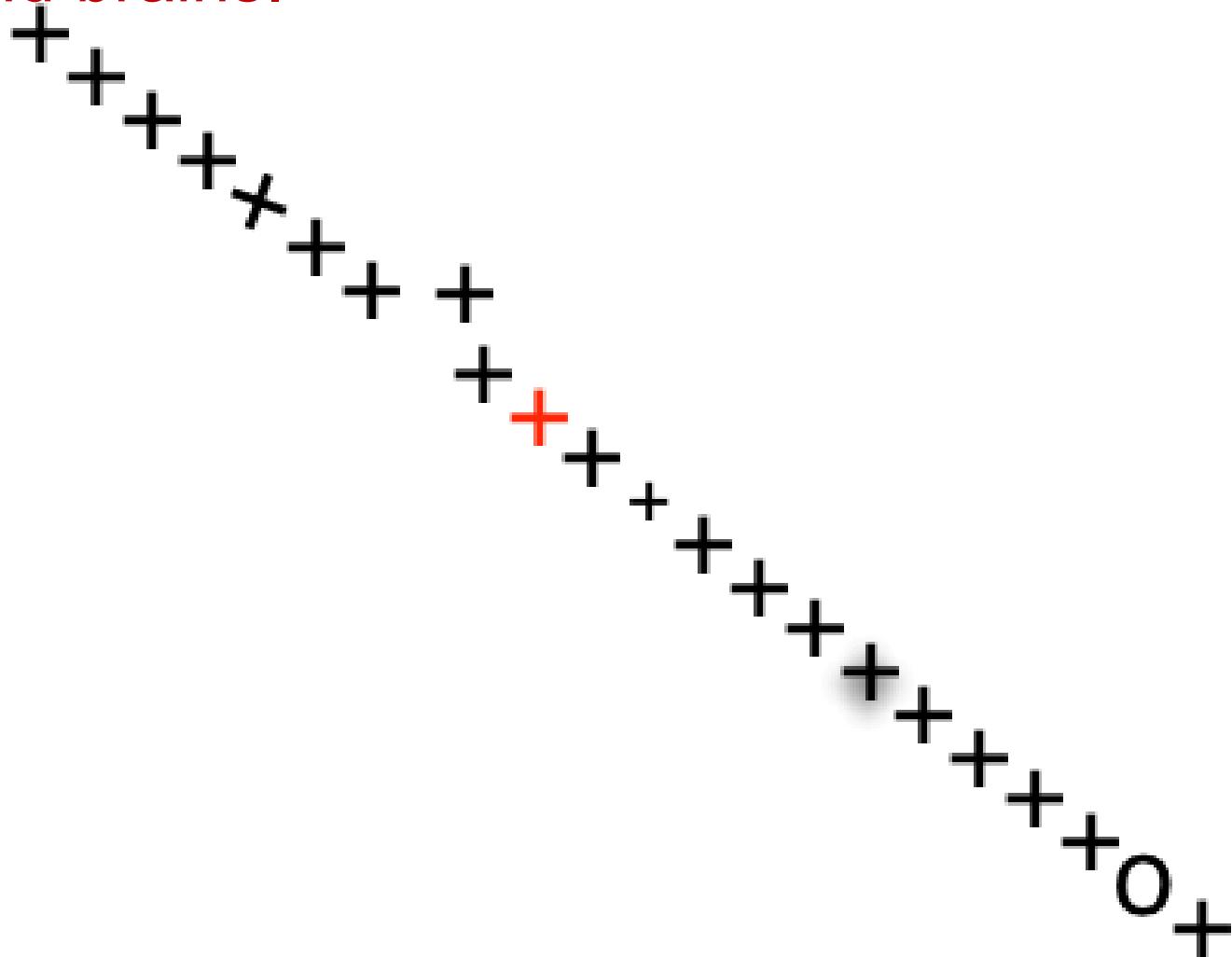
I		II		III		IV	
x	y	x	y	x	y	x	y
10.0	8.04	10.0	9.14	10.0	7.46	8.0	6.58
8.0	6.95	8.0	8.14	8.0	6.77	8.0	5.76
13.0	7.58	13.0	8.74	13.0	12.74	8.0	7.71
9.0	8.81	9.0	8.77	9.0	7.11	8.0	8.84
11.0	8.33	11.0	9.26	11.0	7.81	8.0	8.47
14.0	9.96	14.0	8.10	14.0	8.84	8.0	7.04
6.0	7.24	6.0	6.13	6.0	6.08	8.0	5.25
4.0	4.26	4.0	3.10	4.0	5.39	19.0	12.50
12.0	10.84	12.0	9.13	12.0	8.15	8.0	5.56
7.0	4.82	7.0	7.26	7.0	6.42	8.0	7.91
5.0	5.68	5.0	4.74	5.0	5.73	8.0	6.89

[http://en.wikipedia.org/wiki/Anscombe%27s\\_quartet](http://en.wikipedia.org/wiki/Anscombe%27s_quartet)

# Visualization makes data accessible.



Visualization leverages the amazing abilities of our eyes and brains.

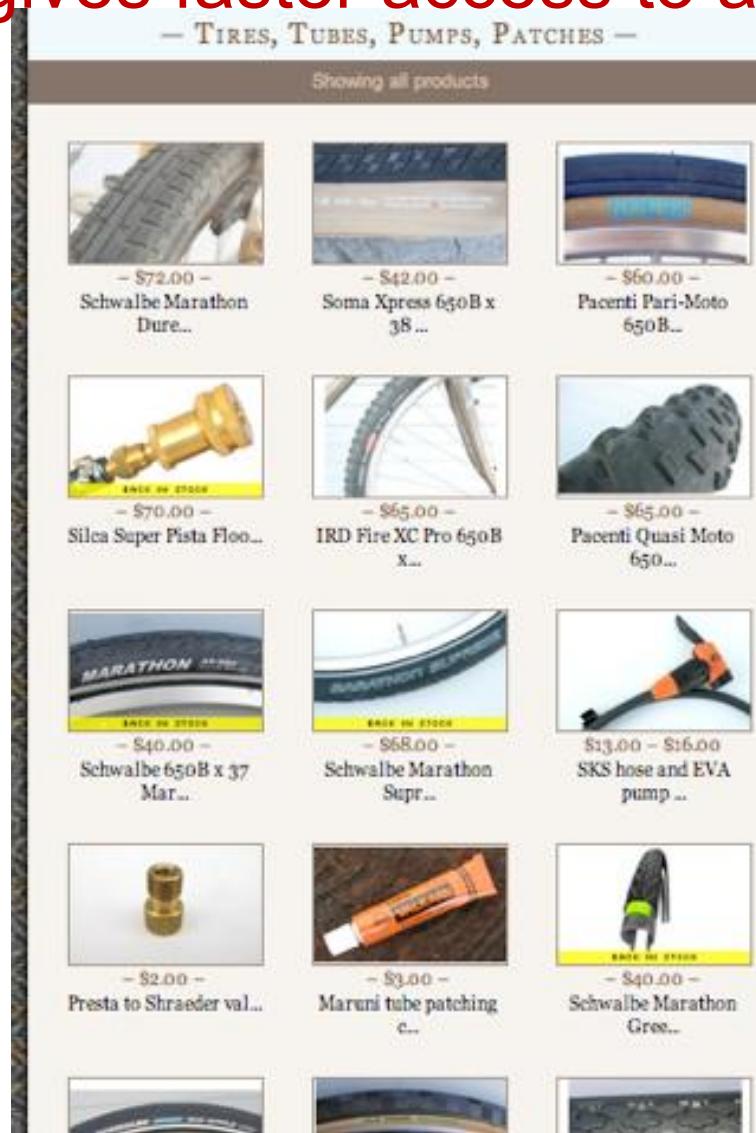


Your brain is a pattern-detecting machine.

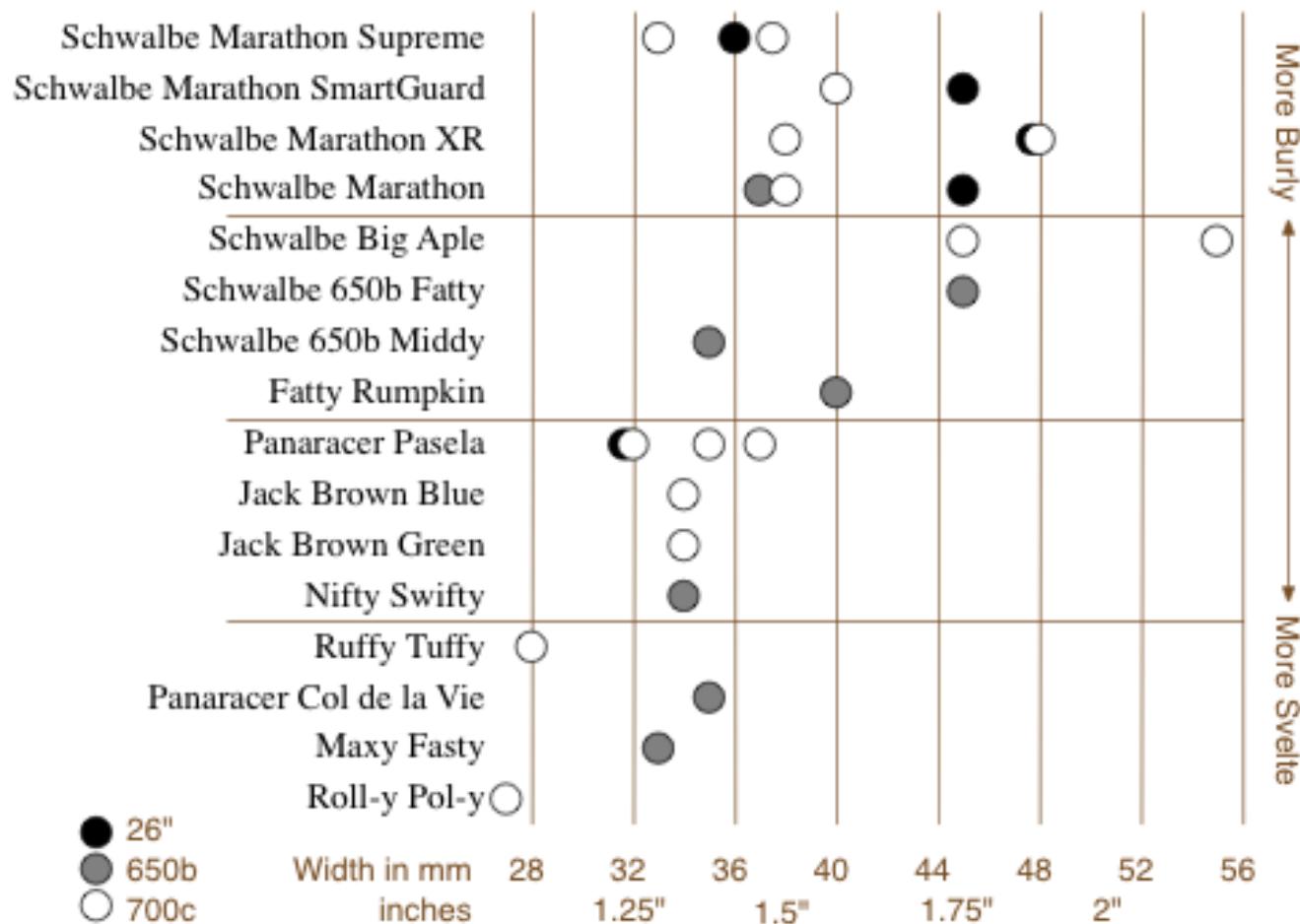
We see patterns and pattern violations

- Trends
- Gaps
- Outliers

# Visualization gives faster access to actionable insight.



# Visualization gives faster access to actionable insight.



# When are visualizations successful?

Visualization ...

1. Has clear purpose and focus.
2. Contains (only) the right information.
3. Is structured correctly.
4. Has useful formatting.

What does success look like?

**Purpose informs Content**

**Purpose & Content inform Structure**

**Purpose & Content & Structure inform  
Formatting**

# What does success look like?

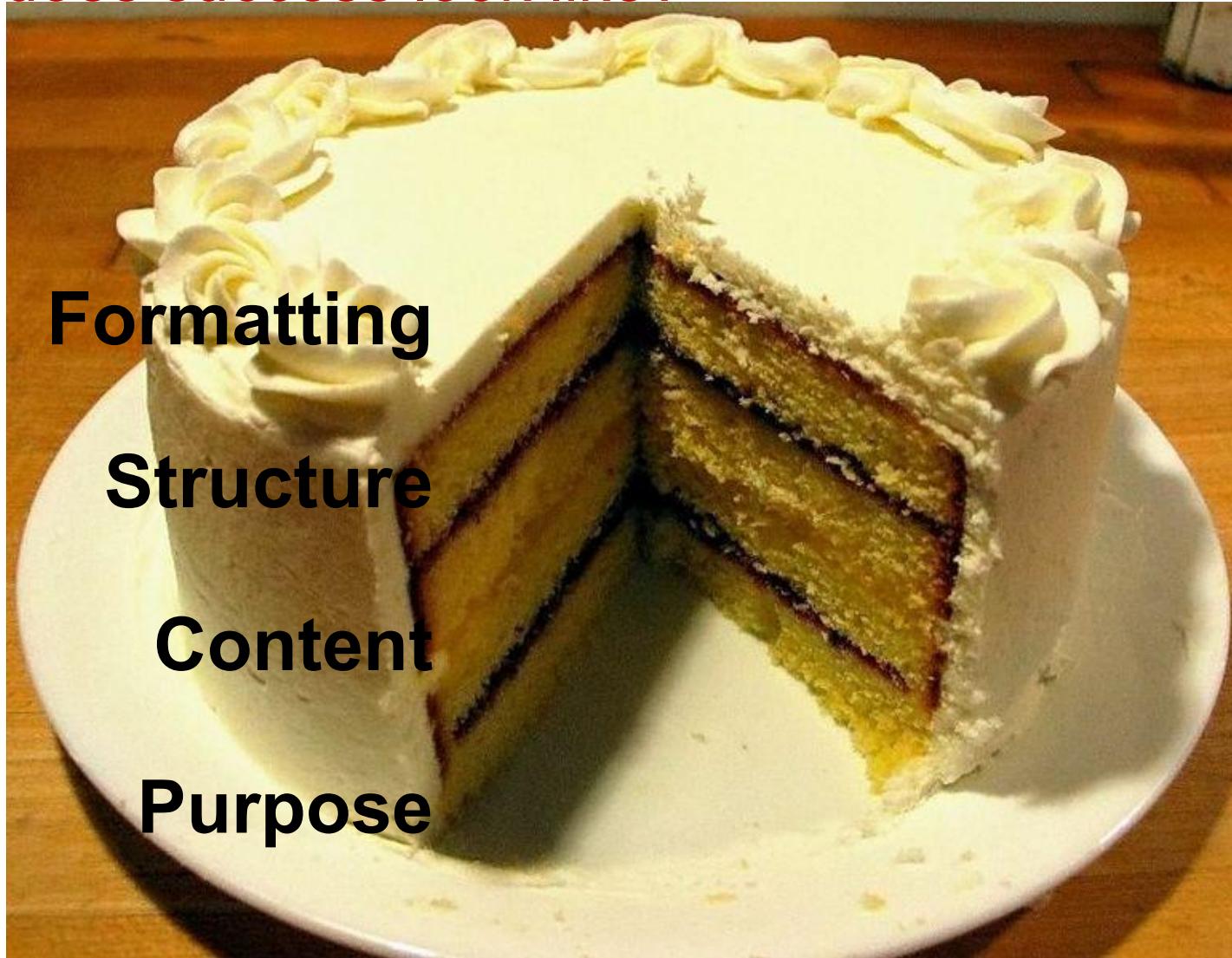
**4. Formatting**

**3. Structure**

**2. Content**

**1. Purpose**

# What does success look like?



[http://commons.wikimedia.org/wiki/File:Pound\\_layer\\_cake.jpg](http://commons.wikimedia.org/wiki/File:Pound_layer_cake.jpg)

## Purpose > Content > Structure > Formatting

For creators, do you know:

- Why am I creating this visualization?
- Who is it for?
- What do they need to understand?
- What actions do you need to enable?

# Purpose > Content > Structure > Formatting

How will it be consumed?



<http://www.apple.com>

# Purpose > Content > Structure > Formatting

- What data matters?
- What relationships matter?
- Informed by purpose!
- What's *excluded* is as important as what's *included*.

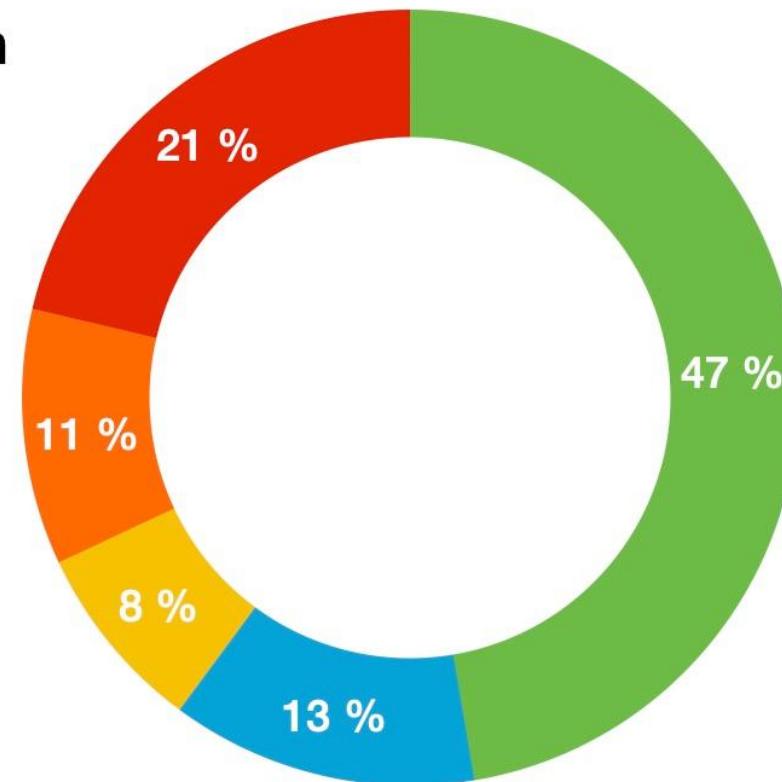
# Purpose > Content > Structure > Formatting

## Apple Quartalszahlen

Q4/2022

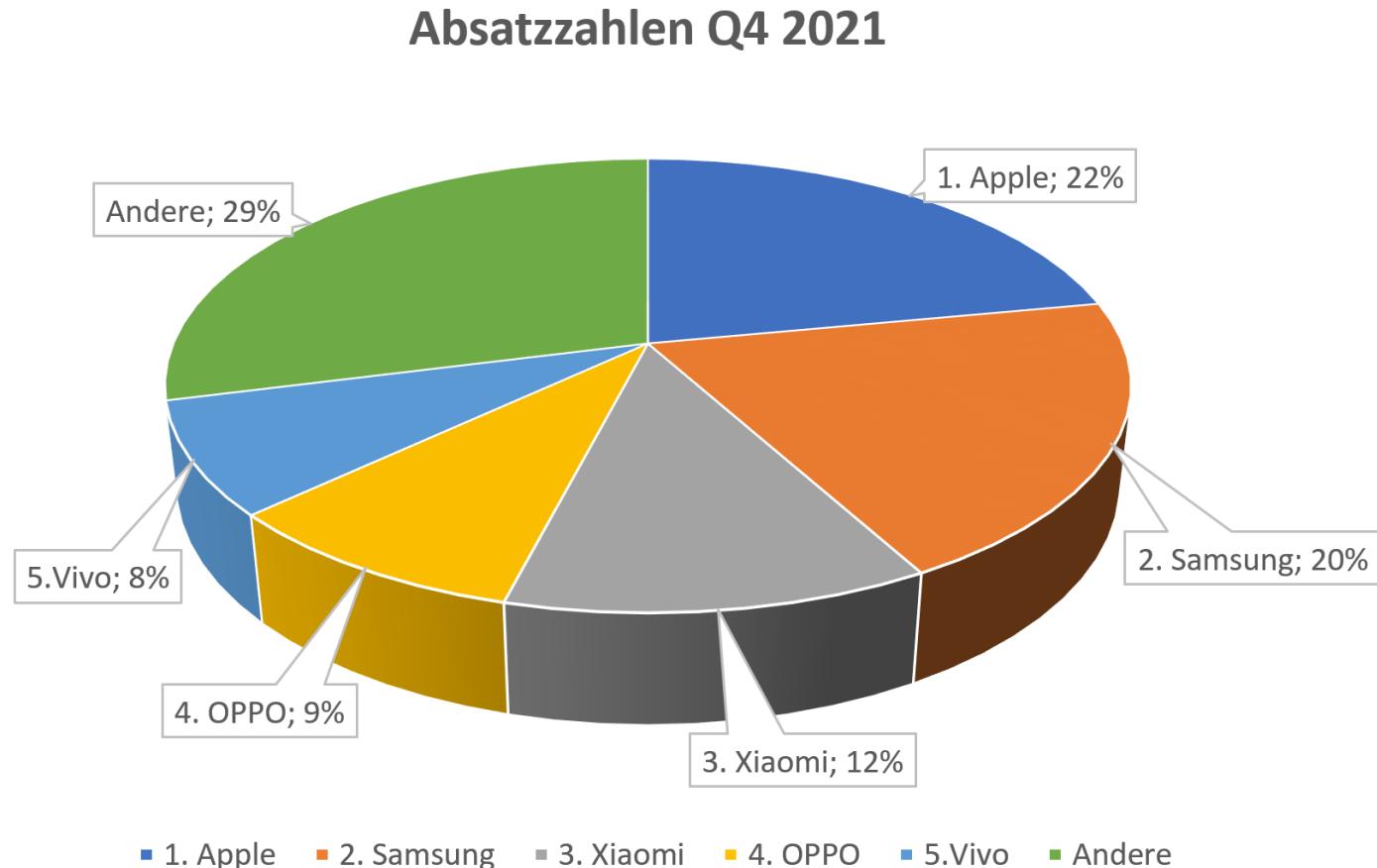
Umsatz nach Kategorie

- iPhone
- Mac
- iPad
- Wearables, Home & Zubehör
- Services



Quelle: <https://www.ifun.de/apples-q42022-rekord-umsatz-aber-rueckgang-bei-service-einnahmen-197483/>

# Purpose > Content > Structure > Formatting

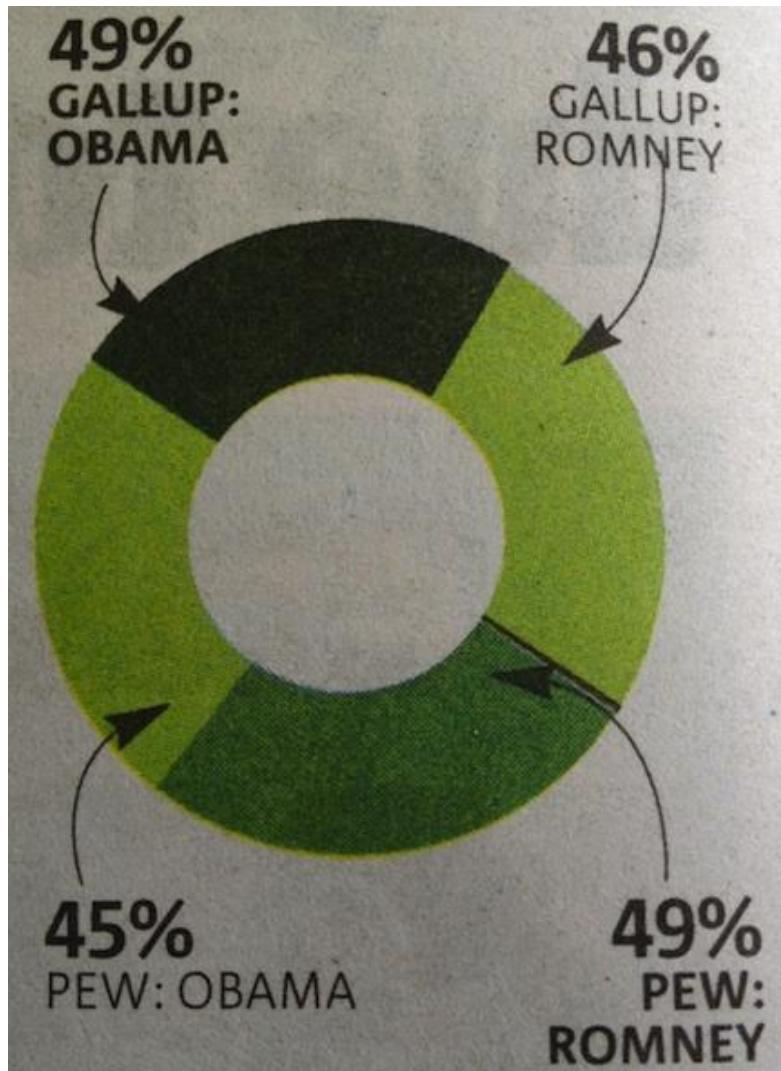


Quelle: <https://www.chinahandys.net/statistiken-q4-2021/>

## Purpose > Content > **Structure** > Formatting

- How do we best reveal the most important data and relationships?
- Choose meaningful layout and axes!
- Use both axes! (Both, not three...)
- Informed by purpose and content!

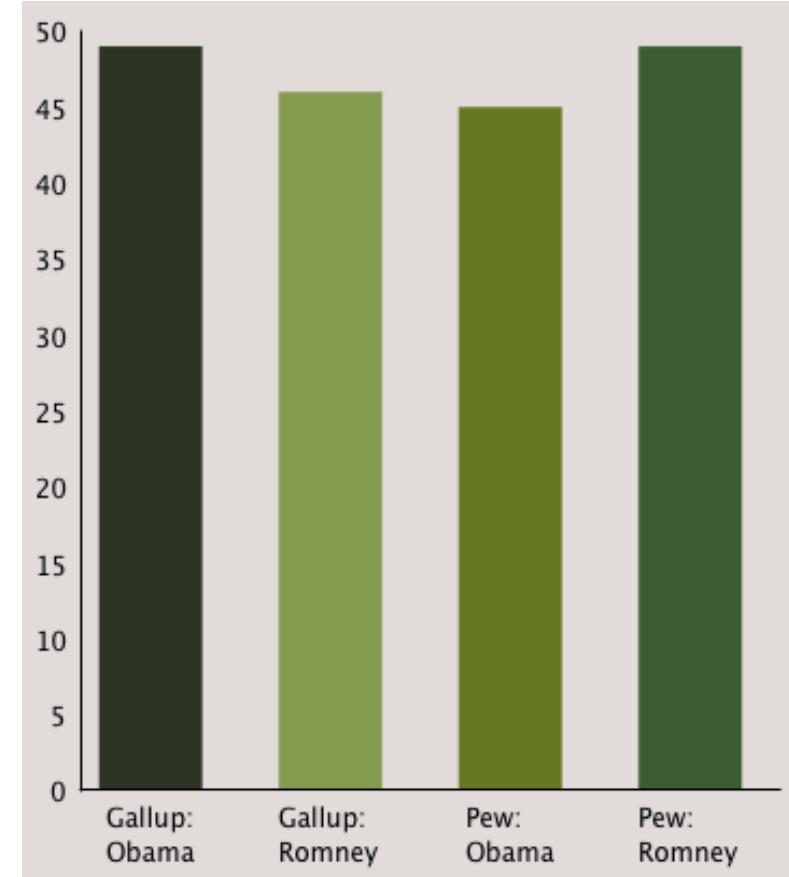
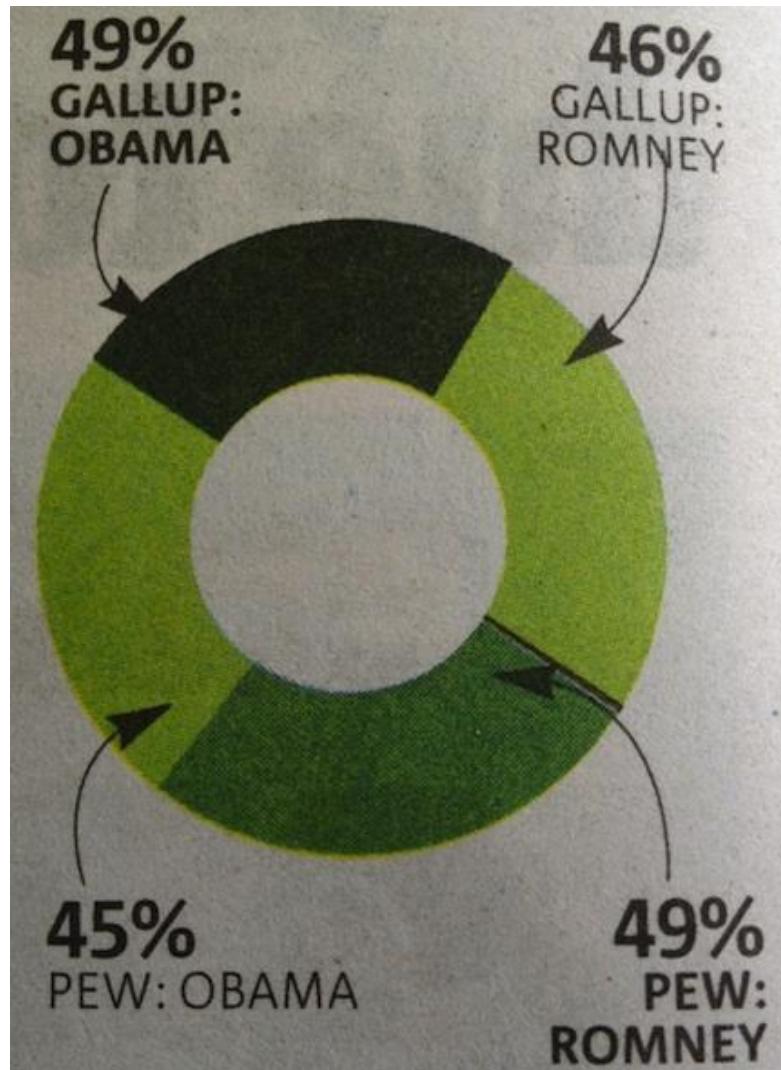
# Purpose > Content > **Structure** > Formatting



Structure fail.

<http://ilovecharts.tumblr.com/post/33308788744/from-the-boston-metro-oct-10th-hannabeth-well>

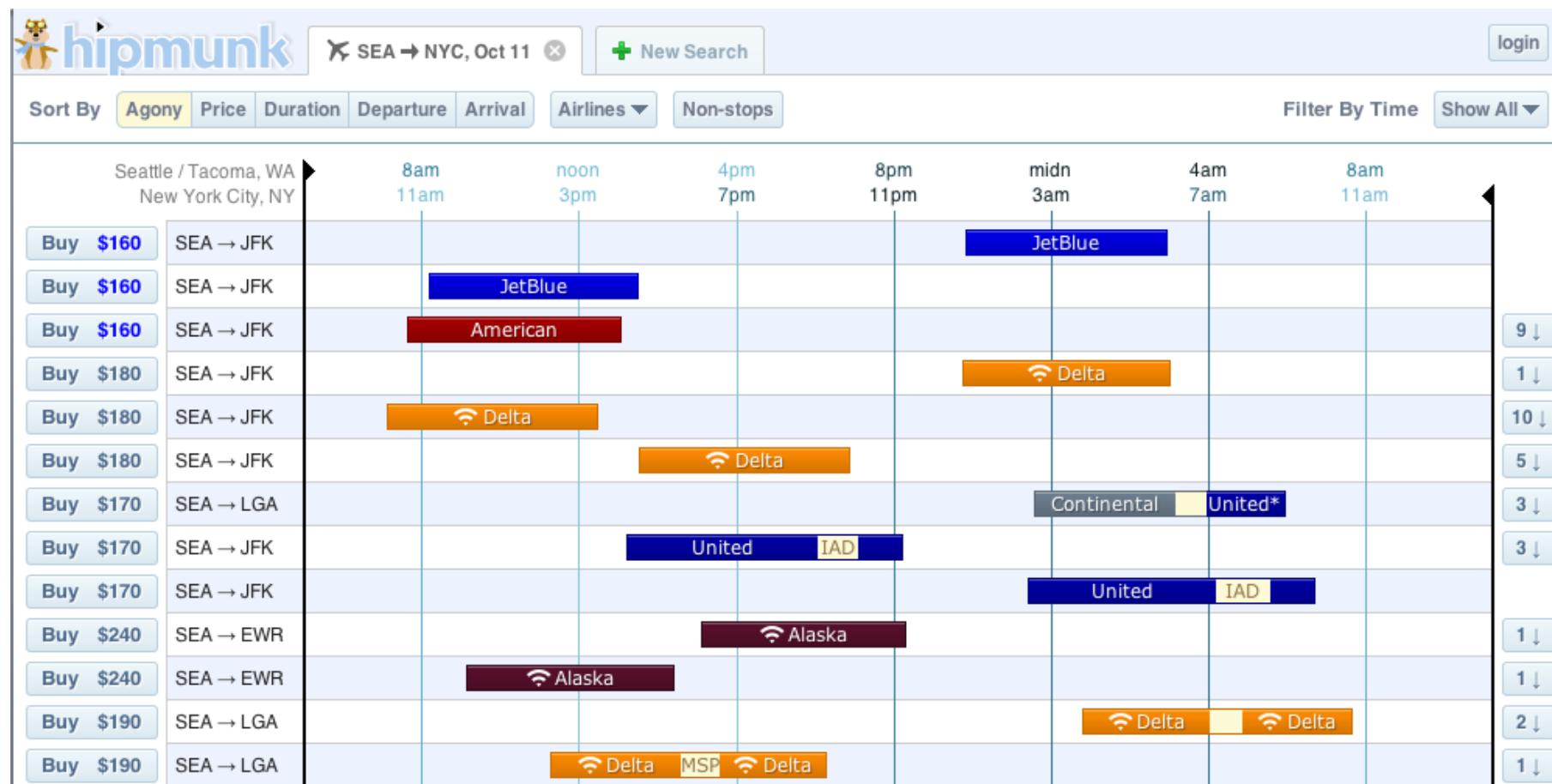
# Purpose > Content > **Structure** > Formatting



Structure fixed.

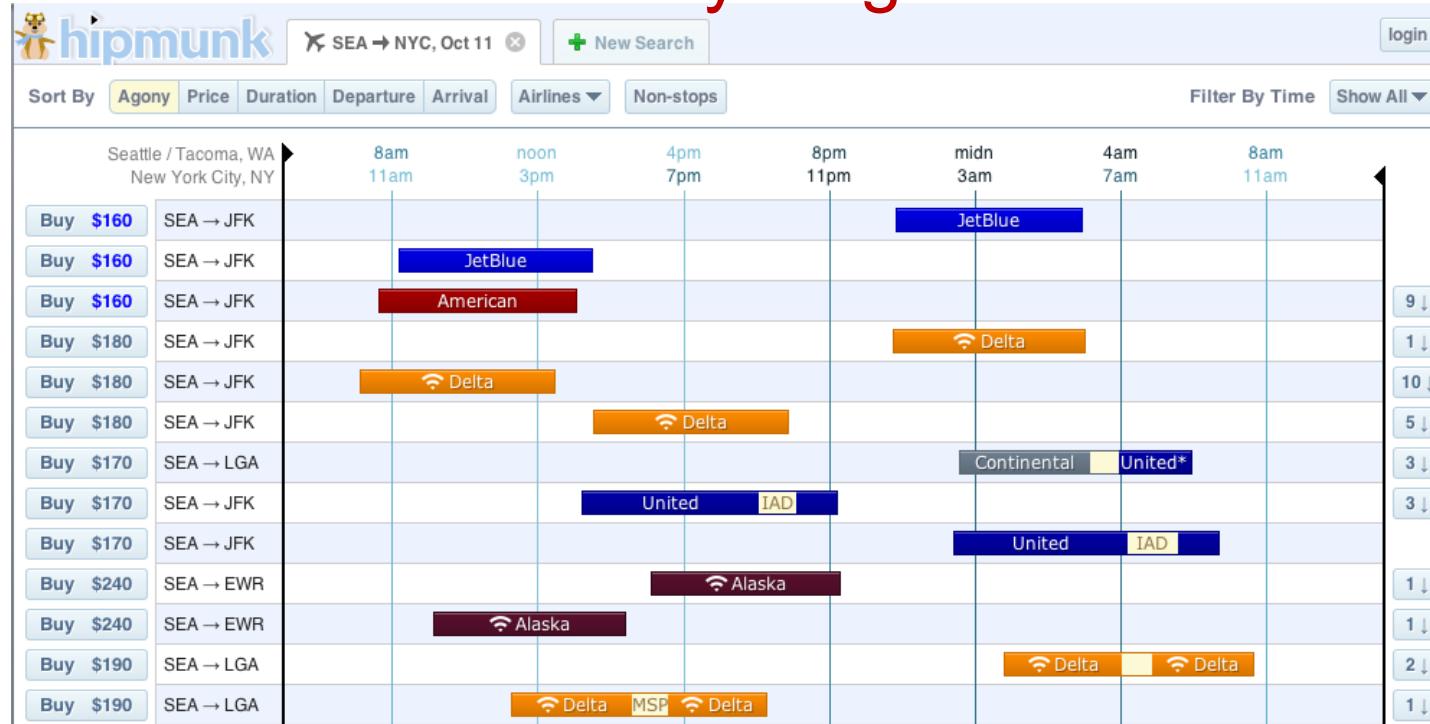
<http://ilovecharts.tumblr.com/post/33308788744/from-the-boston-metro-oct-10th-hannabeth-well>

# Structure: Position is everything.



<http://hipmunk.com>

# Structure: Position is everything.



- absolute & relative departure time (continuous)
- absolute & relative arrival time (continuous)
- absolute & relative length of trip (continuous)
- stopovers (binary)
- absolute & relative stopover duration (continuous)
- absolute & relative stopover start & stop time (continuous)
- sort order (ranked)

<http://hipmunk.com>

# Purpose > Content > Structure > **Formatting**

- How should it look and feel?
- How will it be consumed?
- Makes data and relationships accessible.
- Makes importance visible.
- Informed by purpose, content, and structure!

# Purpose > Content > Structure > Formatting

## Visualization Options Available in Many Eyes

Finding the right way view your data is as much an art as a science. The visualizations provided on Many Eyes range from the ordinary to the experimental.

### See relationships among data points

-  Scatterplot
-  Matrix Chart
-  Network Diagram

### Track rises and falls over time

-  Line Graph
-  Stack Graph
-  Stack Graph for Categories

### Analyze a text

-  Word Tree
-  Tag Cloud
-  Phrase Net
-  Word Cloud Generator

### Compare a set of values

-  Bar Chart
-  Block Histogram
-  Bubble Chart

### See the parts of a whole

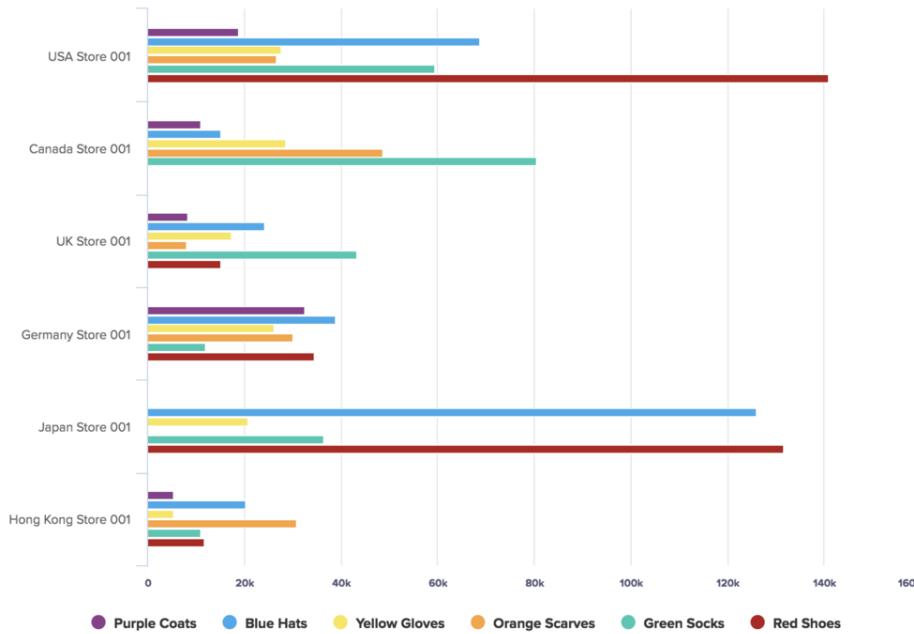
-  Pie Chart
-  Treemap
-  Treemap for Comparisons

### See the world

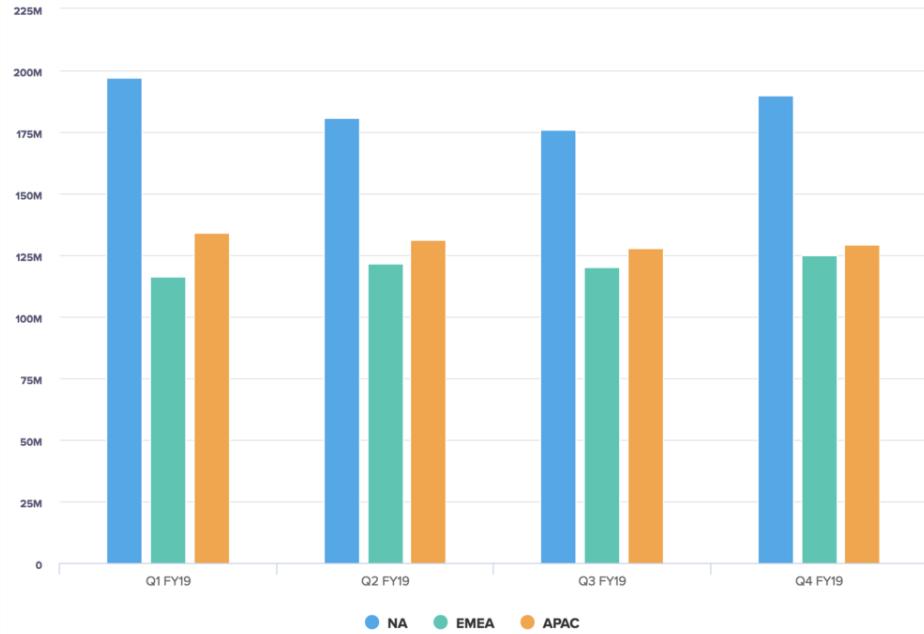
-  Ottawa Neighbourhood Map
-  US County Map
-  World Map
-  Massachusetts Map
-  New Jersey Map

# Compare – Bar Chart

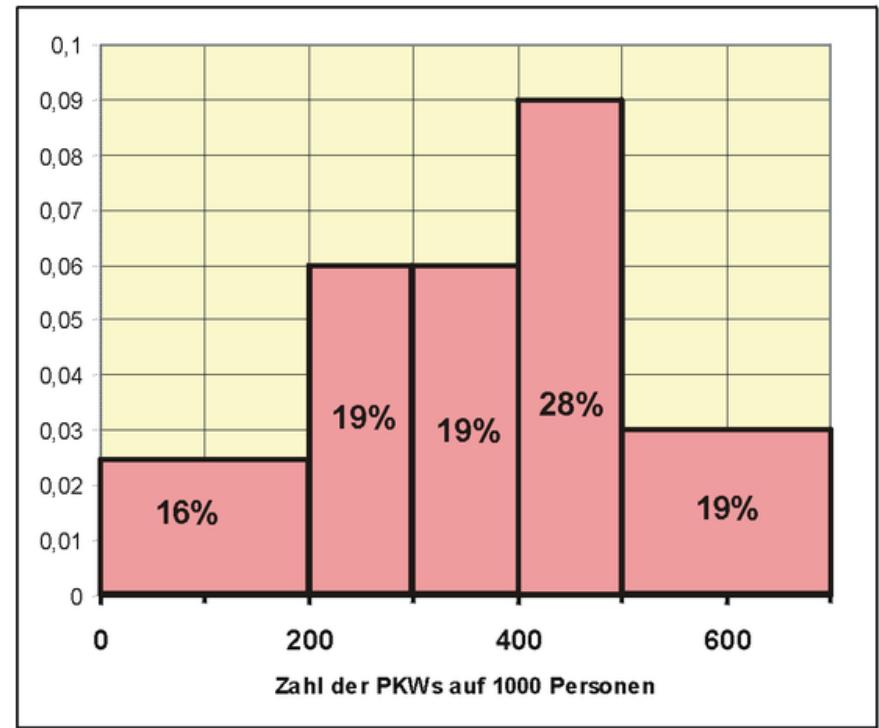
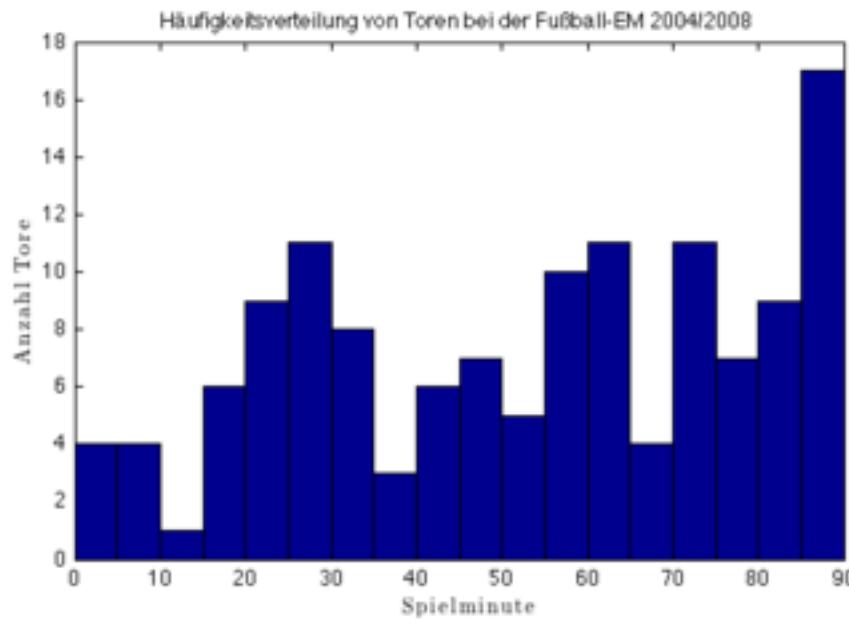
2019 Products Sold by Store



2019 Quarterly Sales Volume by Region

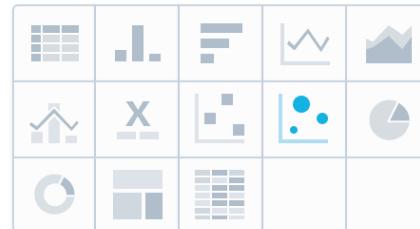


# Compare – Block Histogramm



Klasse j	Zahl der PKW pro 1000	Anzahl der Länder (absolute Klassenhäufigkeit) $n_j$	Klassenbreite $d_j$	Rechteckhöhe (Häufigkeitsdichte) $h_j = n_j/d_j$
1	Über 0 – bis 200	5	200 – 0 = 200	0,025
2	Über 200 bis 300	6	100	0,06
3	Über 300 bis 400	6	100	0,06
4	Über 400 bis 500	9	100	0,09
5	Über 500 bis 700	6	200	0,03
<b>Summe <math>\Sigma</math></b>		<b>32</b>		

# Compare – Bubble Chart



**MEASURE (X-AXIS)**

- > Cart Additions M1  
Sum of Cart Additions

**MEASURE (Y-AXIS)**

- > Checkouts M2  
Sum of Checkouts

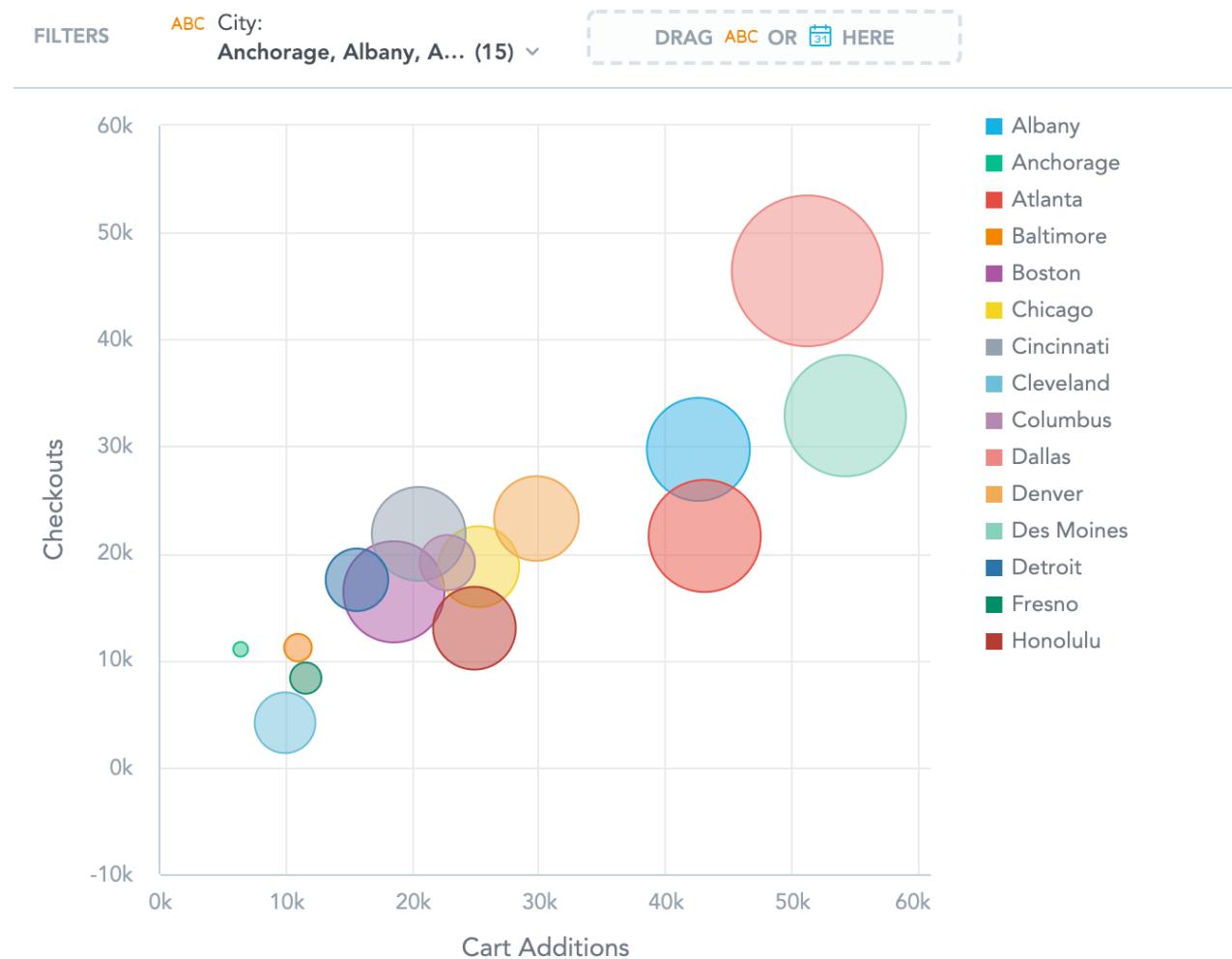
**MEASURE (SIZE)**

- > Spend M3

**VIEW BY**

- ABC City

**CONFIGURATION**



# Purpose > Content > Structure > Formatting

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-  Pie Chart
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-  Treemap for Comparisons

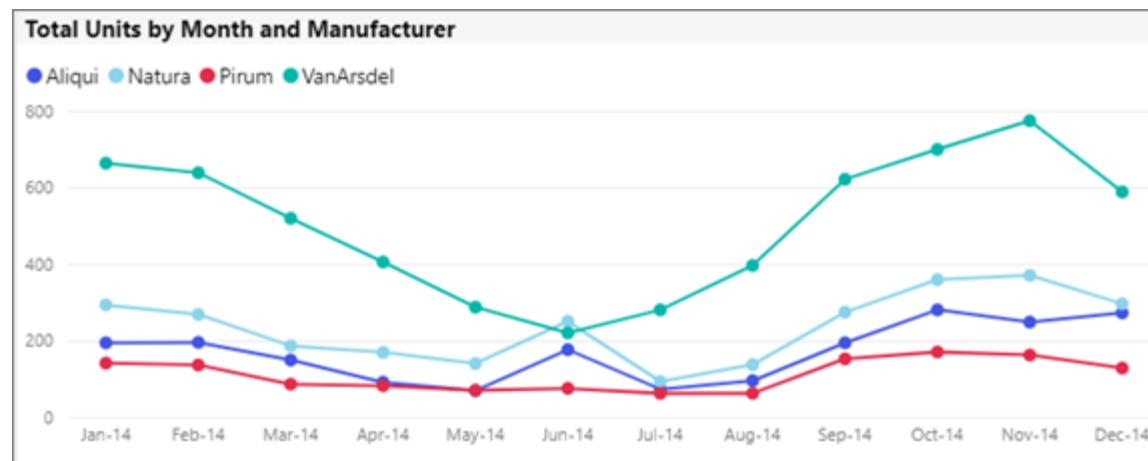
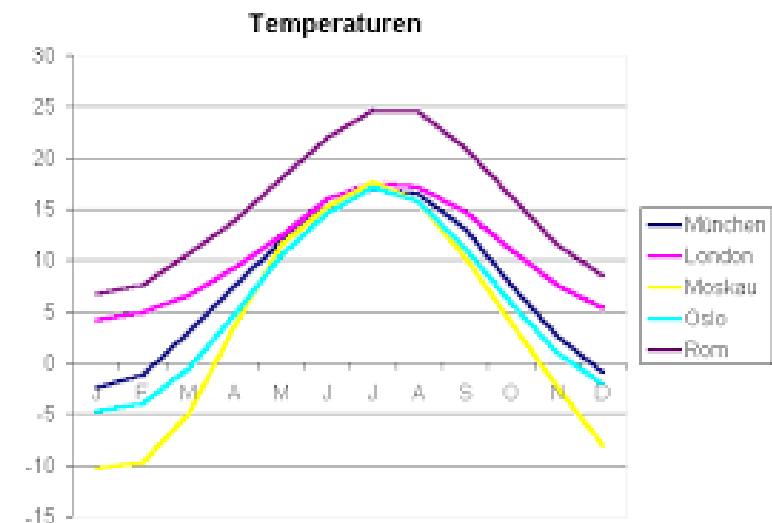
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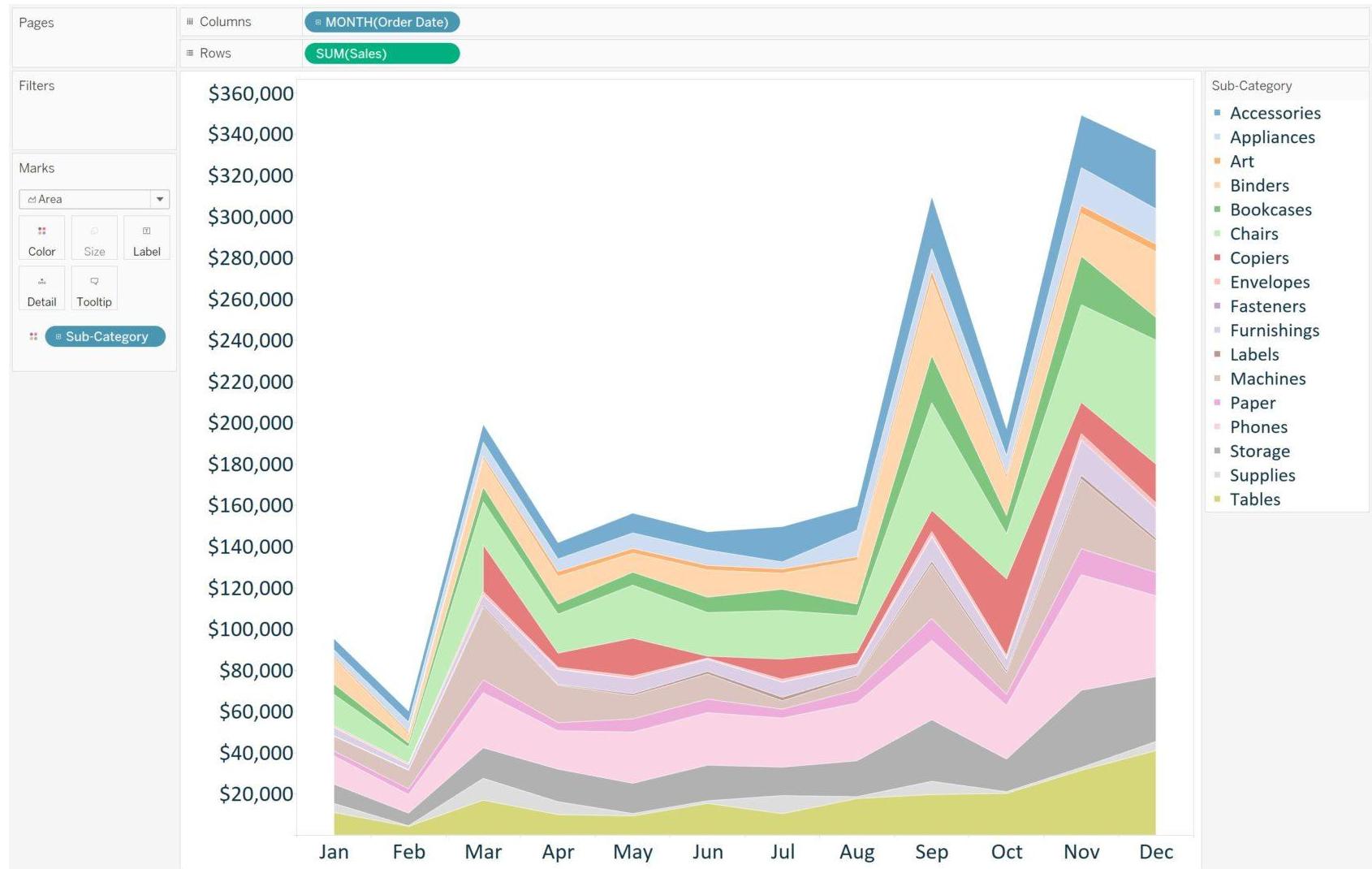
### See the world

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-  World Map
-  Massachusetts Map
-  New Jersey Map

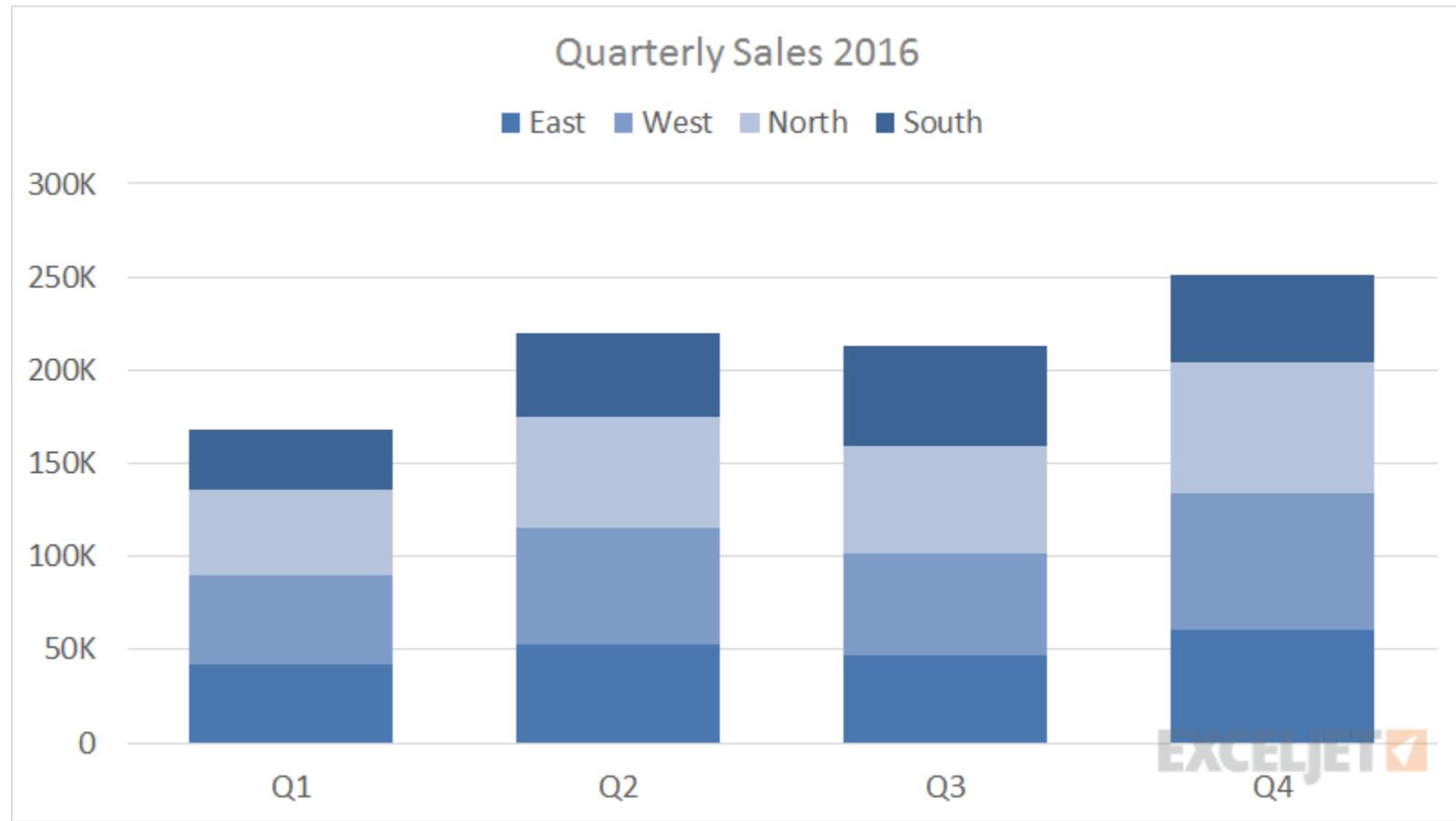
# Time Series – Line Graph



# Time Series – Stacked Linegraph



# Time Series – Stacked Bar Chart



EXCELJET 

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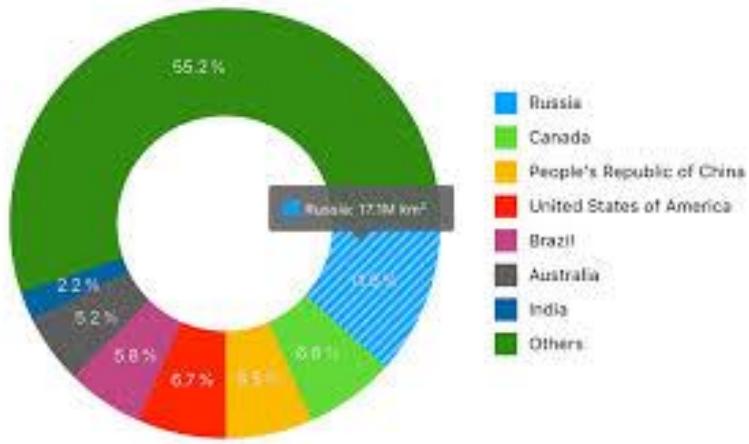
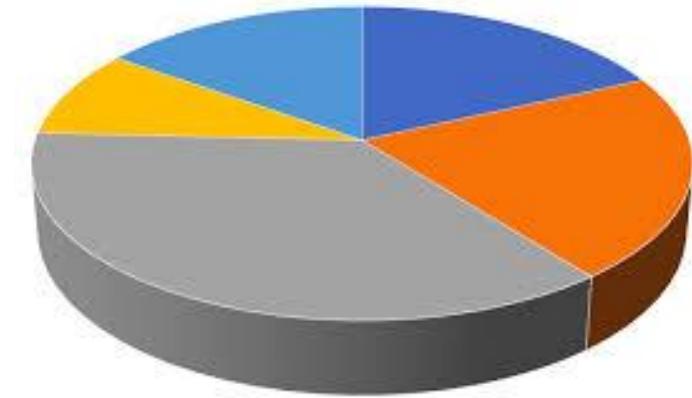
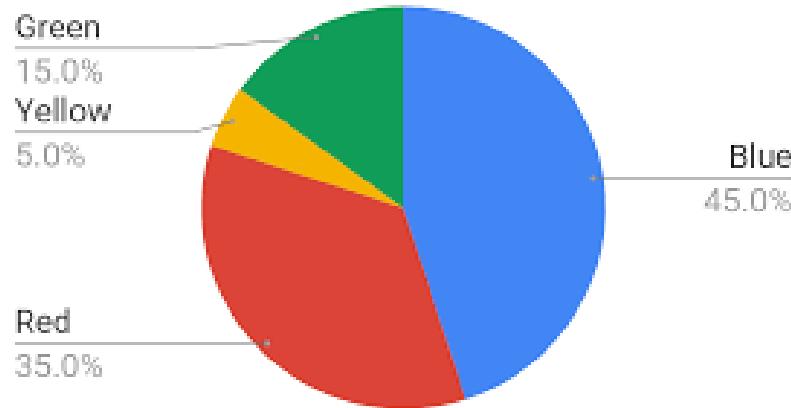
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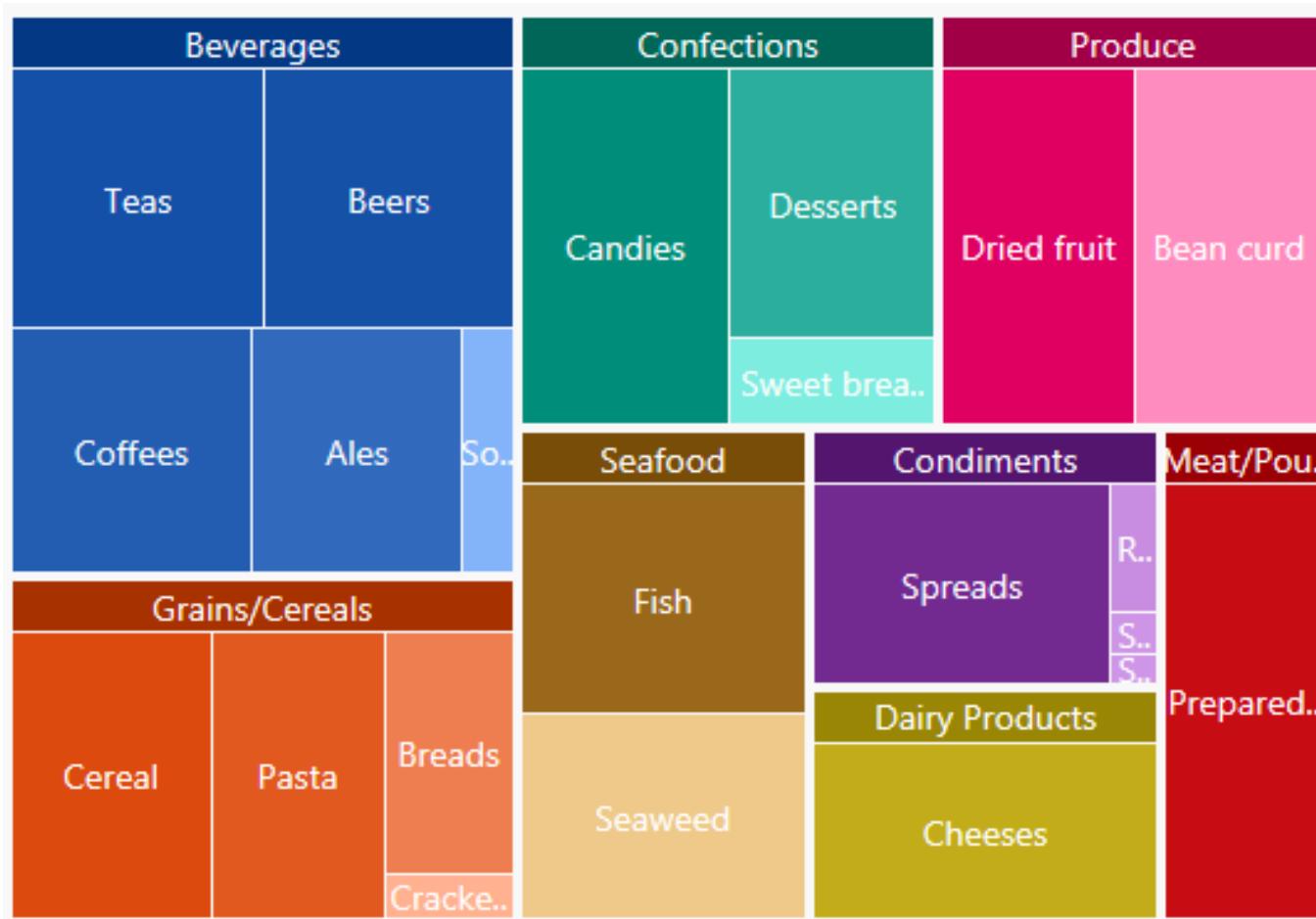
-  Ottawa Neighbourhood Map
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-  World Map
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# Parts – Pie Chart

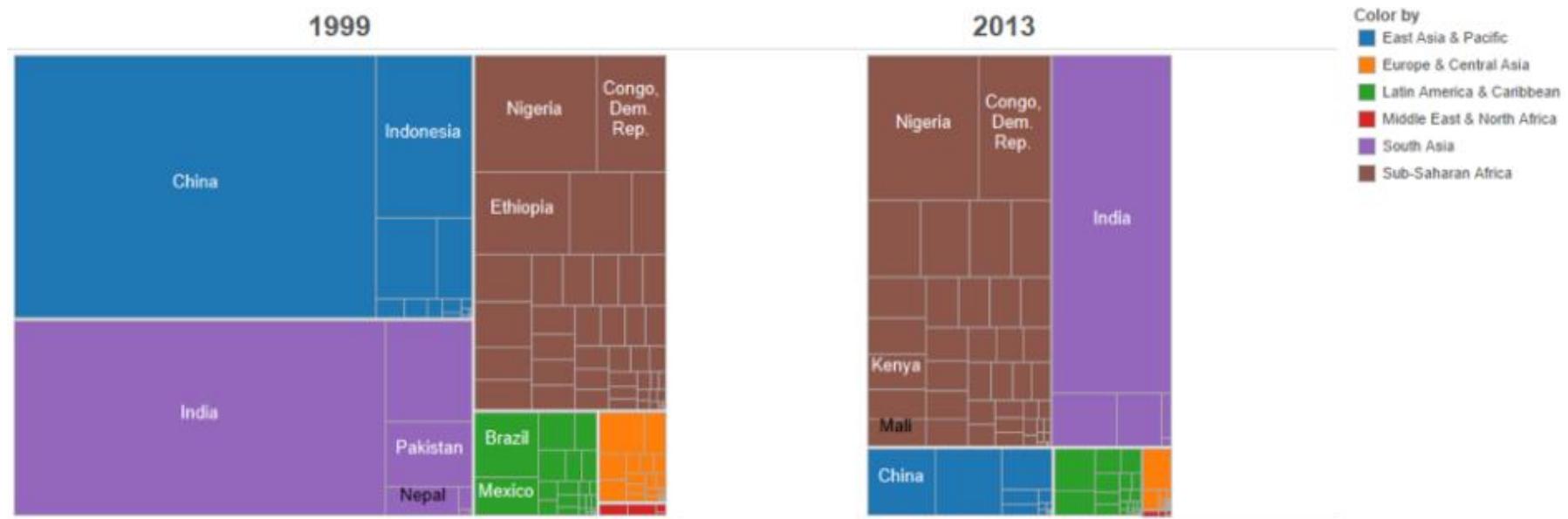
Favorite Color



# Parts – Treemap



# Parts – Treemap for Comparisons



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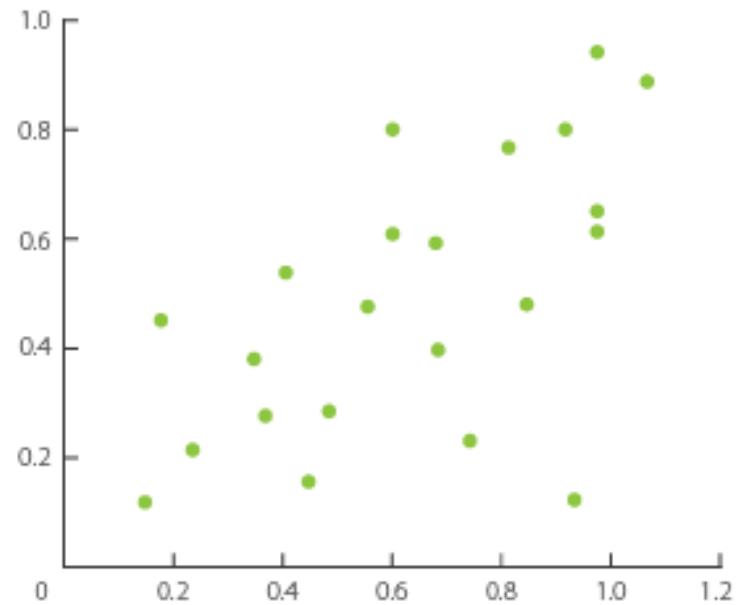
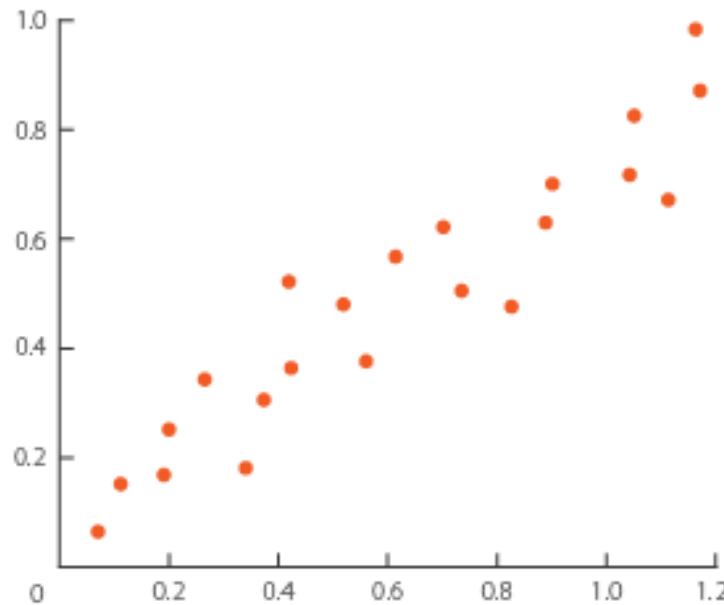
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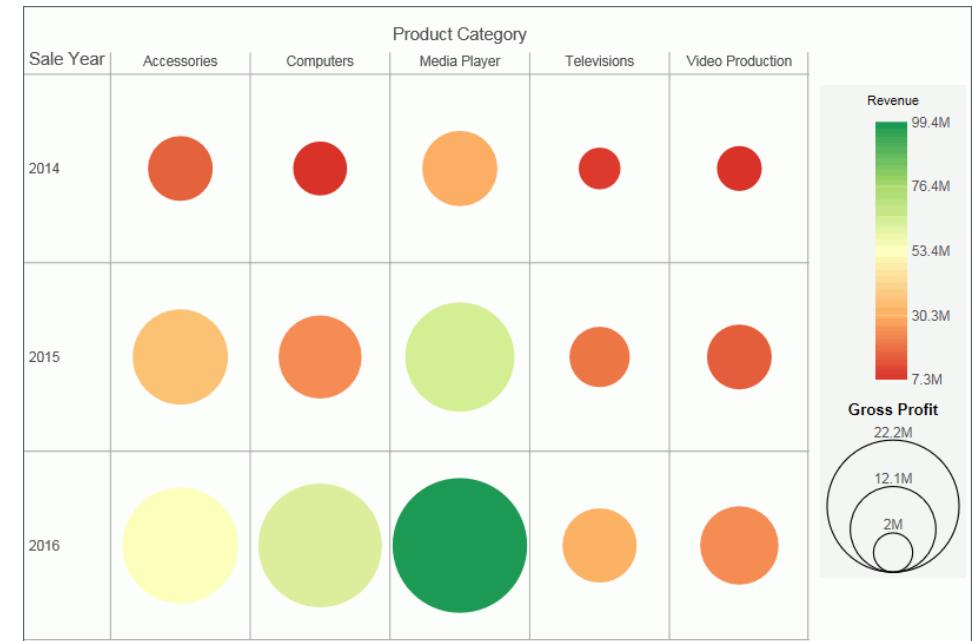
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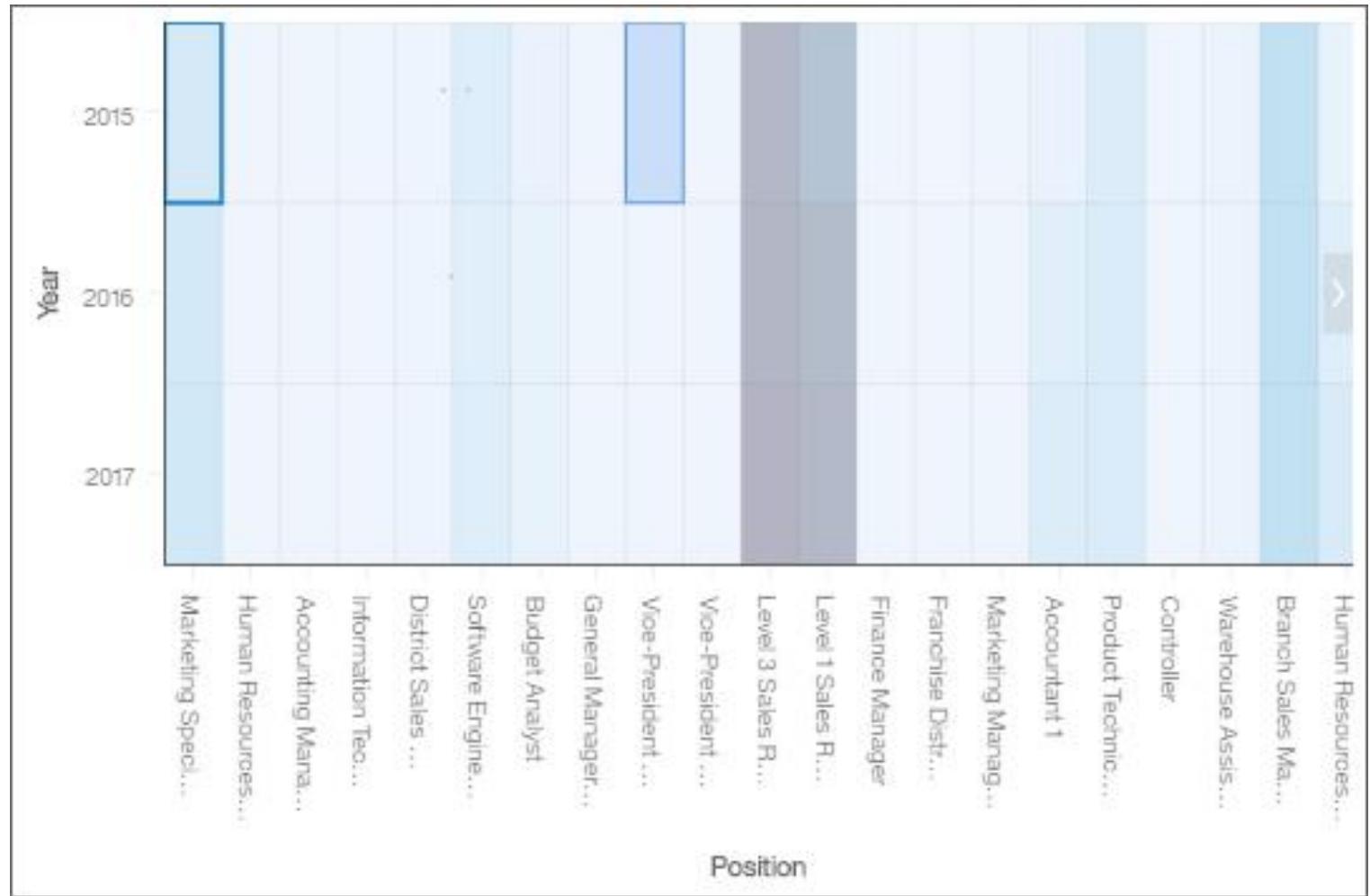
# Relationships - Scatterplot



# Relationships – Matrix Chart

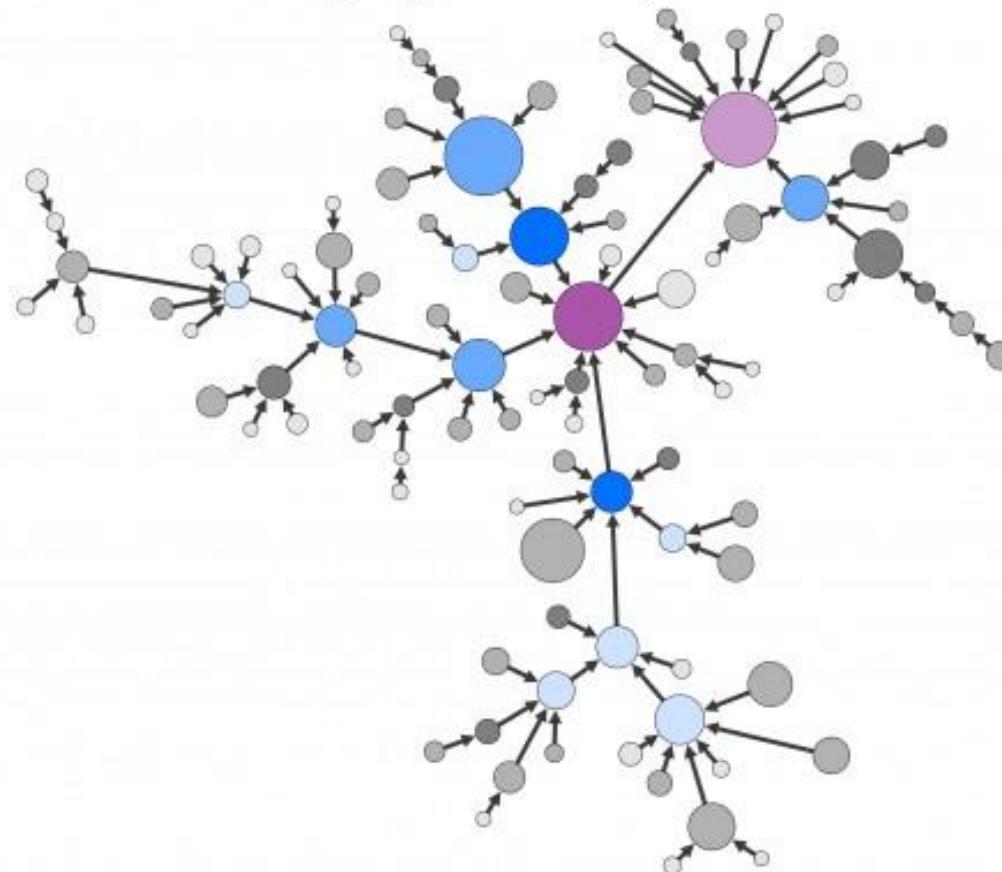


# Relationships – Heat Map



# Relationships – Network Diagram

Network of company X sales representatives



This map shows the sales representatives (nodes) linked if one has recruited another one. Connected nodes are closer, disconnected nodes are farther. Node size shows the sales volume, colors shows the rank, text size shows the level of spinning activity.

100 sales representatives  
99 connections

## LEGEND



## Sales Volume



## Rank



© 2013 Sébastien Heyraud, made with 

# Purpose > Content > Structure > Formatting

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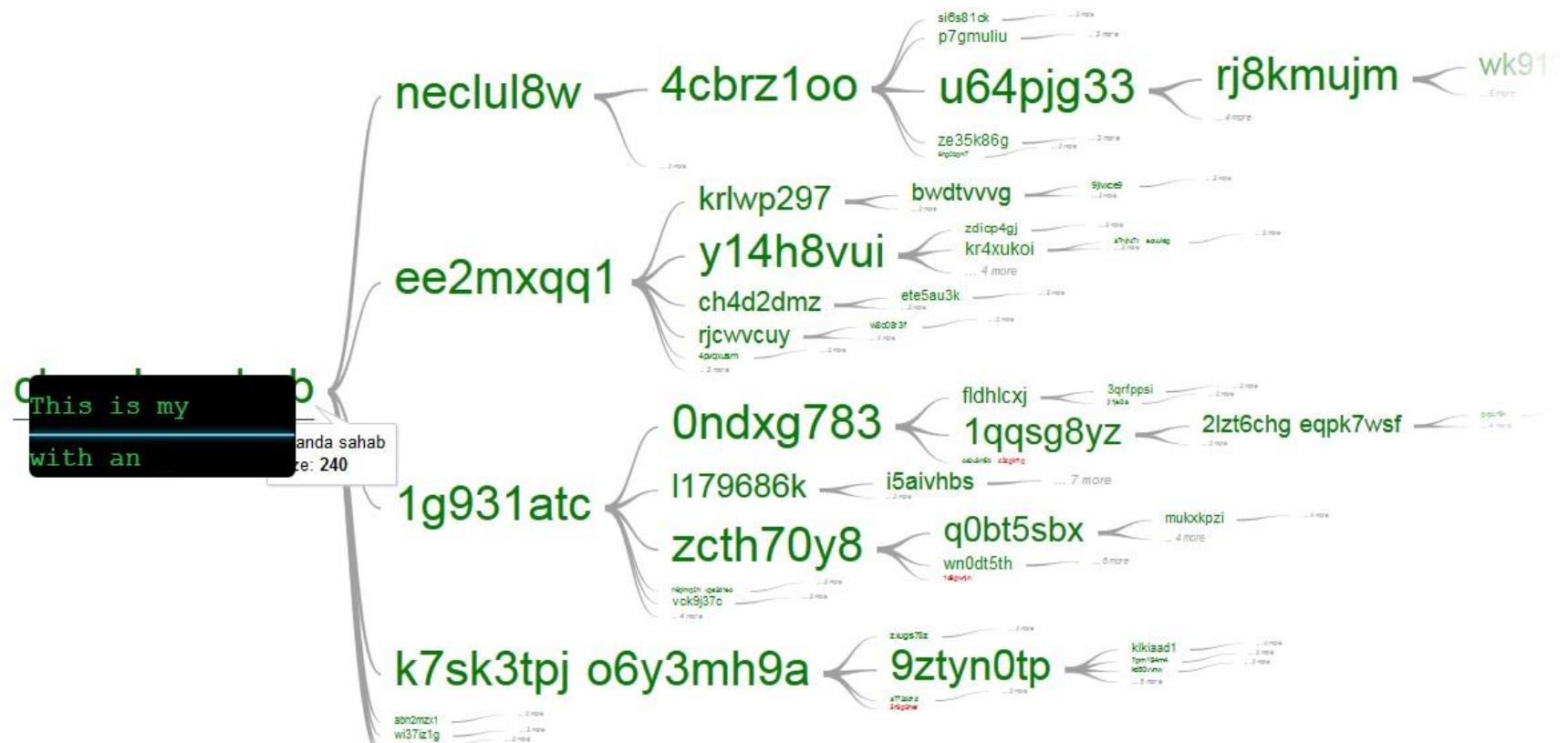
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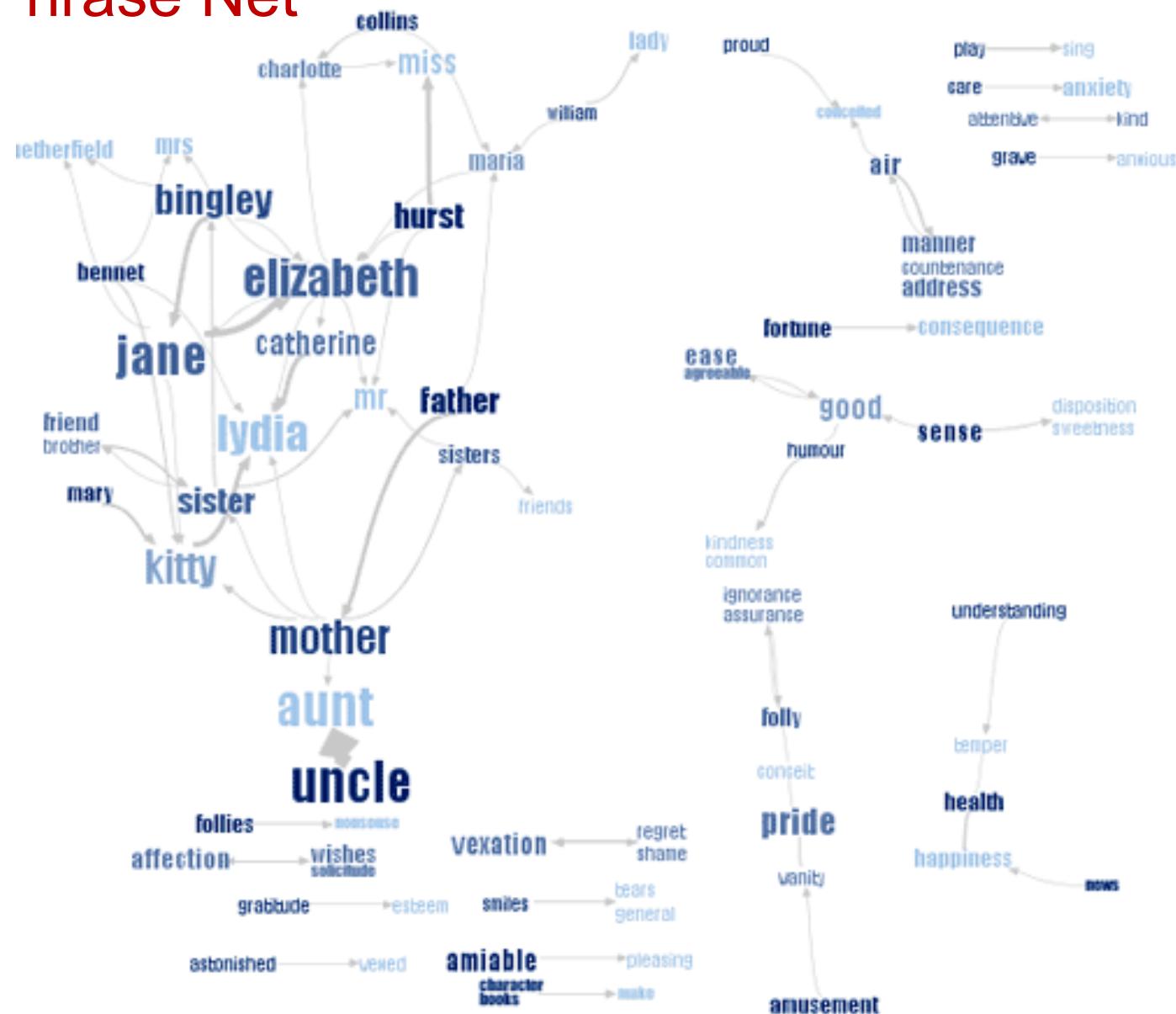
# Text – Word Tree



# Text – Tag Cloud



# Text – Phrase Net



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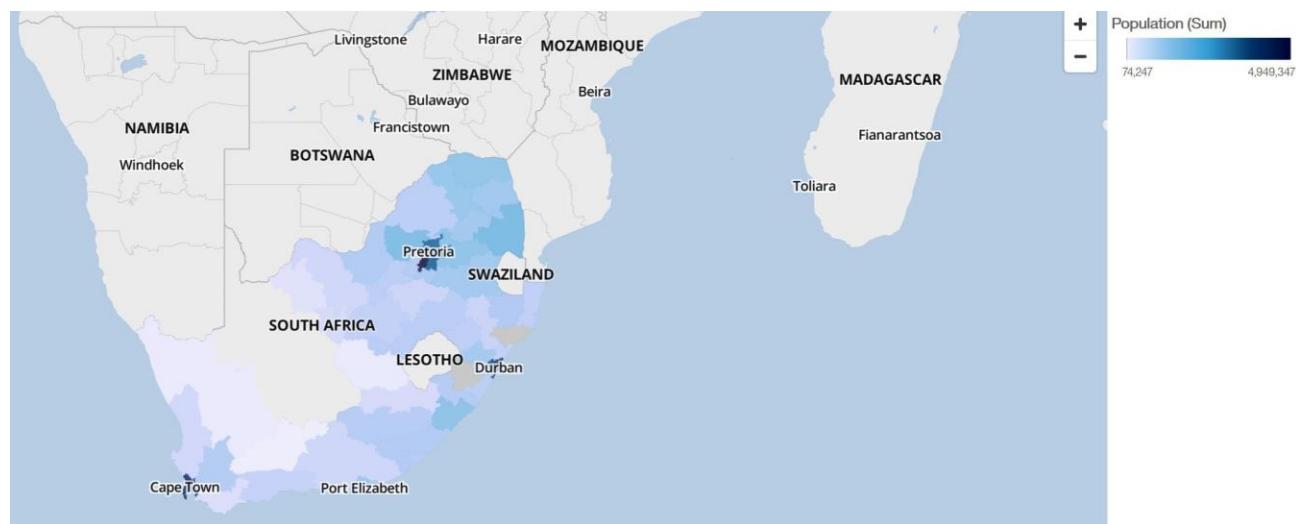
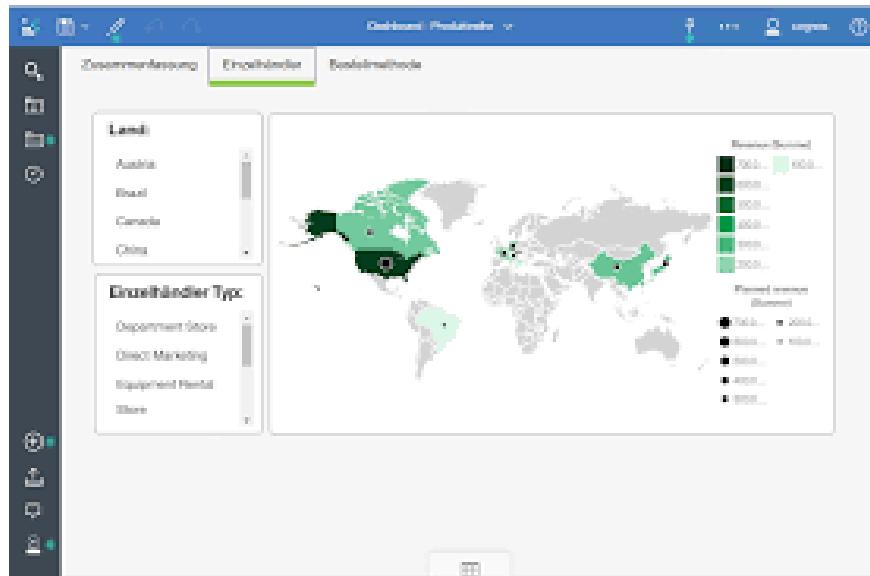
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# Map – Different Map Diagrams



# Purpose > Content > Structure > Formatting

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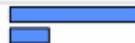
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### See the world

-  Ottawa Neighbourhood Map
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# Purpose > Content > Structure > **Formatting**

## Visual Encoding Properties and Best Uses

Visual Encoding		Properties		Best Uses			
Example	Encoding	Ordered	Useful values	Quantitative	Ordinal	Categorical	Relational
	position, placement	yes	infinite	Good	Good	Good	Good
1, 2, 3; A, B, C	text labels	optional (alphabetical or numbered)	infinite	Good	Good	Good	Good
	length	yes	many	Good	Good		
	size, area	yes	many	Good	Good		
	angle	yes	medium/few	Good	Good		
	pattern density	yes	few	Good	Good		
	weight, boldness	yes	few		Good		
	saturation, brightness	yes	few		Good		
	color	no	few (< 20)			Good	
	shape, icon	no	medium			Good	
	pattern texture	no	medium			Good	
	enclosure, connection	no	infinite			Good	Good
	line pattern	no	few				Good
	line endings	no	few				Good
	line weight	yes	few		Good		



# Checklist

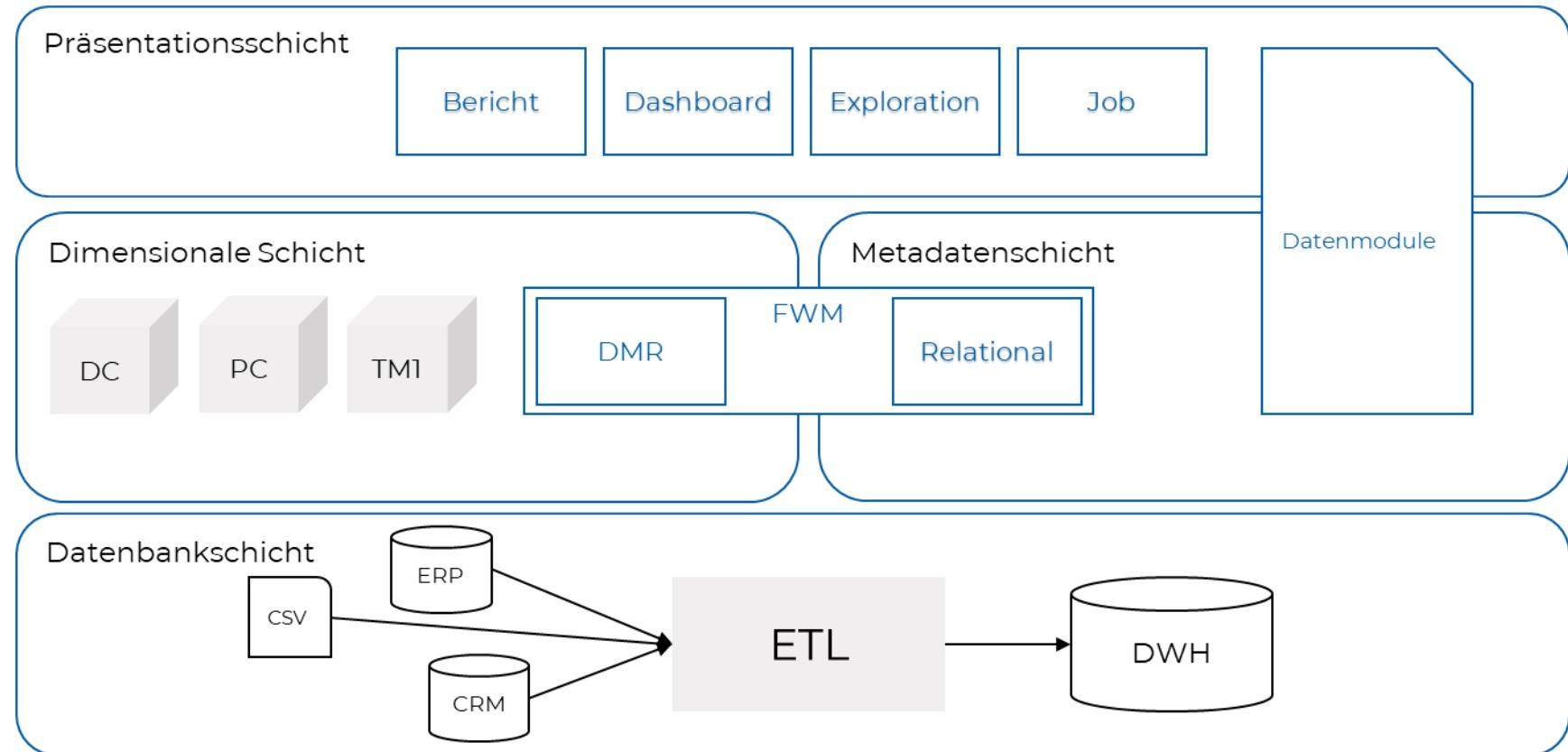
- Is the purpose well-defined?
- Does the content support the purpose?
- Does the structure reveal the content?
- Does the formatting facilitate consumption?

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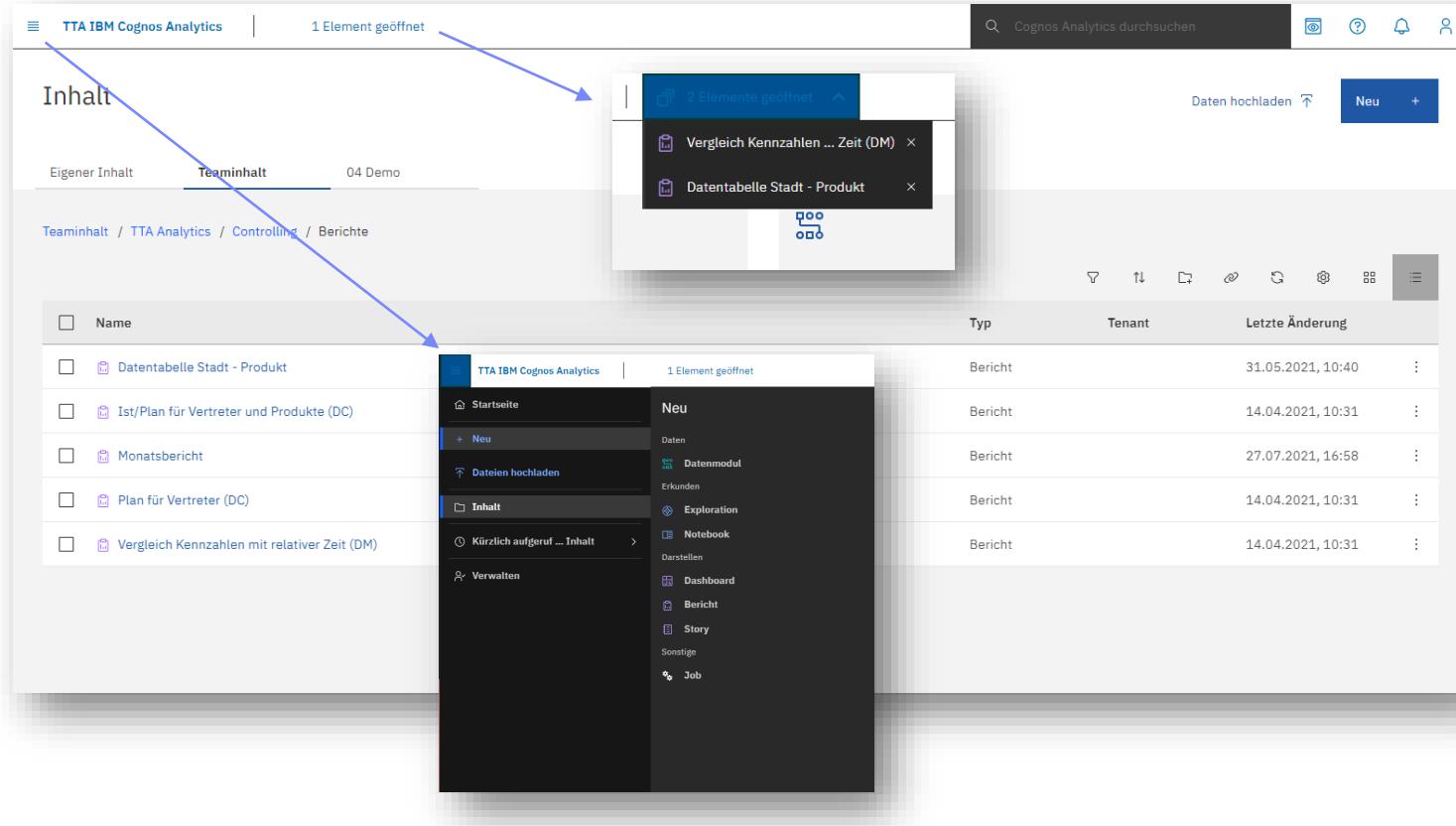
# Visualization – Cognos Analytics Samples



# IBM Cognos Architektur



# Navigation im Portal



The screenshot illustrates the navigation and search functionality within the TTA IBM Cognos Analytics portal.

**Top Navigation Bar:**

- Logo: TTA IBM Cognos Analytics
- Status: 1 Element geöffnet
- Search: Cognos Analytics durchsuchen
- User Icons: Eye, Help, Bell, Person
- Buttons: Daten hochladen, Neu, +

**Left Sidebar:**

- Inhalt
- Eigener Inhalt
- Teaminhalt
- 04 Demo
- Teaminhalt / TTA Analytics / Controlling / Berichte

**Central Content Area:**

2 Elemente geöffnet

- Vergleich Kennzahlen ... Zeit (DM)
- Datentabelle Stadt - Produkt

**Bottom Grid View:**

Name	Typ	Tenant	Letzte Änderung
Datentabelle Stadt - Produkt	Bericht		31.05.2021, 10:40
Ist/Plan für Vertreter und Produkte (DC)	Bericht		14.04.2021, 10:31
Monatsbericht	Bericht		27.07.2021, 16:58
Plan für Vertreter (DC)	Bericht		14.04.2021, 10:31
Vergleich Kennzahlen mit relativer Zeit (DM)	Bericht		14.04.2021, 10:31

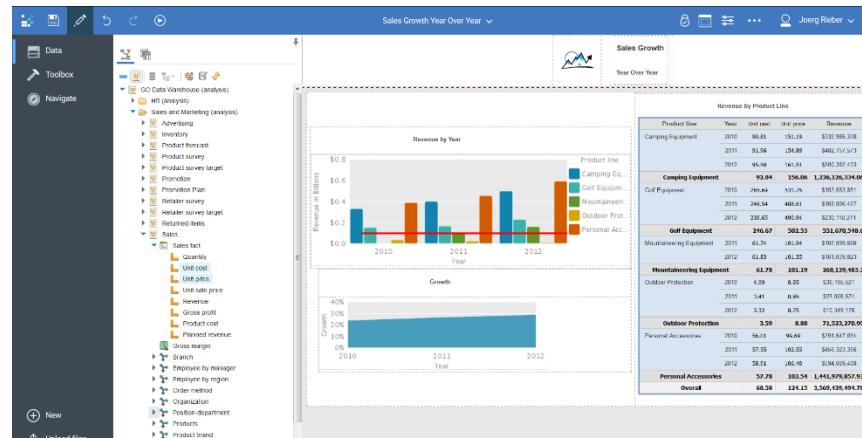
**Bottom Left Overlay:**

- Startseite
- + Neu
- ↑ Dateien hochladen
- Inhalt
- Kürzlich aufgerufen ... Inhalt
- ↓ Verwalten

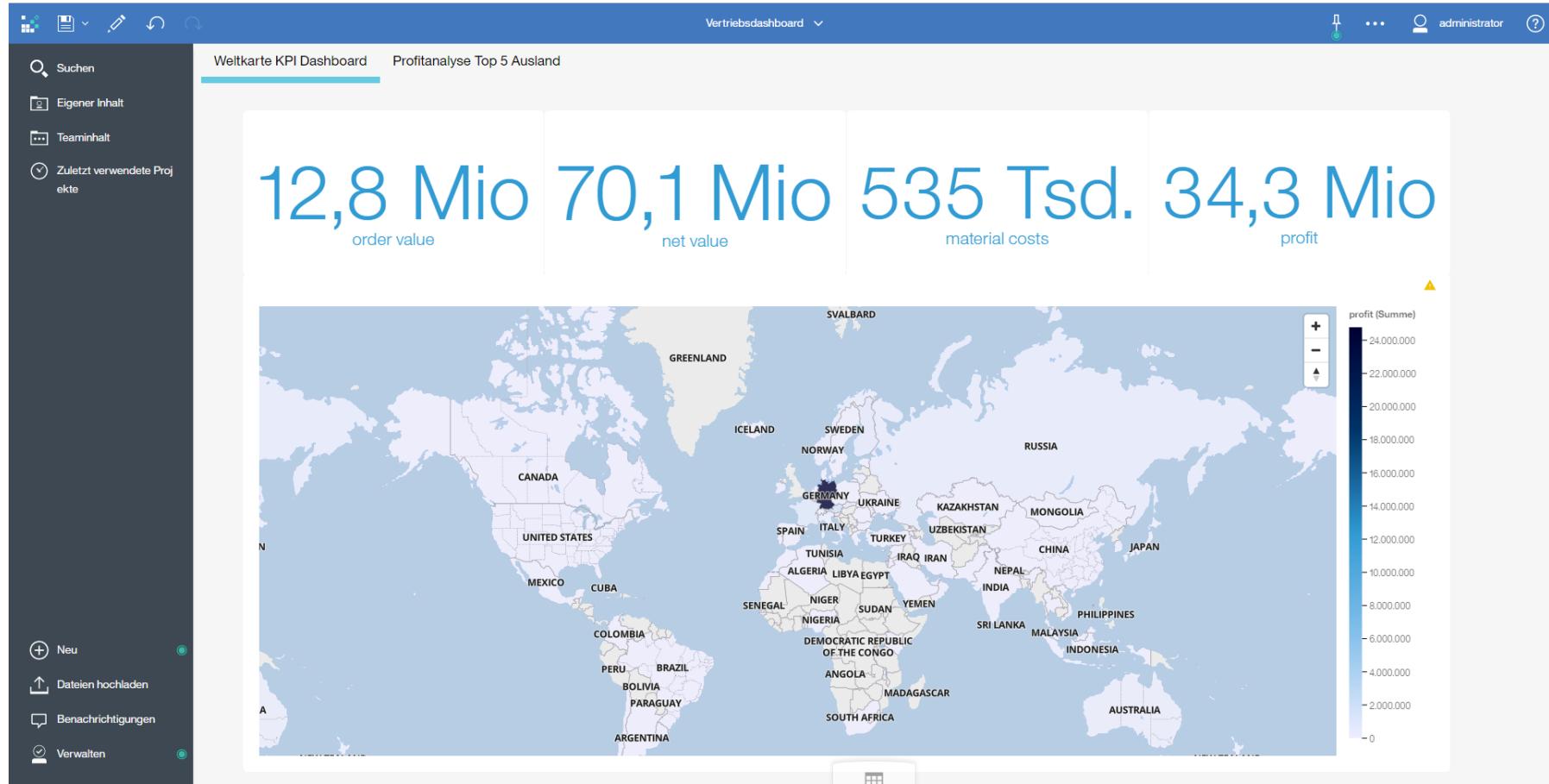
# Konsumenten

## Finden, betrachten, arbeiten

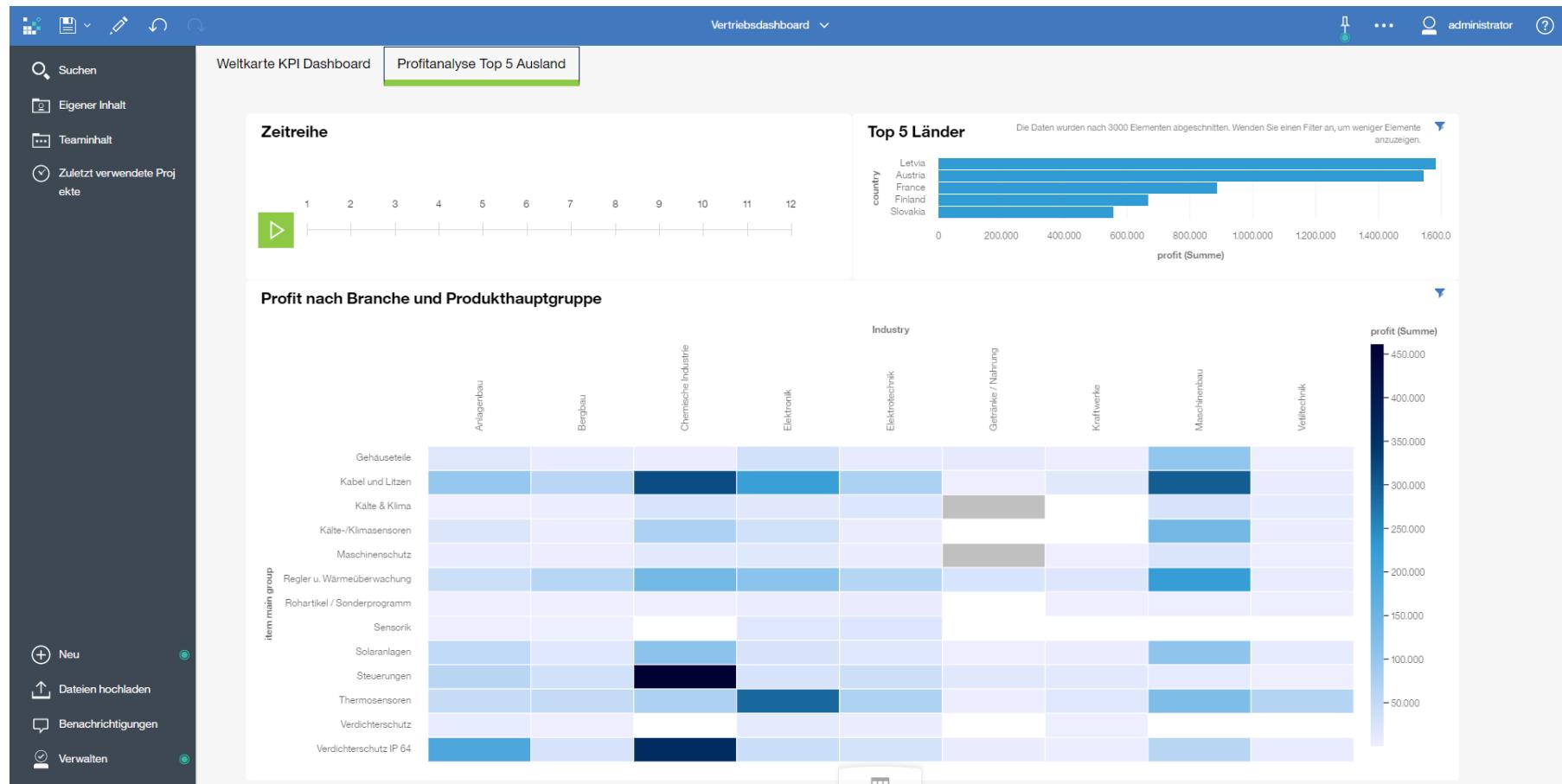
- Smarte Suche die im Kontext schnelle Suchergebnisse liefert
- Sortieren und filtern um die persönlichen Fragen zu beantworten



# Weltkarte mit KPI's



# Profitanalyse Top Länder im Ausland



# Dashboard - Ländervergleich

Ländervergleich \* ... administrator ?

## Country Comparison

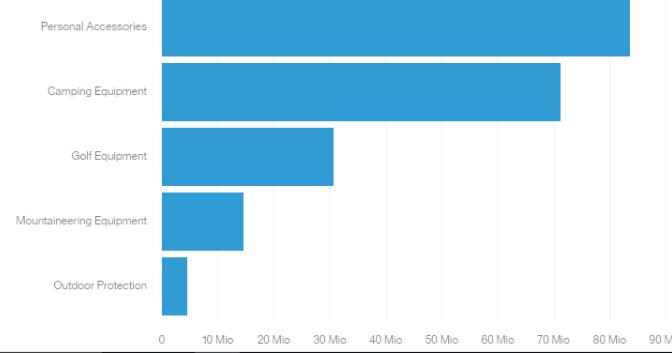
Totals:

2,17 Mrd	2,28 Mrd	42,4 Mio
Revenue	Planned revenue	Quantity

**Country 1:**

Country	Revenue	Quantity
Austria		
Brazil		
Canada		
China		
France		
Germany	205 Mio	4,06 Mio
Italy		

**Revenue by Product Line:**

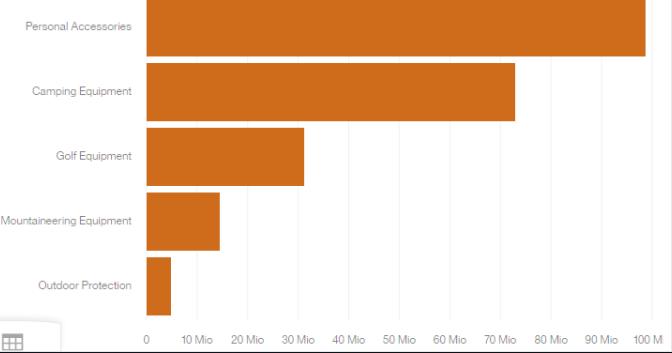


Product Line	Revenue (Mio)
Personal Accessories	~85 Mio
Camping Equipment	~75 Mio
Golf Equipment	~35 Mio
Mountaineering Equipment	~15 Mio
Outdoor Protection	~5 Mio

**Country 2:**

Country	Revenue	Quantity
Austria		
Brazil		
Canada		
China		
France	222 Mio	4,39 Mio
Germany		
Italy		

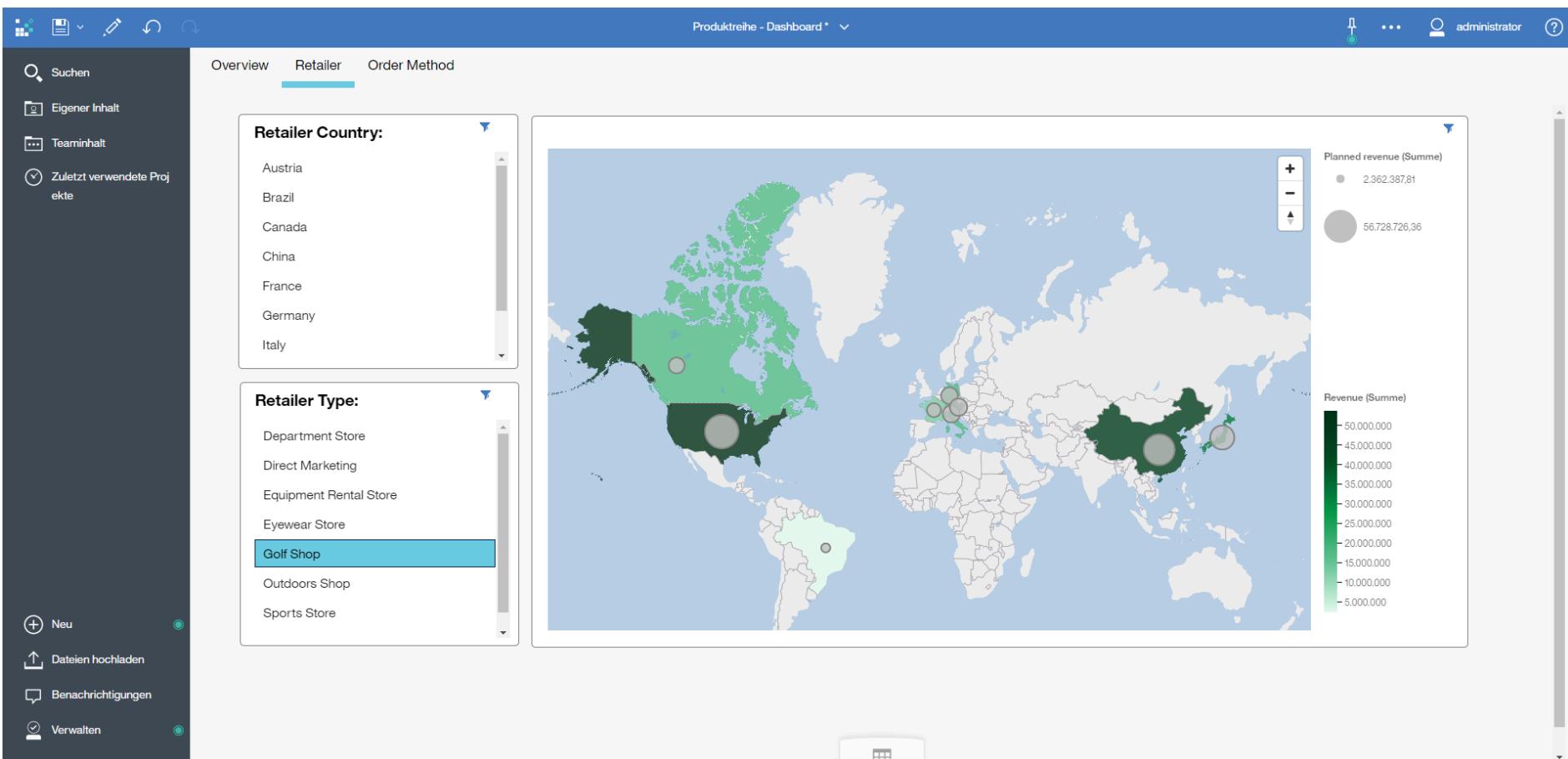
**Revenue by Product Line:**



Product Line	Revenue (Mio)
Personal Accessories	~95 Mio
Camping Equipment	~75 Mio
Golf Equipment	~35 Mio
Mountaineering Equipment	~15 Mio
Outdoor Protection	~5 Mio

Suchen ... Eigener Inhalt Teaminhalt Zuletzt verwendete Projekte ... Neu Dateien hochladen Benachrichtigungen Verwalten

# Geoanalyse (von Kontinent bis zur Koordinate)



# Slice & Dice und Drill-down

Produktreihe - Dashboard \* ▾

administrator ?

Suchen

Eigener Inhalt

Teaminhalt

Zuletzt verwendete Projekte

Overview Retailer Order Method

2013 2014 2015

Revenue by Product Line

Year

- 2013
- 2014
- 2015

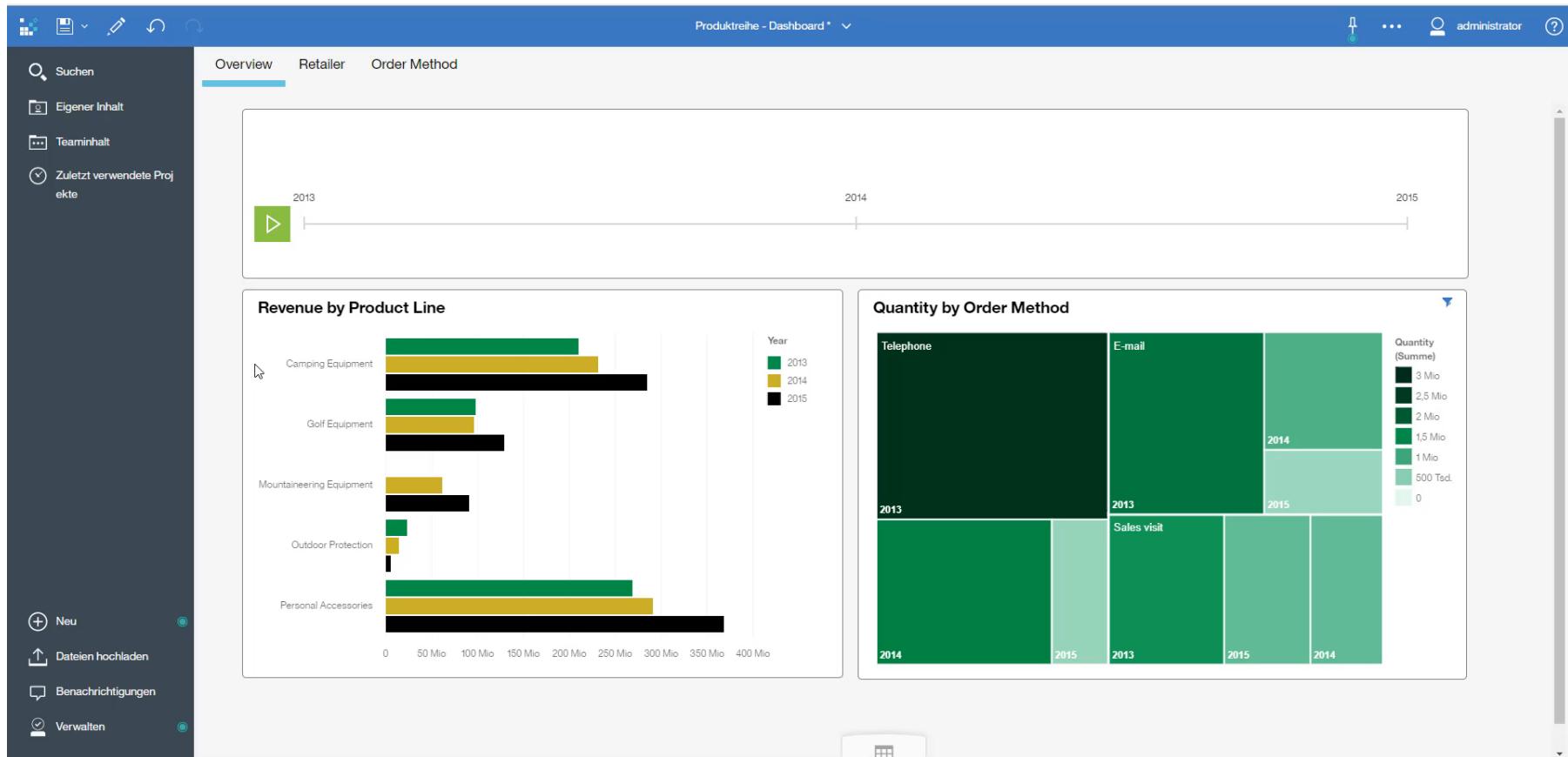
Product Line	2013	2014	2015
Camping Equipment	~210 Mio	~240 Mio	~290 Mio
Golf Equipment	~100 Mio	~100 Mio	~150 Mio
Mountaineering Equipment	~50 Mio	~60 Mio	~90 Mio
Outdoor Protection	~10 Mio	~10 Mio	~10 Mio
Personal Accessories	~280 Mio	~300 Mio	~380 Mio

Quantity by Order Method

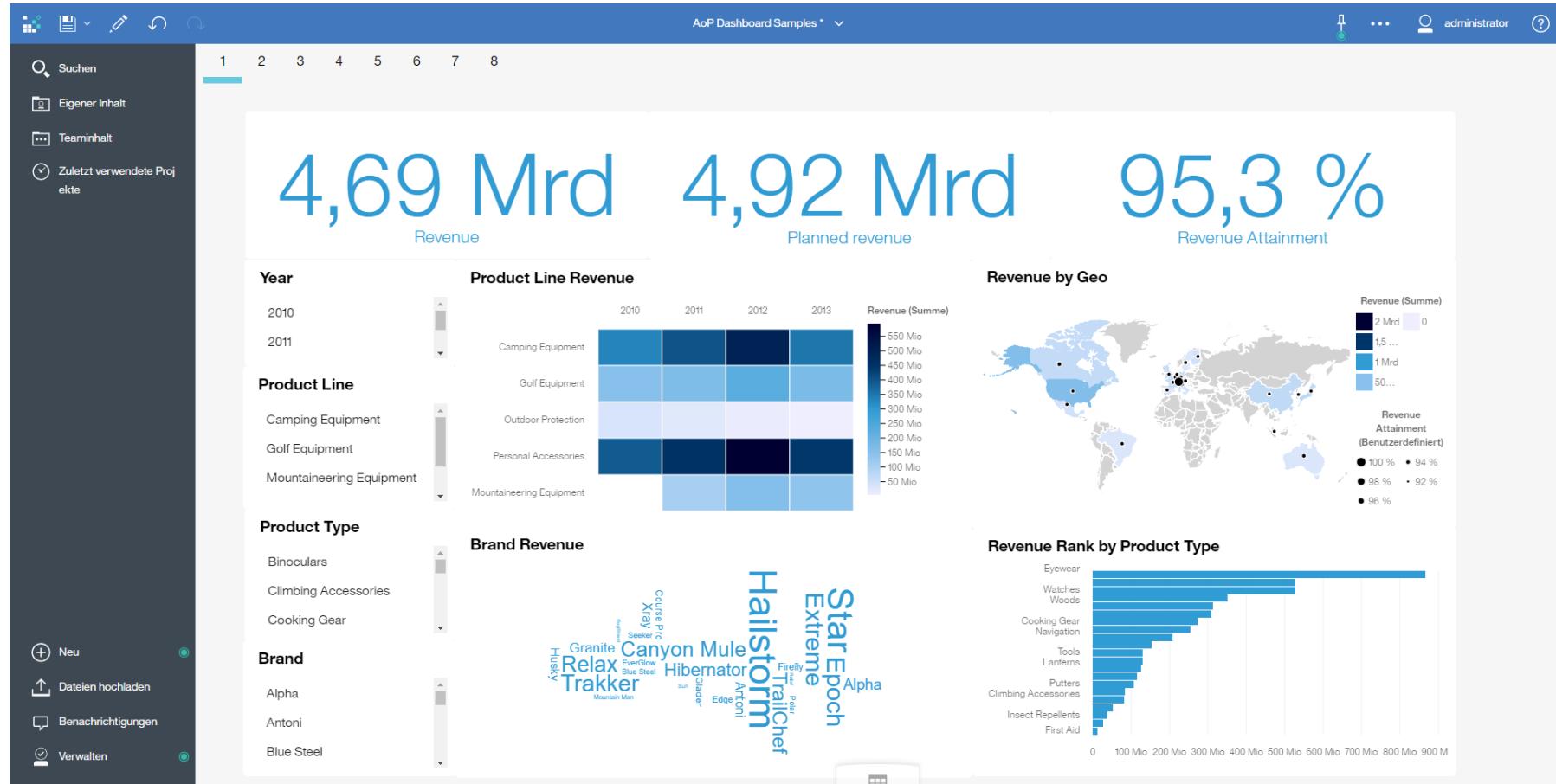
Quantity (Summe)

- 3 Mio
- 2,5 Mio
- 2 Mio
- 1,5 Mio
- 1 Mio
- 500 Tsd.
- 0

Order Method	2013	2014	2015
Telephone	~2,5 Mio	~3 Mio	~2,5 Mio
E-mail	~1,5 Mio	~1 Mio	~1 Mio
Sales visit	~1 Mio	~500 Tsd.	~500 Tsd.



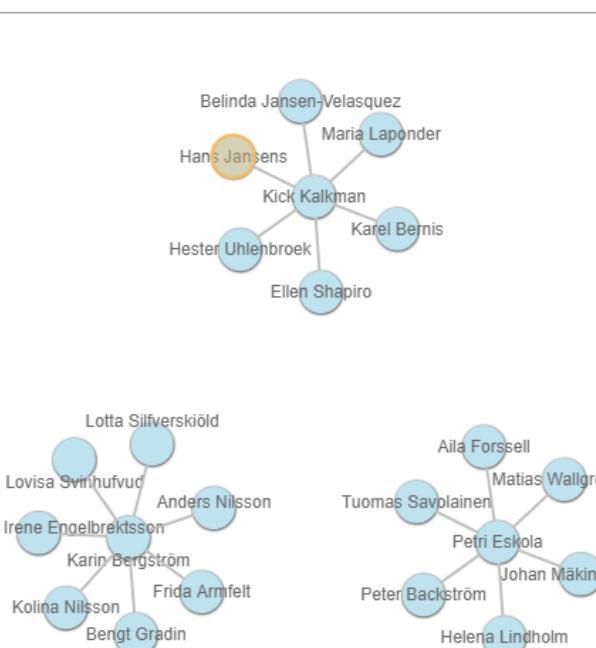
# Kombinationen diverser Visualisierungen



# Netzwerk der Vertriebsbeauftragten

 SALES STAFF NETWORK

REGION:  Click each sales staff node for order details



Hans Jansens	Manager	Kick Kalkman	Country	Netherlands
			Position	Level 3 Sales Representative
			Organization	Sales branch 9 - Amsterdam - NLD

Order Method	Year	Product Line	Product	Product Number
Web	2010	Outdoor Protection	BugShield Lotion Lite	88110
			Sun Blocker	91110
			BugShield Lotion	89110
			BugShield Extreme	90110
Camping Equipment	2011	Star Lite	11110	
		Polar Sun	68190	
		TrailChef Deluxe Cook Set	6110	
Personal Accessories	2012	Star Peg	16110	
			Canyon Mule Carryall	29110
		Camping Equipment	Edge Extreme	75110
			Mountaineering	Husky Rope 200

## Vergleich der Produktlinien



# Vergleich der Produktlinien



## Umsatzvergleich

FLM DASHBOARD FOR: Alex Rodriguez

**REVENUE COVERAGE** 94%

**GROSS PROFIT** 41%

Contact: Alex Rodriguez  
Position: Branch sales manager  
Work phone: 1 (617) 269-6754  
E-mail: ARodriguez@grtd123.com

Address: 1288 Dorchester Avenue  
City/Province or State: Boston, Massachusetts,  
Postal code: 02133  
Country: United States

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TEAM DETAILS										MONTH: (All)			
SALES REP		ORDER \$			DISCOUNT (Average)			COST		REVENUE			
Name	Rep count: 4	Order count	Order quantity	Unit price	Unit sale price	Discount %	Unit cost	Total cost	Revenue	Planned revenue	Revenue %	Gross margin	Gross profit
Eric Carson	52	1	223,462	\$137	\$131	4.7%	\$75	\$7,319,432	\$12,196,161	\$12,918,865	94.4%	\$4,876,729	40.0%
James Ripley	52	1	189,159	\$135	\$128	4.9%	\$71	\$5,533,064	\$9,603,169	\$10,172,479	94.4%	\$4,070,105	42.4%
Pierre Lavoie	42	1	151,672	\$162	\$154	5.0%	\$88	\$5,931,554	\$9,792,414	\$10,341,274	94.7%	\$3,860,860	39.4%
Rhonda Cummings	69	1	199,707	\$169	\$159	5.9%	\$85	\$7,612,489	\$13,392,909	\$14,287,735	93.7%	\$5,780,420	43.2%
<b>Rep count: 4</b>	<b>215</b>	<b>1</b>	<b>764,000</b>			<b>5.1%</b>			<b>\$44,984,653</b>	<b>\$47,720,352</b>	<b>94.3%</b>	<b>\$18,588,113</b>	<b>41.3%</b>

● less than 2%  
 ■ greater than 5%  
 ● greater than 45%  
 ■ less than 40%

---

TEAM SALES (Quantity)

This bubble chart displays the quantity of sales for different store types across four sales representatives. The size of each bubble corresponds to the total quantity sold.

Store Type	Eric Carson	James Ripley	Pierre Lavoie	Rhonda Cummings
Sports Store	24,379	67,666	10,000	10,000
Outdoors Shop	104,492	85,500	10,000	10,000
Department Store	64,551	71,005	10,000	10,000
Other	52,787	10,000	10,000	10,000

TEAM SALES BY PRODUCT LINE

This bar chart compares the quantity of sales across five product lines for each sales representative.

Product Line	Eric Carson	James Ripley	Pierre Lavoie	Rhonda Cummings
Camping Equipment	100,000	80,000	70,000	100,000
Golf Equipment	10,000	15,000	10,000	20,000
Mountain	60,000	40,000	30,000	10,000
Outdoor Protection	15,000	20,000	15,000	15,000
Personal Accessories	30,000	20,000	20,000	20,000

TEAM PIPELINE

This line chart tracks the pipeline quantity for each sales representative from January to December. The data shows significant fluctuations and seasonal trends.

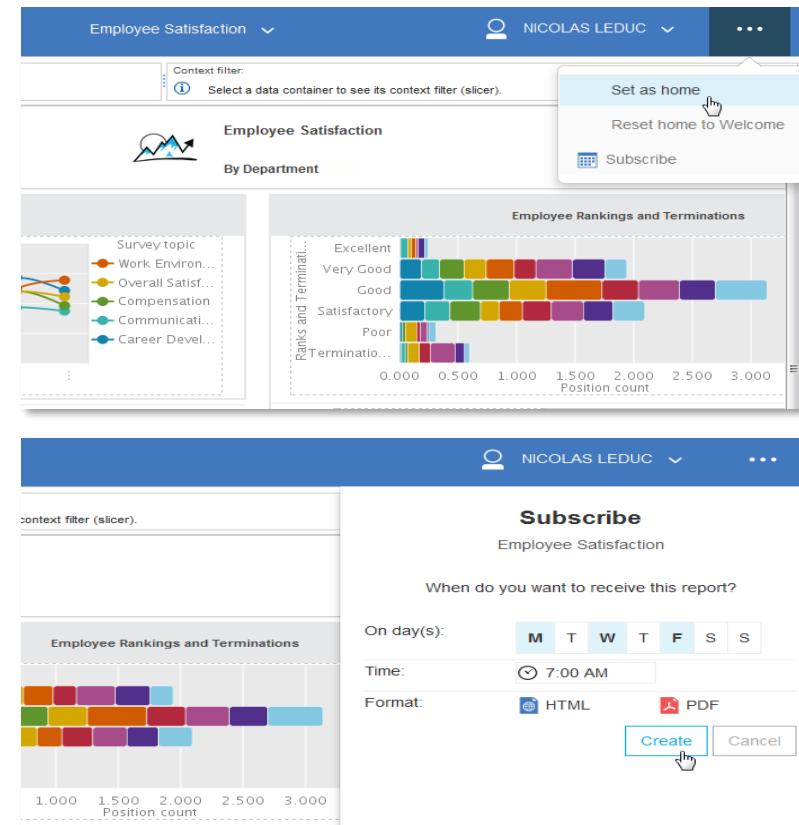
Month	Eric Carson	James Ripley	Pierre Lavoie	Rhonda Cummings
Jan	10,000	10,000	5,000	32,000
Feb	25,000	20,000	10,000	15,000
Mar	15,000	10,000	10,000	28,000
Apr	10,000	15,000	10,000	20,000
May	35,000	15,000	10,000	10,000
Jun	20,000	10,000	10,000	25,000
Jul	15,000	10,000	10,000	30,000
Aug	20,000	10,000	10,000	25,000
Sep	15,000	10,000	10,000	28,000
Oct	10,000	35,000	10,000	20,000
Nov	5,000	20,000	10,000	10,000
Dec	10,000	25,000	10,000	10,000

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# Meine Analysen

## Wie ich sie brauche

- Personalisierung (Interaktivität nicht mehr durch die Vorgaben des Berichtserstellers limitiert)
- Häufigste Berichte sofort verfügbar
- Fließender Übergang zur Anpassung von Berichten
- Der Bericht wird zum Ausgangspunkt für weiterführende Analysen
- Abonnieren von Berichten



# Erstellen einfache Dashboards und Berichte

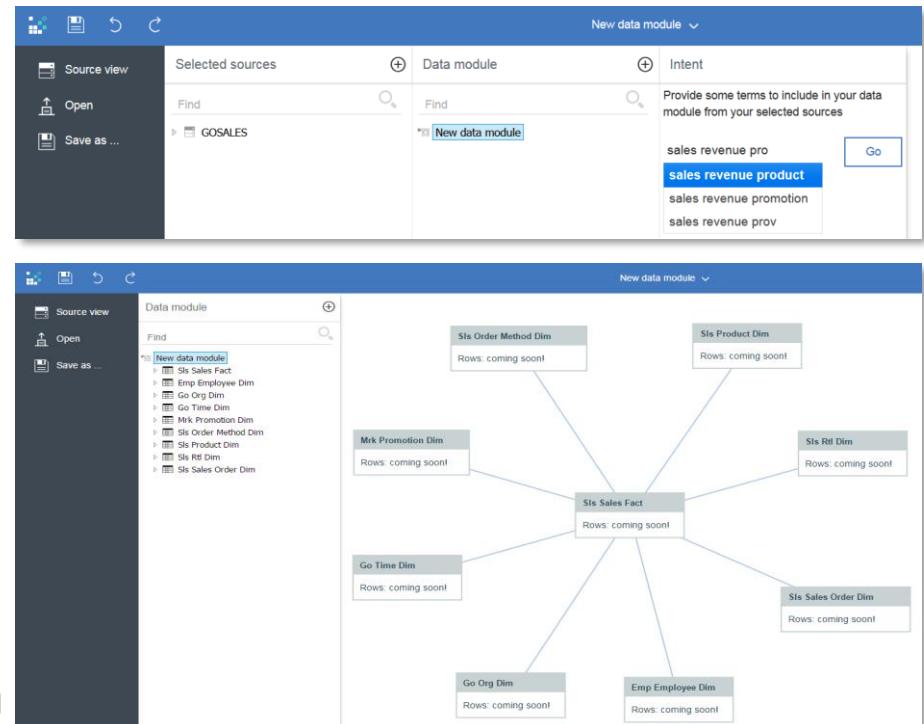
- Datenquelle auswählen und los
- Geführte Navigation
  - ▶ Design und Layout
  - ▶ Drag and Drop
  - ▶ Empfehlung der Visualisierung
- Aufbauende Oberfläche
- Dashboard-Erstellung auf dem IPad



# Power User

## Daten für fortgeschrittene Berichte

- „Intent-driven modeling“ basierend auf den ausgewählten Daten
  - ▶ Suche nach Feldern
  - ▶ Verknüpfen mehrere Quellen
  - ▶ Automatische Modellerstellung
- Verbesserte Daten Qualität – Data Cleansing
- Visualisierung des Models
- Report aus mehreren Datenquellen



# Self-service BI

## Navigieren

- Eine einheitliche Web-Oberfläche auf allen Endgeräten
- Smart search (kontextbezogen)
- Zuletzt benutzt

The screenshot shows the IBM Cognos Analytics interface. On the left, there are two main navigation panes: 'My content' and 'Team content'. The 'My content' pane includes sections for 'Sales Module', 'Sales Growth Year Over Year', and 'Audit Reports'. The 'Team content' pane includes sections for 'Great Outdoors Company', 'Audit Reports', 'Calls', 'Current Asset...nt Liabilities', 'Employee Satisfaction', 'Models', and 'Product Line Dashboard'. In the center, a search bar is at the top, followed by a table titled 'sales' with columns 'Type', 'Name', and 'Count'. Below this is a detailed table titled 'By product lines' showing revenue over four years for 'Camping Equipment' and 'Golf Equipment'.

## Analysieren

- Funktionen liegen hinter On-Demand Toolbars und Menüs
- Intuitive and Interaktiv
- Personalisiert

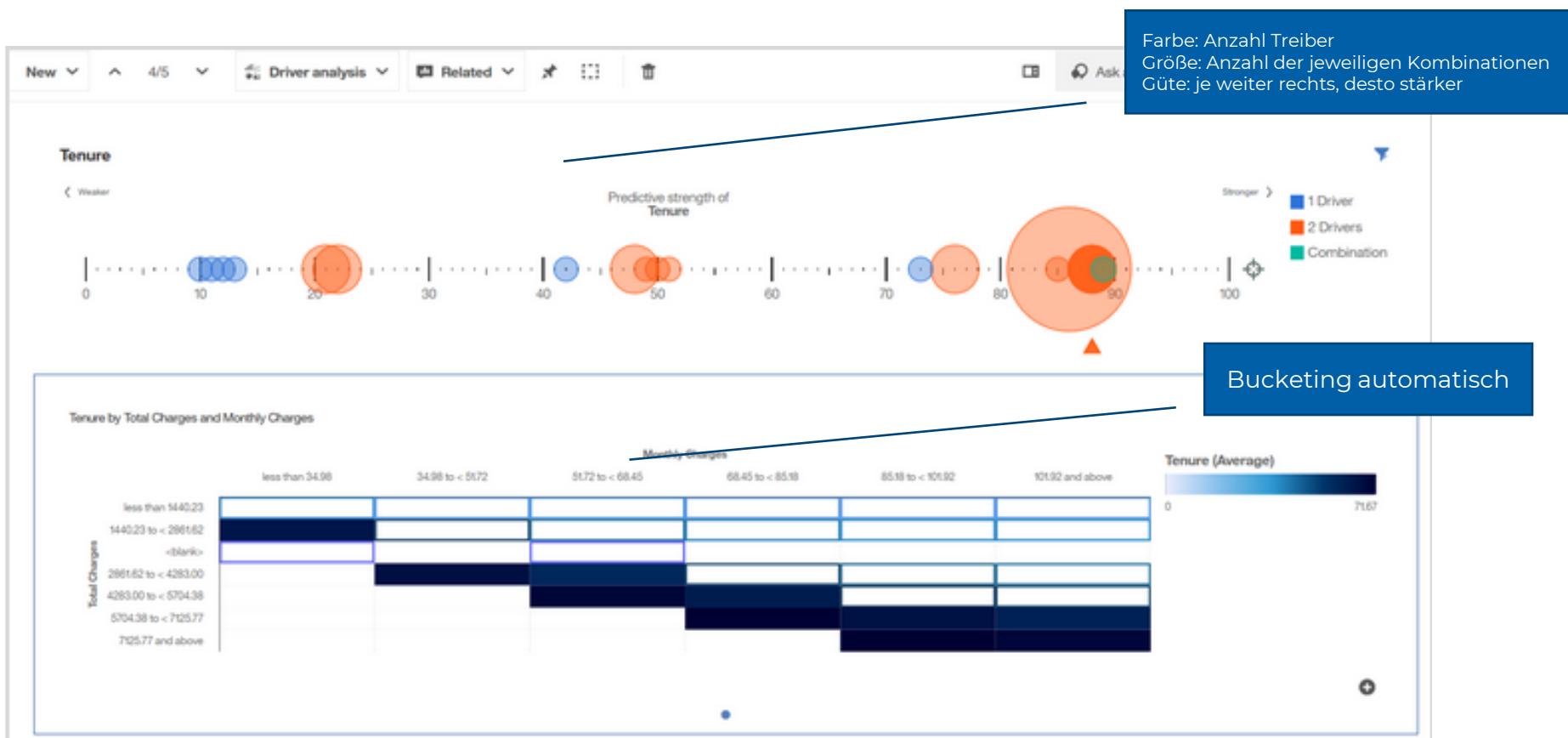
By product lines		
	Year	Revenue
Camping Equipment	2010	332,986,338.06
	2011	402,757,573.17
	2012	500,382,422.83
	2013	352,910,329.97
Camping Equipment - Summary		1,589,036,664.03
Golf Equipment	2010	153,553,850.98
	2011	168,006,427.07
	2012	230,110,270.55
	2013	174,740,819.29
Golf Equipment - Summary		726,411,367.89

## Erstellen

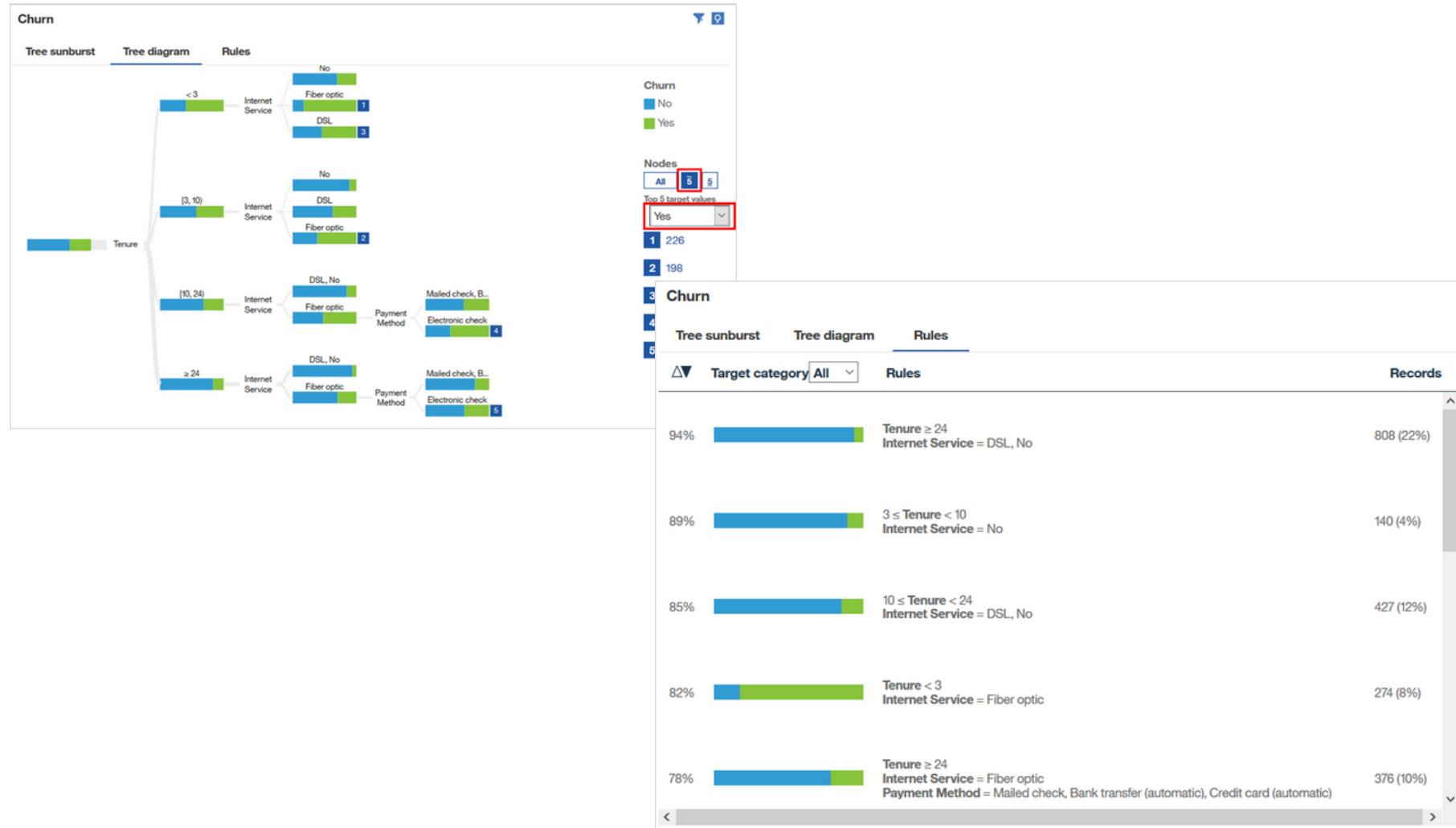
- Einfacher Datenzugriff
- Einfach zu erweiterbare Daten Module
- Intent-driven Modellierung und beschleunigte Erstellung

The screenshot shows a data visualization tool interface. On the left, there's a sidebar with 'Data', 'Toolbox', and 'Navigate' buttons. The main area displays a dashboard with a large text box labeled 'Double-click to edit text'. Below it are several icons for different visualizations: 'Table', 'Map', 'List', 'Crosstab', 'Visual...', and 'Chart'. This interface allows users to quickly create and edit various types of data visualizations.

# AI Erweiterungen: Korrelation



# Treiberanalyse / Entscheidungsbaum & -regeln



# Zusammenfassung

## Cognos Analytics

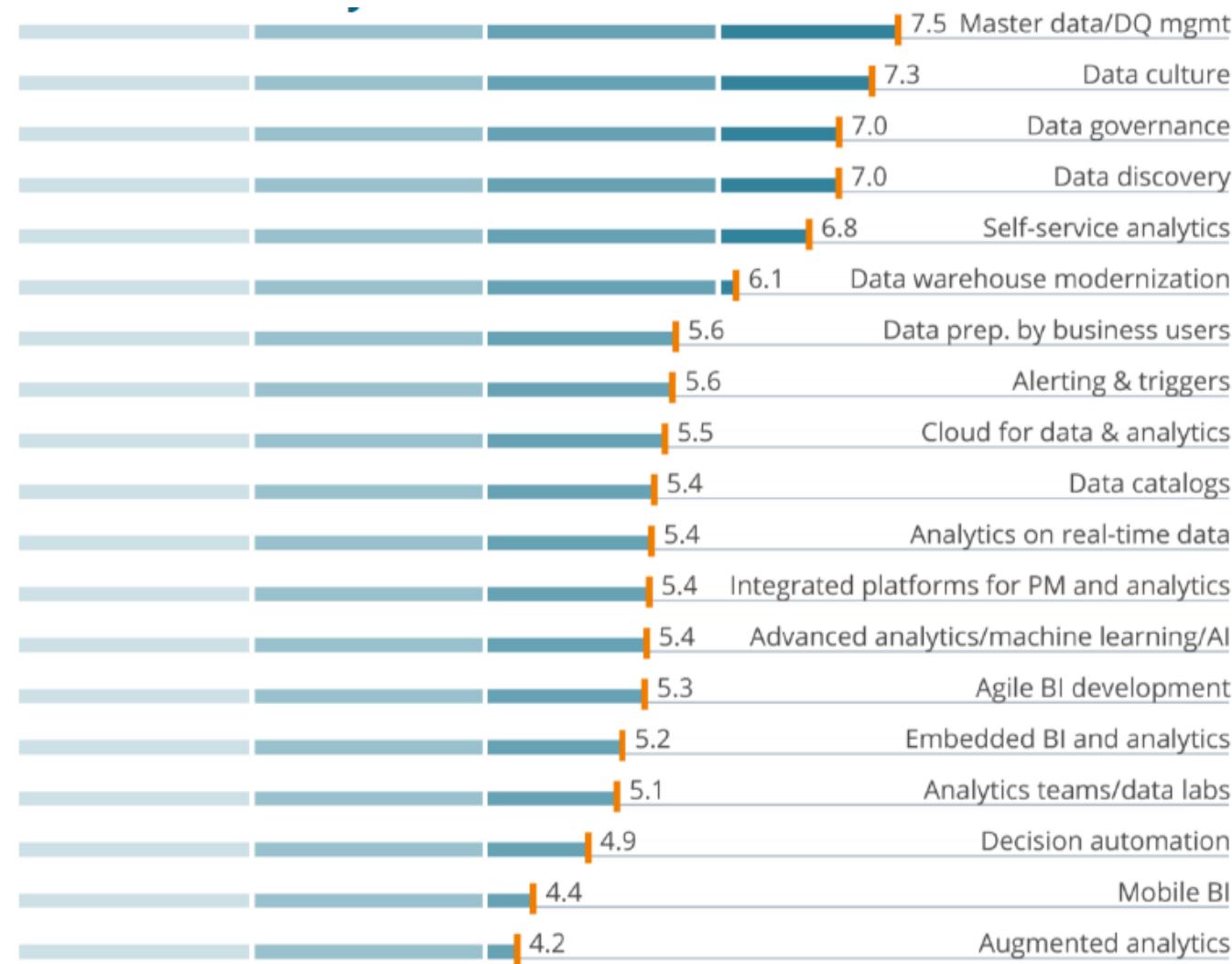
- Moderne Oberfläche
- Dashboarding
- Self Service BI
- Basierend auf vertrauenswürdigen Daten
- Keine Client Installation
- Alle Devices (Mobile)



# Einsatz von BI – Trends in Unternehmen



# Einsatz von BI – Trends in Unternehmen



# Einsatz von BI – Trends in Unternehmen

