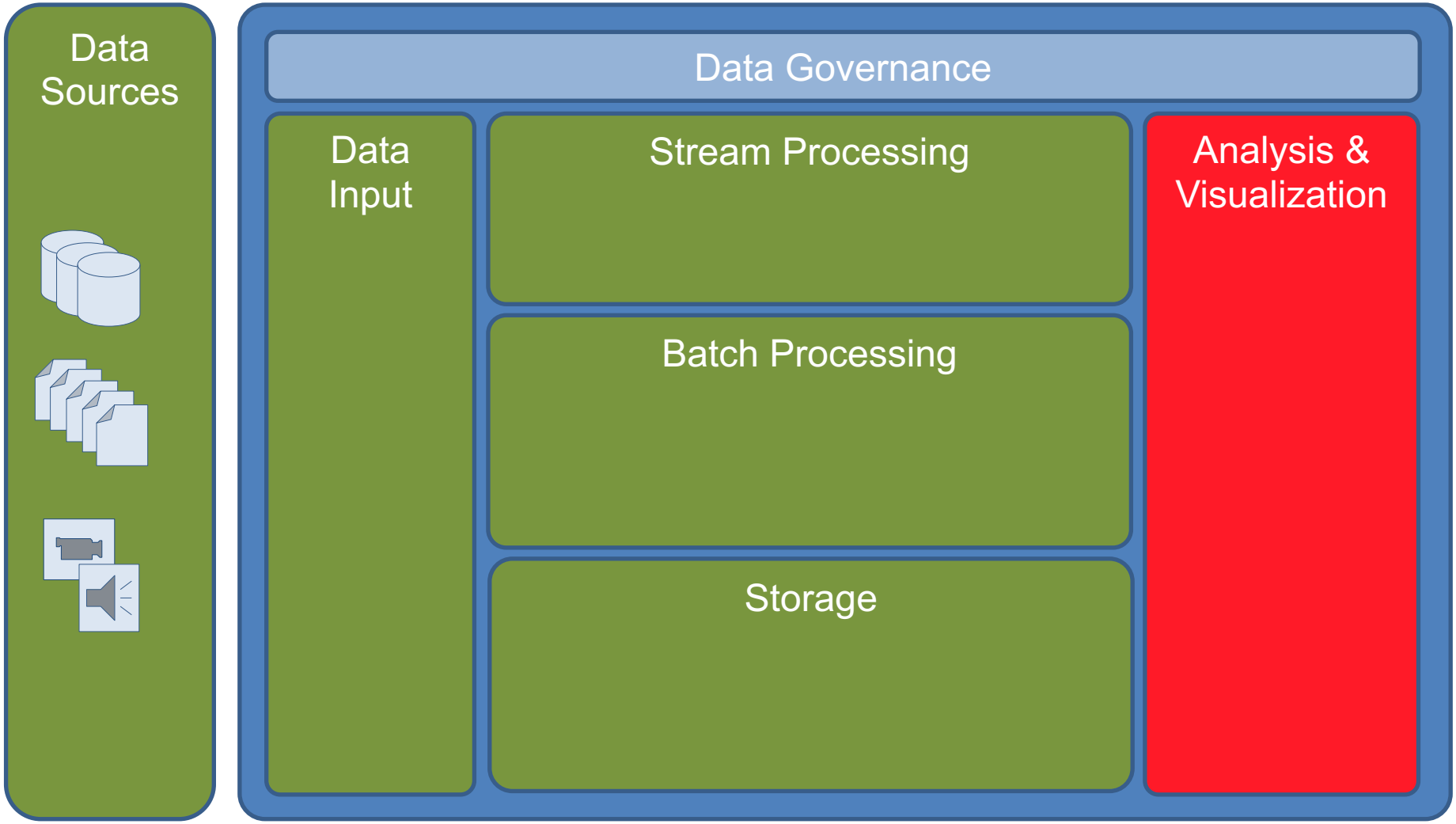
Big Data

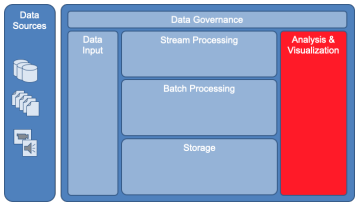
Visualisierung

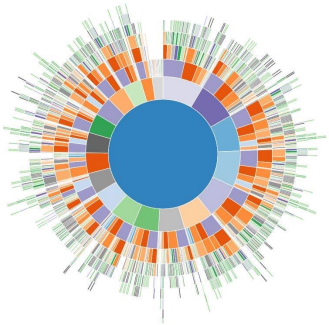
Einige Import-Tools



VISUALISIERUNG

Gründe für Visualisierung

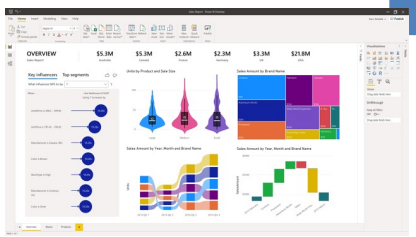


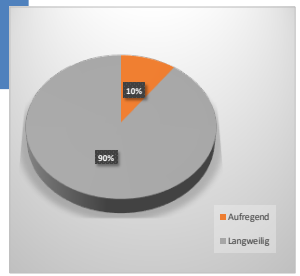


Zusammenhänge finden

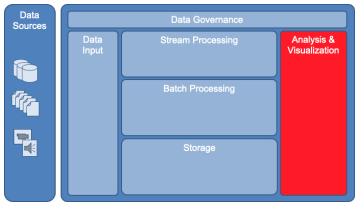
Nutzer mit Daten arbeiten lassen

Ergebnisse präsentieren

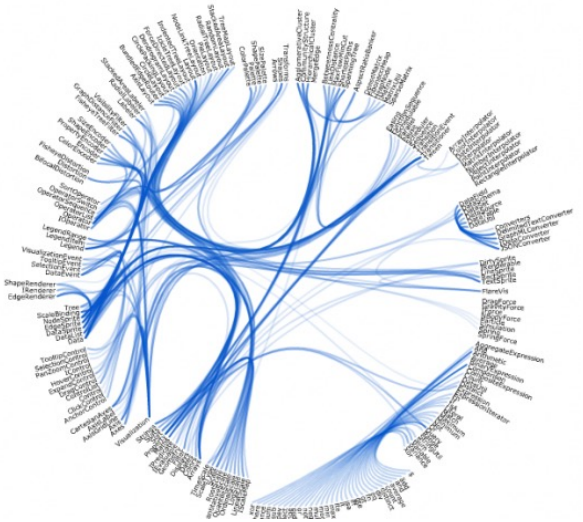


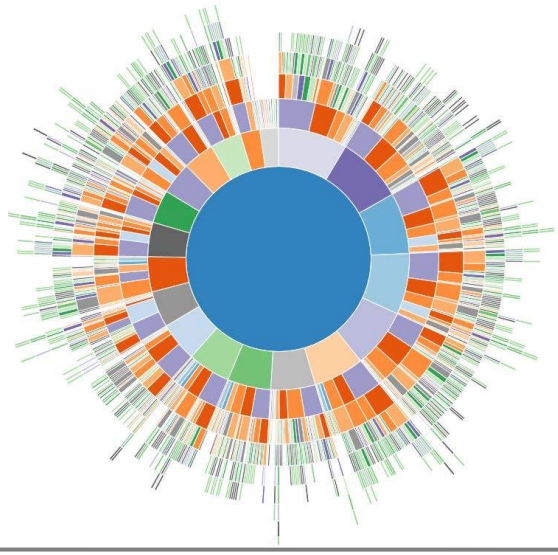


Zusammenhänge Finden

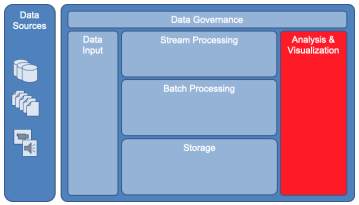


- Abhängigkeiten lassen sich in graphischer Form leichter finden, besonders in der Anfangsphase der Analyse
- Grafiken erlauben die Darstellung von großen Datensätzen
- Outlyer (Ausreiser) lassen sich einfach identifizieren



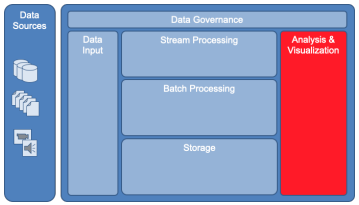


Denken in Bildern



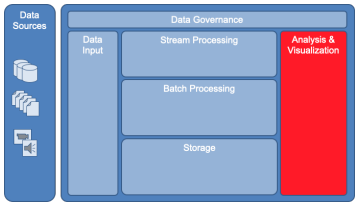
Unser Gehirn ist gut darin, Muster in Bildern zu finden (selbst da, wo keine sind)…

Zusammenhänge und Outlyer

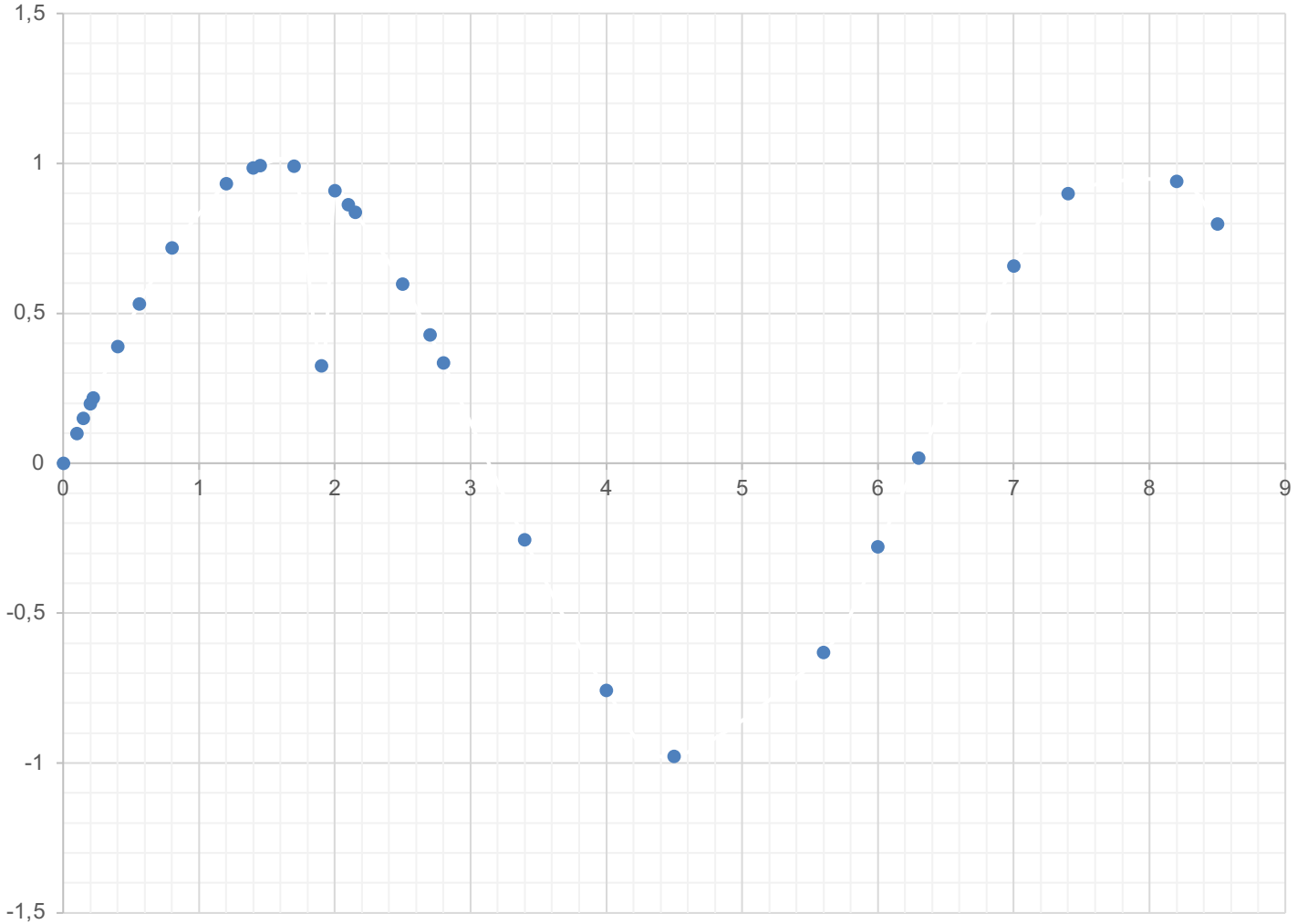


0	0
0,1	0,09983342
0,15	0,14943813
0,2	0,19866933
0,22	0,21822962
0,4	0,38941834
0,56	0,5311862
0,8	0,71735609
1,2	0,93203909
1,4	0,98544973
1,45	0,99271299
1,7	0,99166481
1,9	0,32436829
2	0,90929743
2,1	0,86320937
2,15	0,83689879
2,5	0,59847214
2,7	0,42737988
2,8	0,33498815
3,4	-0,2555411
4	-0,7568025
4,5	-0,9775301
5,6	-0,6312666
6	-0,2794155
6,3	0,0168139
7	0,6569866
7,4	0,8987081
8,2	0,94073056
8,5	0,79848711

Zusammenhänge und Outlyer

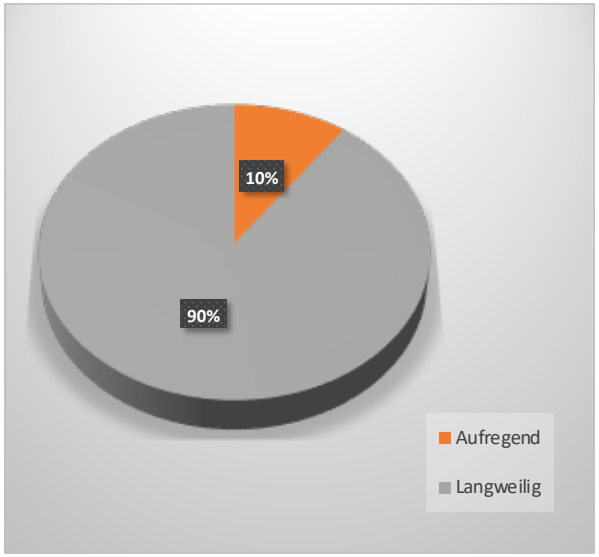


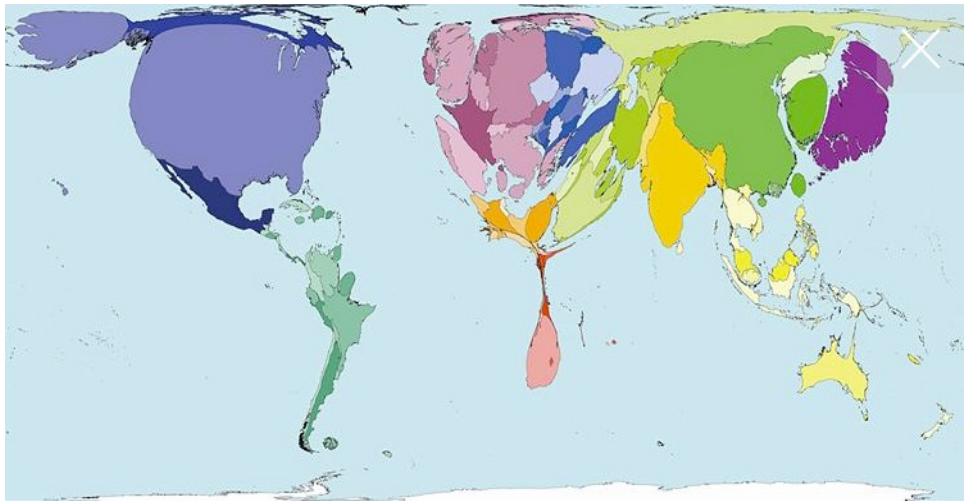
0	0
0,1	0,09983342
0,15	0,14943813
0,2	0,19866933
0,22	0,21822962
0,4	0,38941834
0,56	0,5311862
0,8	0,71735609
1,2	0,93203909
1,4	0,98544973
1,45	0,99271299
1,7	0,99166481
1,9	0,32436829
2	0,90929743
2,1	0,86320937
2,15	0,83689879
2,5	0,59847214
2,7	0,42737988
2,8	0,33498815
3,4	-0,2555411
4	-0,7568025
4,5	-0,9775301
5,6	-0,6312666
6	-0,2794155
6,3	0,0168139
7	0,6569866
7,4	0,8987081
8,2	0,94073056
8,5	0,79848711



Ergebnisse Präsentieren

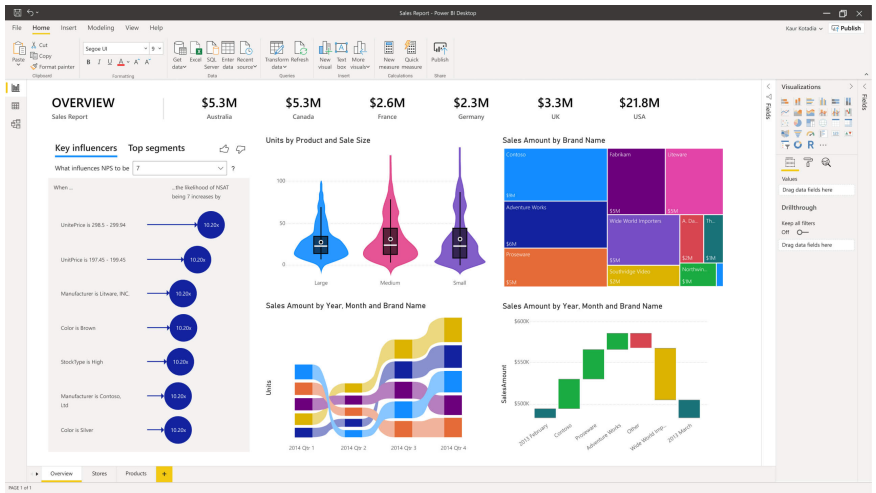
- Um Wert aus Daten zu bekommen (Data to Wisdom) müssen Sie Ihre Daten so präsentieren, dass die Aussage bei den Entscheidungsträgern im Unternehmen ankommt
- Grafik muss interessant, vielleicht überraschend, aber auch intuitiv erfassbar sein
- Farben transportieren eine Aussage (grün = gut, rot = schlecht)

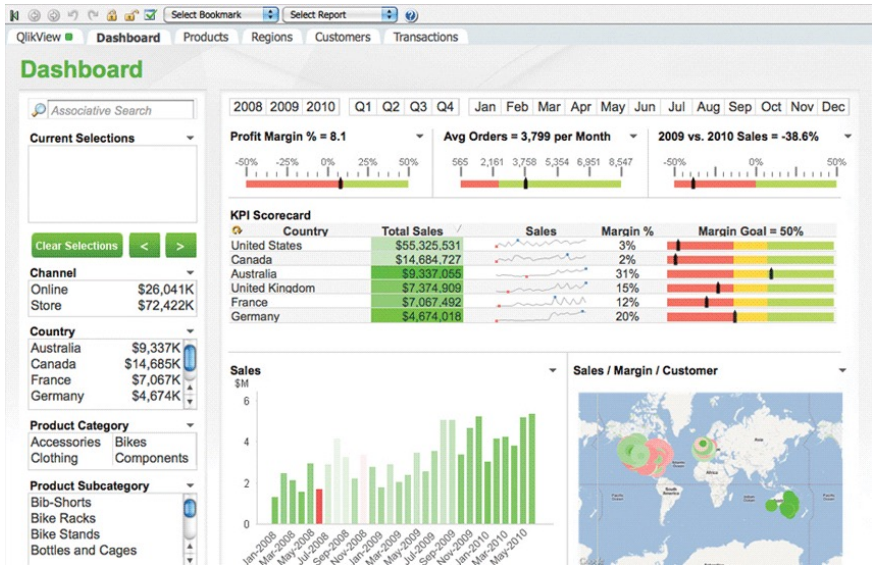




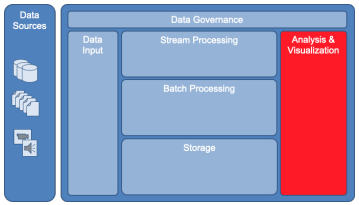
Nutzer mit Daten arbeiten lassen

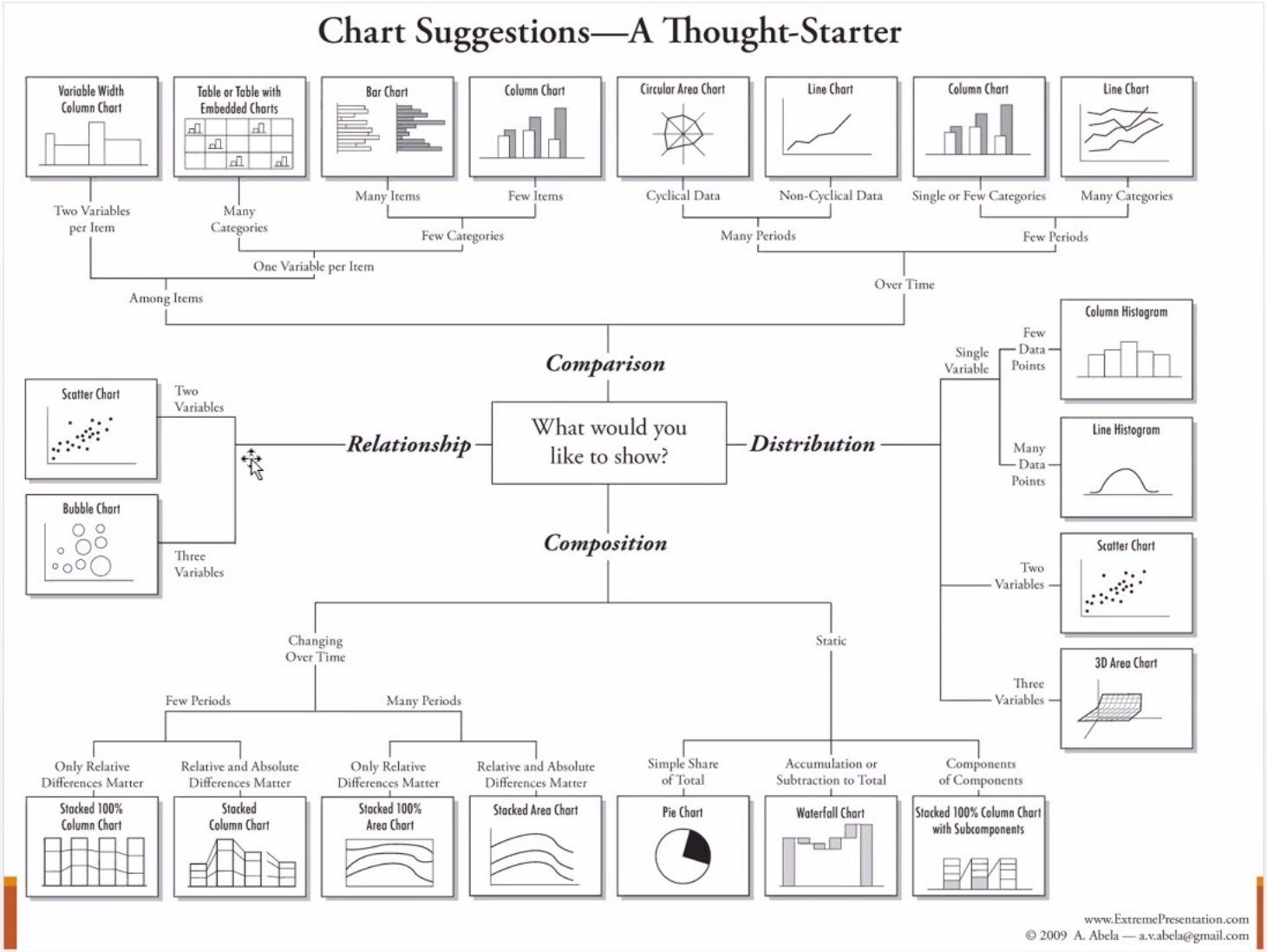
- Warscheinlich grösster Nutzen für das Unternehmen (Business Value), wenn Nutzer in den Fachabteilungen selber mit den Daten “spielen” können
- Aufbereitete Daten z.B. in Data Warehouse
- z.B. interaktive Diagramme, die Filtern, Drill-down usw. Ermöglichen
- Benutzung von BI Tools wie MS PowerBI, Tableau, Qlickview etc.



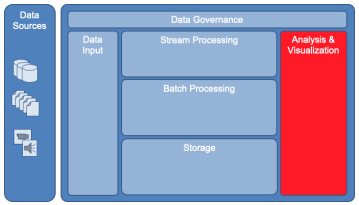


Visualisierung – die Klassiker





Heat Maps



Erlauben eine 3. Dimension als Farben darzustellen

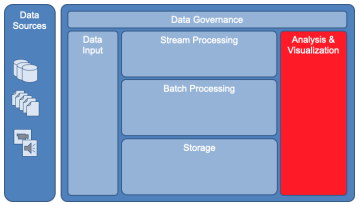
College major of wife and husband: College graduates married in the previous year

Couples in which women married for the first time only; 2009-2016 American Community Survey (N=27,806) *Philip N. Cohen*

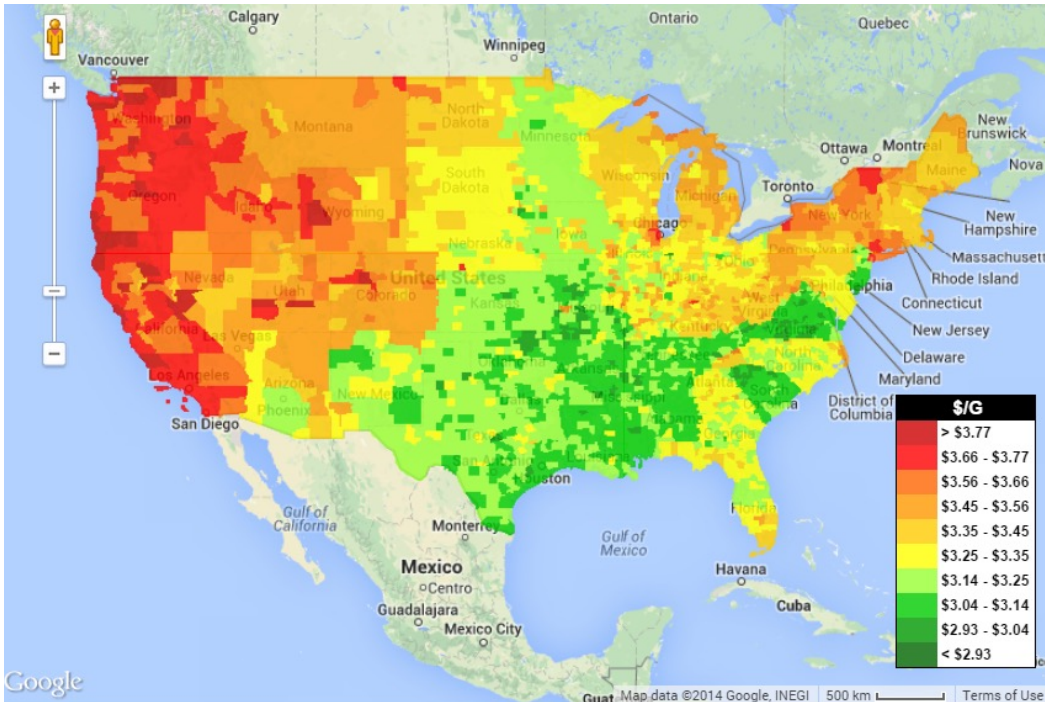
Ratio of observed to expected frequency

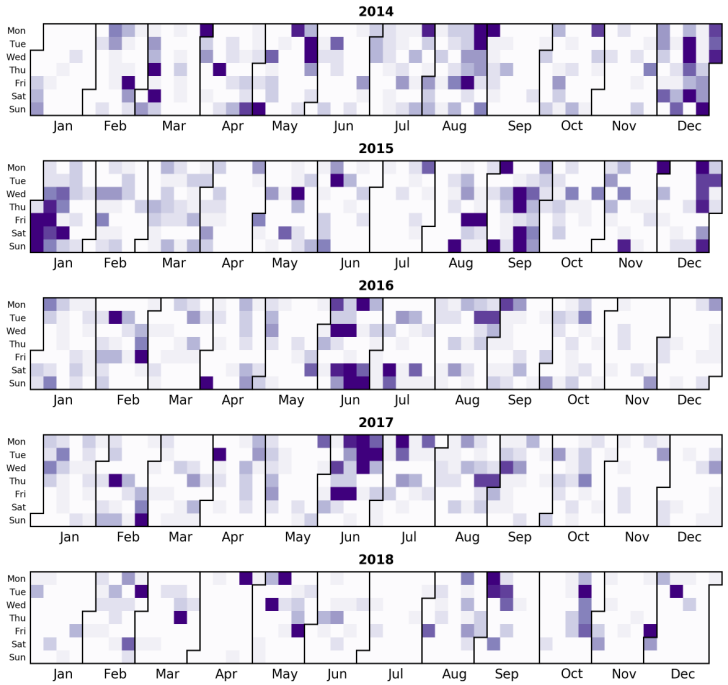
		HUSBAND																										
	WIFE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	Agriculture	19.6	3.4	.5	.0	.4	1.0	.6	1.1	.8	.0	5.3	.4	.0	1.2	.9	.0	.8	.0	.4	.7	.9	1.0	1.5	.4	.7	1.7	.7	.5
2	Environment NatRes	1.9	11.4	2.3	2.0	.9	.6	.4	.9	.2	.0	.0	2.4	.9	1.3	1.2	.0	.9	1.7	.0	1.2	.7	.5	.6	1.3	.6	2.3	.5	.6
3	Architecture	.2	.0	17.9	1.2	.4	1.2	.3	1.6	.0	.8	.0	.5	1.6	.8	1.5	.0	.5	2.7	.0	.3	.1	.1	.6	.8	1.0	.0	.7	.6
4	Area/Ethnic/CivStud	.7	1.7	2.2	6.9	1.3	1.5	.9	.6	.0	2.6	.0	1.0	.2	1.3	1.4	.6	.1	1.4	.0	1.0	.3	.0	.6	1.2	1.8	.6	.8	2.1
5	Communications	.7	.9	.4	1.2	2.6	.6	.8	.7	.8	.5	1.3	1.2	.9	.6	.9	1.1	.9	1.2	1.2	.7	.9	1.0	1.2	1.2	.8	.8	1.2	1.2
6	Computer/InfoSci	.4	.2	.4	.0	.8	4.7	.1	2.1	4.6	.1	.0	.3	.2	.5	.7	.4	.1	.5	.1	1.0	.4	.3	.7	.3	.4	.7	.4	.2
7	Education Admin	1.7	.9	.7	.7	.9	.8	3.3	.7	.9	.7	1.4	.8	1.3	.7	.8	1.0	1.2	.7	2.1	.6	.9	1.4	.4	.7	.9	1.0	1.0	1.3
8	Engineering	.2	.6	.9	.2	.4	1.8	.3	3.5	1.1	.5	.0	.3	.1	.6	.5	.4	.5	.2	.3	1.2	.2	.4	.9	.4	.4	.6	.4	.2
9	Engineering Techn	1.3	.0	.0	.0	.1	2.2	1.3	2.5	7.0	1.5	.0	.0	.0	1.1	.5	1.1	.3	.7	.7	.0	.2	.0	.0	.4	.8	1.4	.5	.0
10	Linguistics/Foreign	.2	1.6	1.2	1.2	.9	.9	.8	.9	.9	5.0	.0	1.9	.1	1.1	2.0	1.6	1.4	1.5	.7	.8	.7	.6	1.3	1.4	1.3	.4	.7	1.4
11	Family/Consumer Sci	.5	1.6	1.7	2.2	1.5	1.0	.5	1.0	.7	.5	2.5	1.3	2.4	.6	.8	1.5	2.5	.5	.3	.7	1.3	1.3	1.6	1.1	.7	.2	1.0	.6
12	English Language/Lit	.9	1.2	.8	1.4	1.3	1.1	.7	.7	.5	1.3	.4	2.9	1.6	.9	1.7	1.5	.6	.9	.9	.9	1.3	.6	.8	1.3	1.3	.4	.8	1.8
13	LiberalArts/Human	.3	.4	3.6	3.1	1.3	1.0	.8	.8	.6	1.2	.0	1.2	9.4	.7	1.6	1.3	.5	.2	1.0	1.5	.8	1.5	.3	1.1	.8	.8	.7	1.2
14	Biology and LifeSci	.9	1.2	1.2	.9	.6	.9	.5	1.0	1.0	.9	.8	.8	.6	3.0	.8	.8	1.0	.7	.8	1.8	1.1	.8	.8	1.0	.6	1.2	.7	.8
15	Math/Stats	.0	.3	.8	.0	.5	1.6	1.3	1.3	2.1	1.7	.0	1.3	.8	.6	5.7	1.7	.5	1.2	1.8	2.0	.5	.3	.8	.7	.9	1.1	.7	.5
16	Interdisc/multidisc	1.5	.5	.3	1.8	1.0	1.1	.6	.9	2.5	1.3	.0	.9	.8	1.6	.7	2.9	1.2	1.6	1.7	1.0	1.8	.5	.0	1.1	.9	.3	.8	1.2
17	PhysFit, Park/Rec	1.3	.7	.5	.4	.6	.5	1.3	.7	2.0	.8	1.6	.4	.6	1.1	.2	1.5	5.7	.5	.4	.5	.9	.8	2.5	.9	.5	.9	1.3	1.2
18	Philosophy/ReligStud	.9	1.5	1.2	1.4	.9	.7	.4	.9	1.0	3.7	.0	1.8	.7	.7	2.8	4.2	.4	8.3	1.6	.7	1.8	1.1	.0	1.0	1.2	.2	.6	1.9
19	Theology/ReligVoc	.0	.0	2.6	1.7	1.1	.3	2.4	.5	.4	1.5	.0	.4	.0	1.3	2.7	2.7	.0	4.0	31.0	.0	1.0	1.4	2.7	.3	1.7	1.5	.5	.4
20	PhysicalSci	.4	.8	.4	2.0	.4	.9	.6	.9	.5	1.9	.5	.8	.5	1.2	2.0	1.0	.6	.9	.2	7.2	.6	.6	.0	.9	.5	.8	.6	1.0
21	Psychology	.9	1.3	.8	1.0	1.0	.8	.8	.8	.4	.8	2.4	.8	.7	.8	1.0	1.4	1.0	2.0	1.2	.7	1.9	1.4	1.5	1.2	1.3	.8	1.0	1.3
22	CrimJustice/Fire	.6	.5	.5	1.5	1.0	.9	1.2	.5	.9	1.9	2.7	.2	2.3	.6	1.0	1.0	1.1	1.1	.3	.7	.5	6.3	1.1	.8	.9	1.8	1.2	.2
23	PubAff/Policy/SocWk	1.5	.6	1.1	3.9	1.0	1.1	.9	.8	1.1	1.9	2.0	1.4	1.3	.8	.3	.2	.4	.7	1.1	1.3	1.4	1.0	6.9	.9	.3	.6	1.2	.4
24	SocialSci	.4	.9	1.2	1.6	.9	.9	.5	.8	.4	.7	.3	1.2	1.1	1.0	1.1	1.4	.5	1.9	.3	1.0	1.4	.7	1.7	1.8	1.1	.4	.9	1.3
25	Fine Arts	.5	1.0	1.6	1.1	1.4	1.0	1.0	.7	.6	1.2	.5	1.8	1.3	.4	.9	.9	.8	1.0	1.1	.7	.7	.8	.6	1.0	4.4	.5	.8	.8
26	Medical/HealthSci	.8	1.1	.5	.7	.8	.7	1.1	1.0	1.0	.8	1.7	.6	.9	1.4	.8	1.0	1.6	.9	.7	.8	1.2	1.2	1.0	.7	.5	3.4	1.0	.9
27	Business	1.0	.7	.7	.5	.9	1.0	.6	1.0	1.3	1.1	.8	.7	.6	.7	.8	.5	.8	.3	.7	.6	.8	1.1	.7	.9	.6	.7	1.6	.6
28	History	.4	1.1	1.5	.5	.8	.7	1.0	.7	.2	.6	.7	2.0	.4	1.0	1.0	.8	.8	2.9	1.0	.8	1.2	.9	.7	1.6	1.0	.6	.8	2.9

Heat Maps



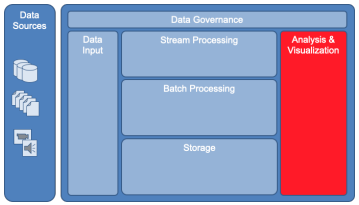
Besonders gut in Kombination mit geographischen Koordinaten…

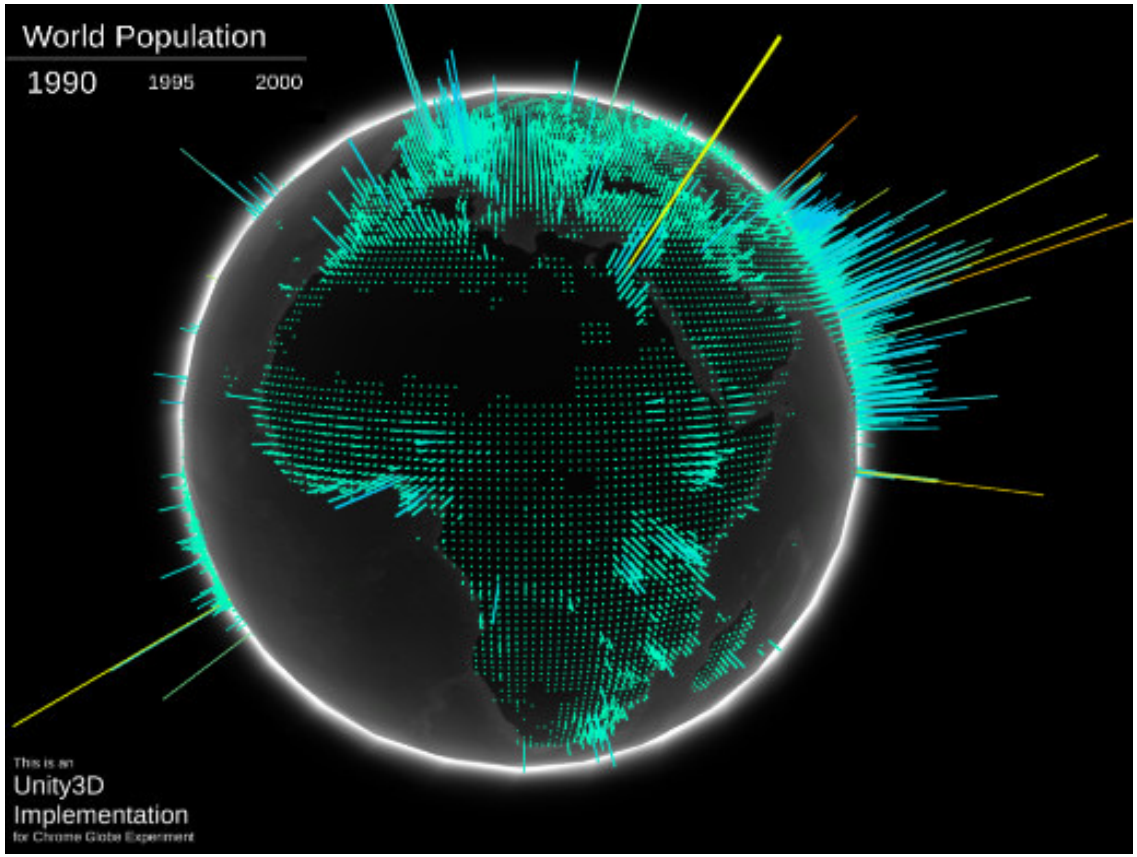




…oder in Kalender-Darstellung

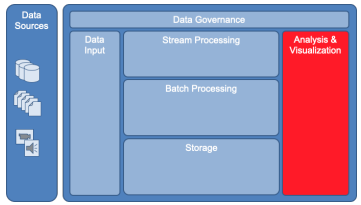
Heat Map Variante

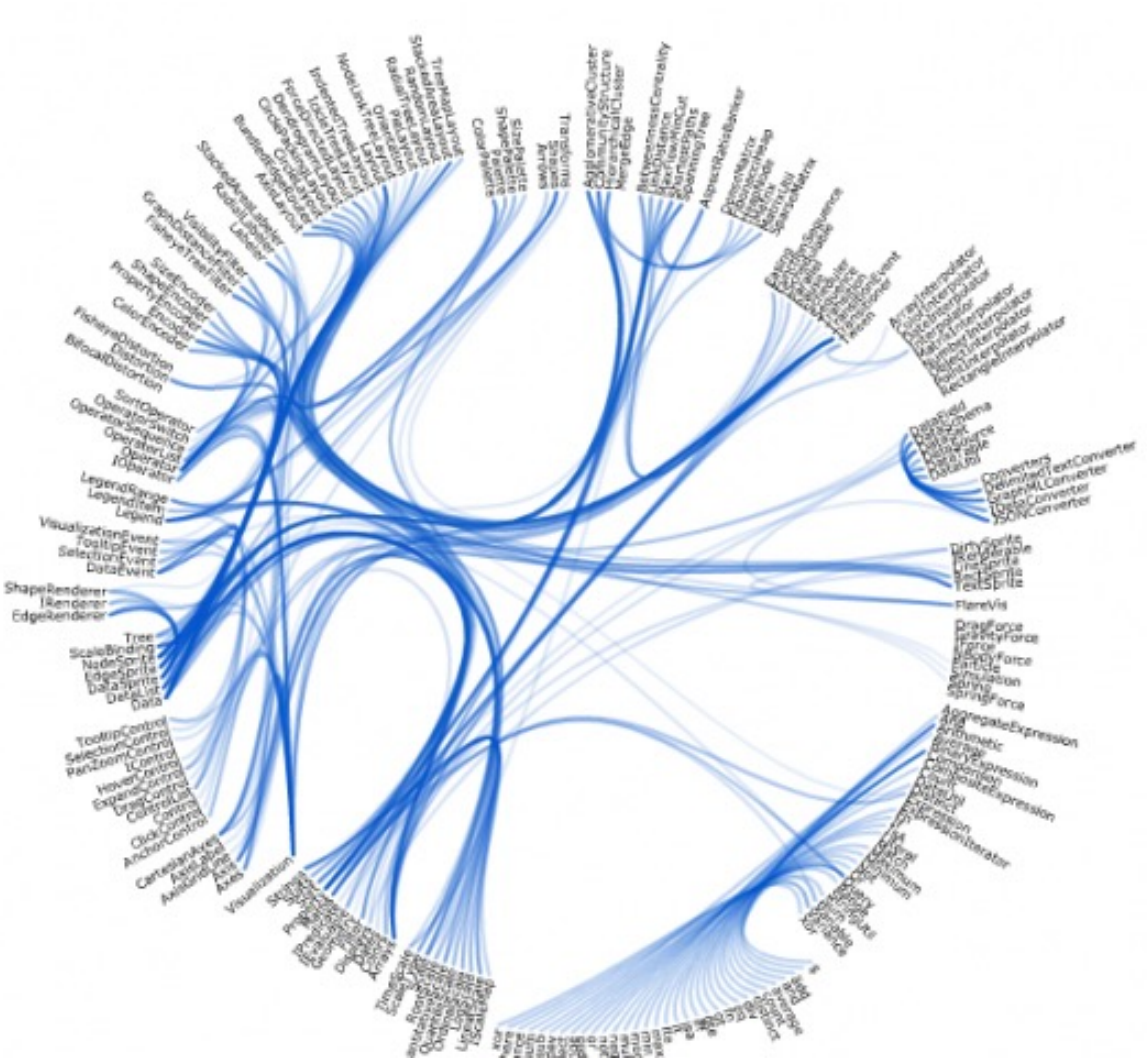




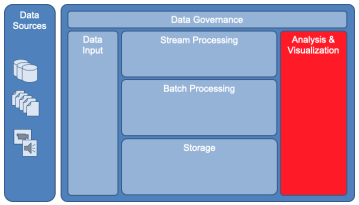
https://youtu.be/jl3k9cEu65g

Flare Charts



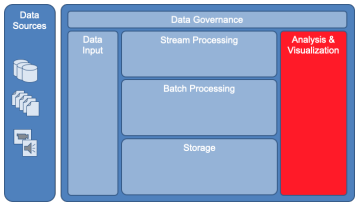


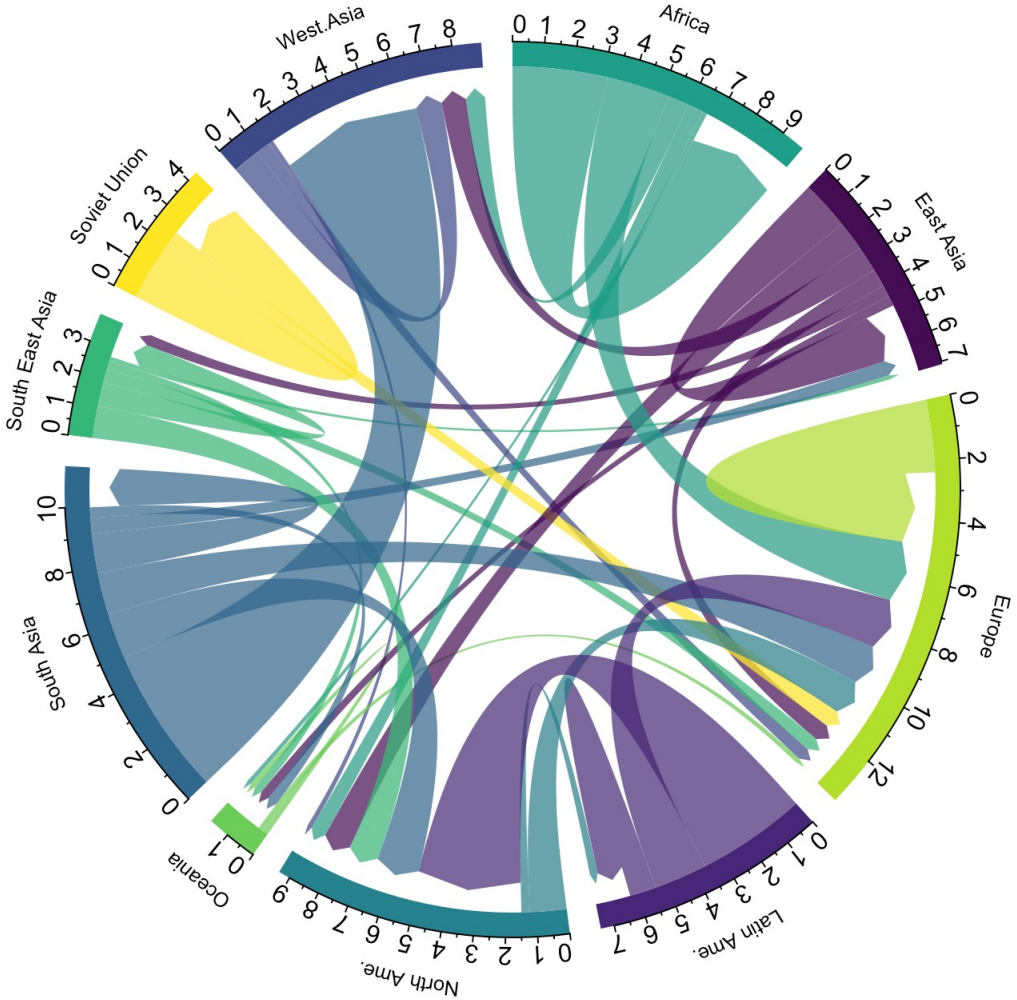
Tree Charts



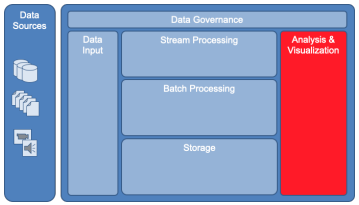
US Car Sales 2017

Chord Charts

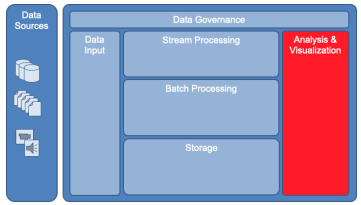


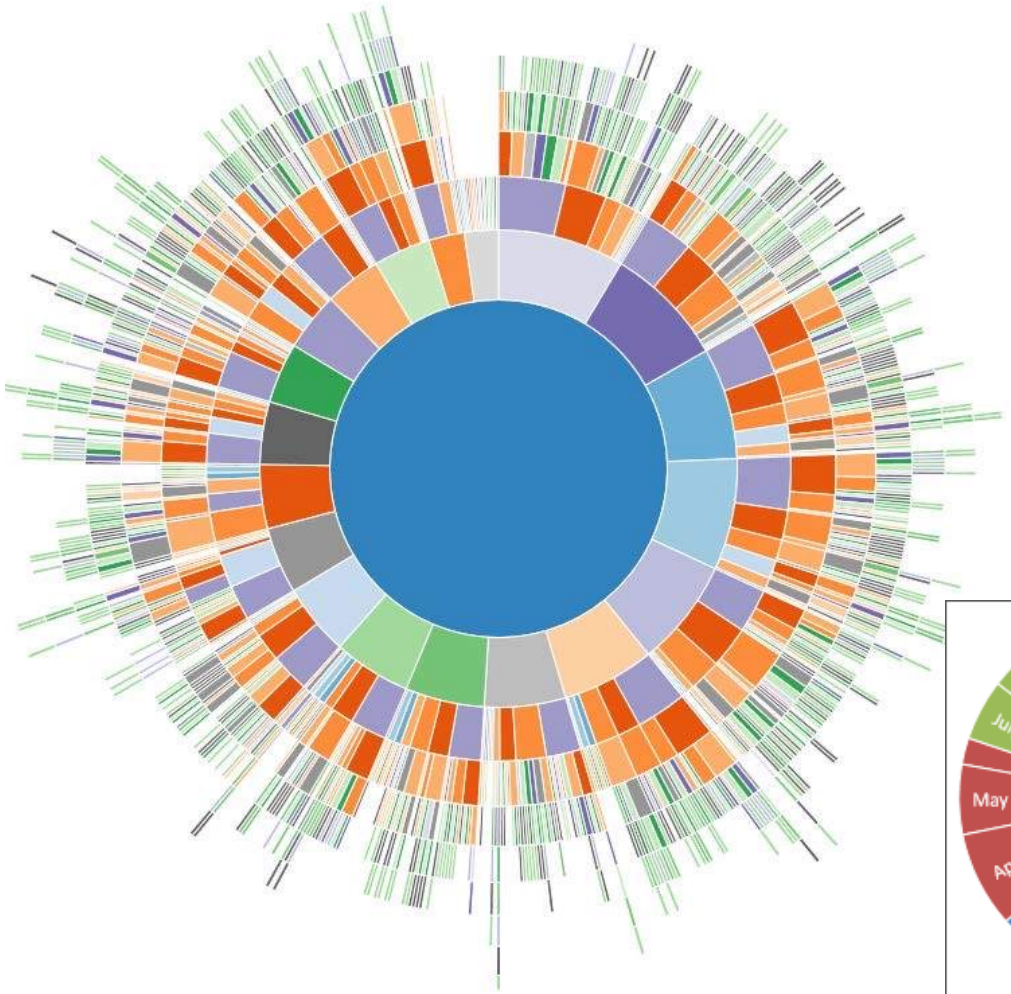


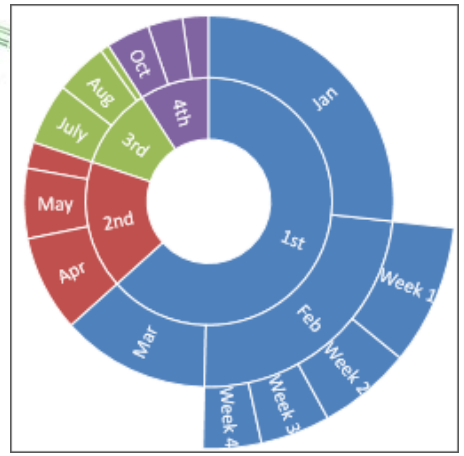
Wordcloud Diagramme



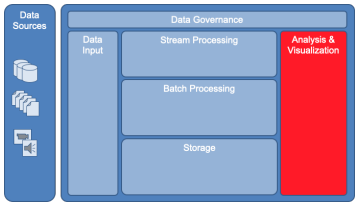
Sunburst Diagramme







Tools und Frameworks



Frameworks

- Raphael (JavaScript)
- D3.js (JavaScript) – 130 fertige Diagramme!
- InfoViz (JavaScript)
- JPGraph (PHP)
- Processing.js (JavaScript)
- GoogleCharts (JavaScipt)

BI-Tools mit Visualisierung

- PowerBI (Microsoft)
- Tableau
- Qlik

Statistik-Tools mit Visualisierung

- SAS
- R