Predictive Analytics

Data Visualization – Part II

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Perceptual Rules[1]

- Clear and useful representation
  - **EXPRESS** – Choose proper visualisation
  - **SIMPLIFY** – Avoid clutter
  - **CONDENSE** – Increase information density
  - **CHECK** – Ensure visual integrity

EXPRESS – Proper Visualisation

- Choice of table type accoding to its contents
- Tables are used for different purposes
  - Time
  - Variance
  - Cross Tables (Pivot Tables)

Time **table**

	'14	'15
Italy		
Austria		
UK		
France		
Rest		
Europe		

Variance **table**

	PL	FC	ΔPL
Italy			
Austria			
UK			
France			
Rest			
Europe			

Cross **table**

	Sales	Profit
Italy		
Austria		
UK		
France		
Rest		
Europe		

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Tables[1]

- Tables are a means of communication
- Representation of two-dimensional information
  - Row header
  - Column header
    - Unidimensional „table“ is called list
- Column types
  - Time
  - Scenario (planned vs actual)
  - Variances (ΔPL oder ΔPY)
  - Sums

Tables[1] II

- Information with similar structure in same column
- Row types
  - Measure (e.g. sales, costs, return, …)
  - Structure (e.g. Germany, Holland, …)

Table Type Examples[1]

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Time Series

Electronic Inc.
Net sales in mEUR
AC 2010..2014, **PL** 2015..2016

	2010	2011	2012	2013	2014	2015	2016
Austria	560	590	546	548	555	509	456
Belgium	56	72	58	59	77	79	88
France	140	149	134	137	165	155	178
Germany	345	279	260	234	288	297	268
Italy	78	91	86	77	69	59	71
Sweden	77	81	86	85	93	95	98
Denmark	61	70	66	70	78	79	93
Rest of EU	502	498	545	601	688	782	655
EU	**1 819**	**1 830**	**1 781**	**1 811**	**2 013**	**2 055**	**1 907**

Variance

Electronic Inc.
Net sales in mEUR
2015, Q1

	PY	PL	AC	ΔPY	ΔPY%	ΔPL	ΔPL%
Austria	560	590	559	-1	-0%	-31	-5%
Belgium	56	72	58	+2	+4%	-14	-19%
France	140	149	134	-6	-4%	-15	-10%
Germany	345	279	260	-85	-25%	-19	-7%
Poland	78	91	86	+8	+10%	-5	-5%
Sweden	77	81	86	+9	+12%	+5	+6%
Italy	61	70	66	+5	+8%	-4	-6%
Other	502	498	545	+43	+9%	+47	+9%
Europe	**1 819**	**1 830**	**1 794**	**-25**	**-1%**	**-36**	**-2%**

Cross Table

Electronic Inc.
Net sales in mEUR
2015, Q1

	AL1	AL2	AL3	AL4	AL5	AL6..9	**AL**
Austria	231	590	432	559	123	559	**2 494**
Belgium	23	72	58	33	6	58	**250**
France	55	149	134	134	134	134	**740**
Germany	762	210	100	43	15	29	**1 159**
Poland	56	91	7	77	82	55	**368**
Sweden	74	81	41	44	123	341	**704**
Denmark	32	70	66	43	52	25	**288**
Other	502	498	127	321	776	321	**2 545**
Europe	**1 735**	**1 761**	**965**	**1 254**	**1 311**	**1 522**	**8 548**

SIMLIFY – Avoid Clutter

THU
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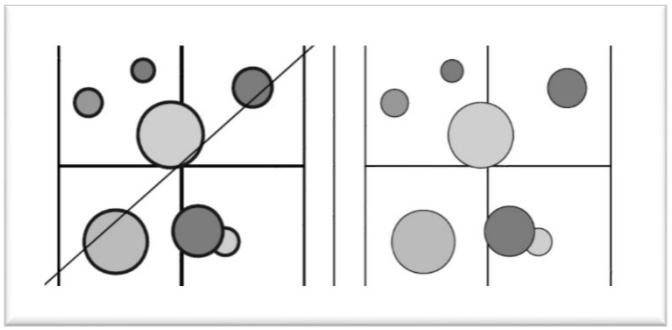
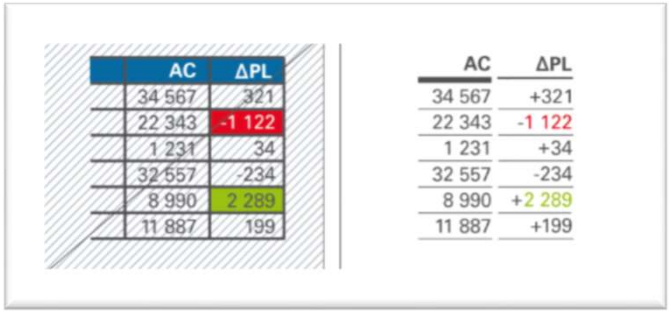
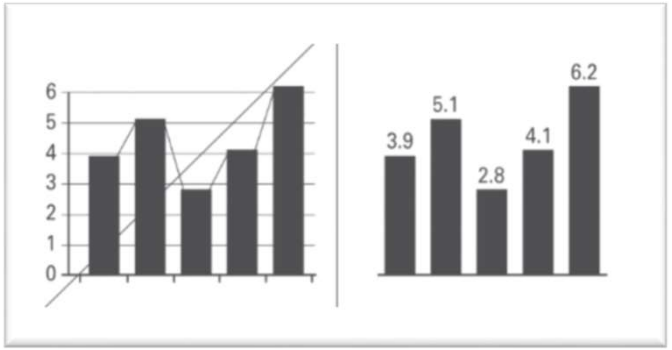
- Information instead of decoration
  - No 3D diagrams
  - No borders and shadows
  - Use meaningful colors
  - Use meaningful gridlines
- Simplify content
  - Simple figures
  - Avoid redundant terms (sum, total…)
  - Max. 4 – 5 digits per number

SIMPLIFY– Examples







SIMPLIFY– Examples II

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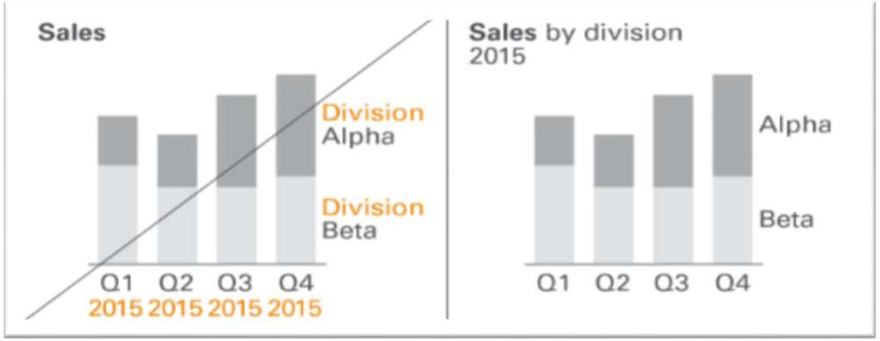
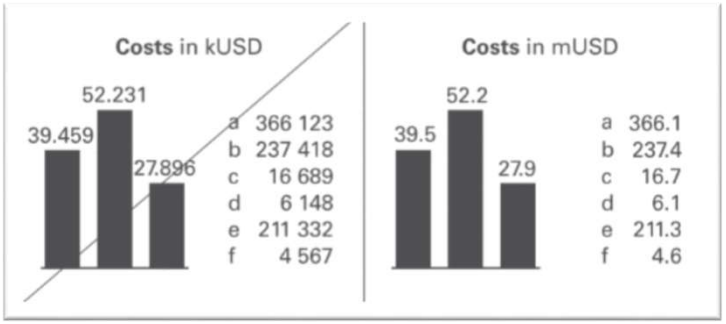
Alpha Corporation statistics
Sales development in EUR

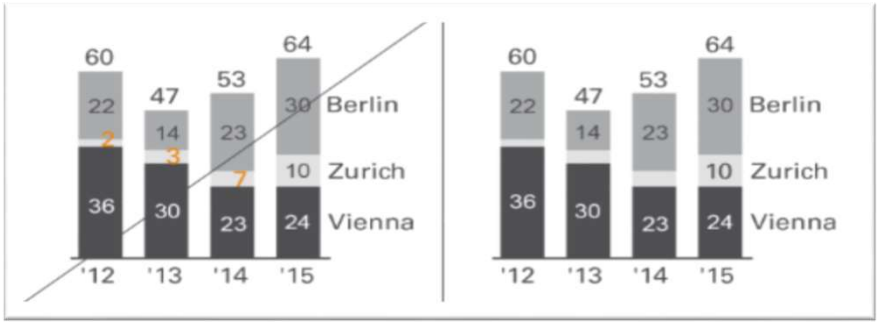
	2014	2015
Germany	802	788
Austria	49	34
Switzerland	128	122
Rest	256	345
Total Europe	**1 235**	**1 289**

Alpha Corporation
Sales in EUR

	2014	2015
Germany	802	788
Austria	49	34
Switzerland	128	122
Rest	256	345
Europe	**1 235**	**1 289**





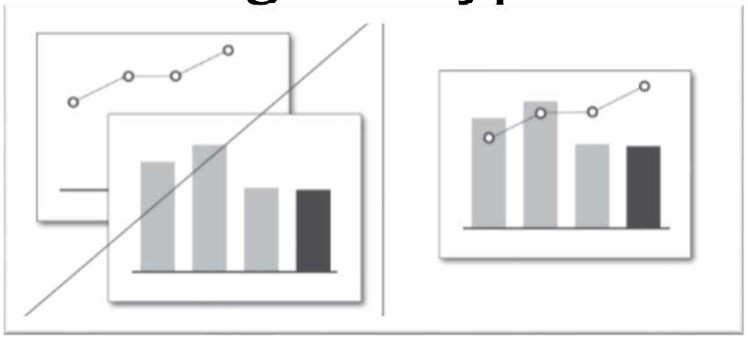


CONDENSE

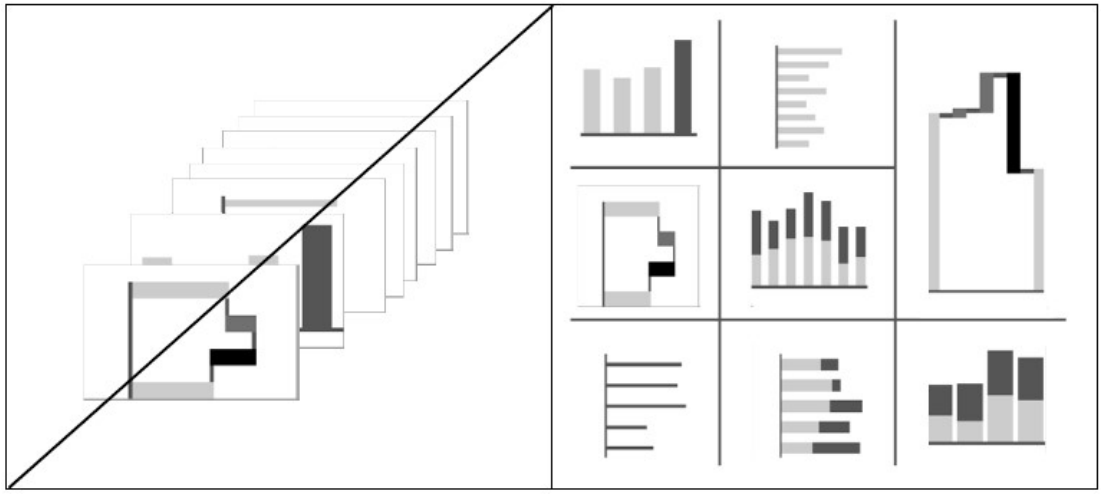
- Use space
  - No blank spaces on page
  - Increase information density
- Increase amount of data displayed
  - Use overlay
  - Show more elements

CONDENSE – Examples[1]

- Join diagram types



- Multiple diagram types together

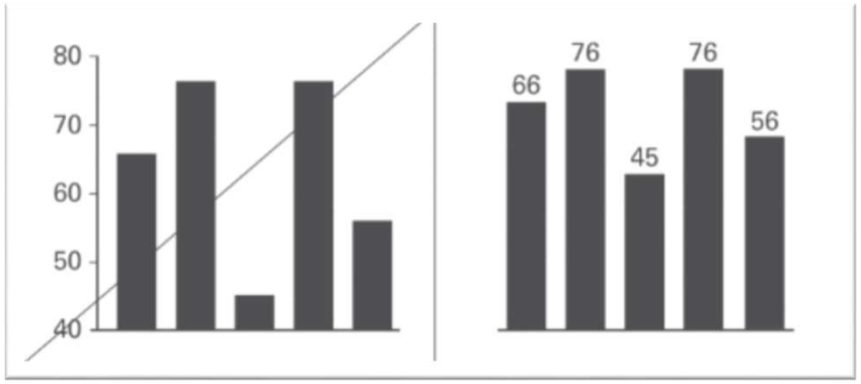


CHECK – Visual Integrity[1]

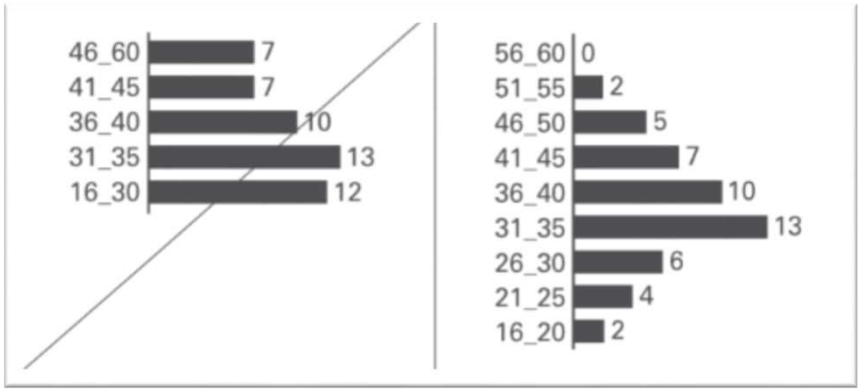
- Check of (visual) report integrity
  - Diagrams are easy to understand
  - Avoid ambiguities
  - Reasons for violation of integrity
    - Manipulated axis
    - Manipulated visualization elements
    - Different scales

CHECK – Axis[1]

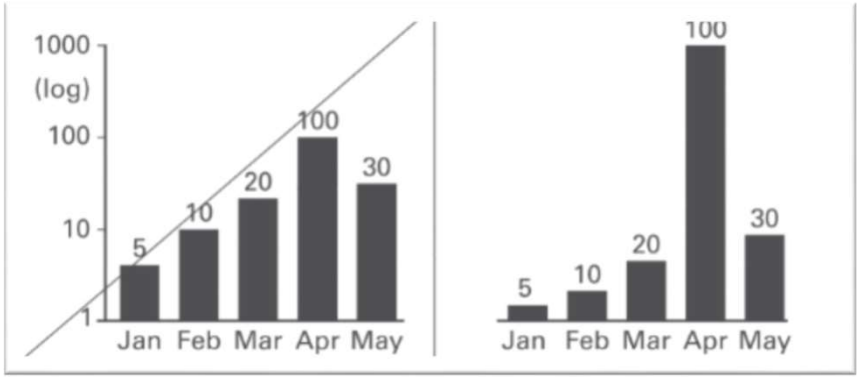
- cut axis



- bucket size

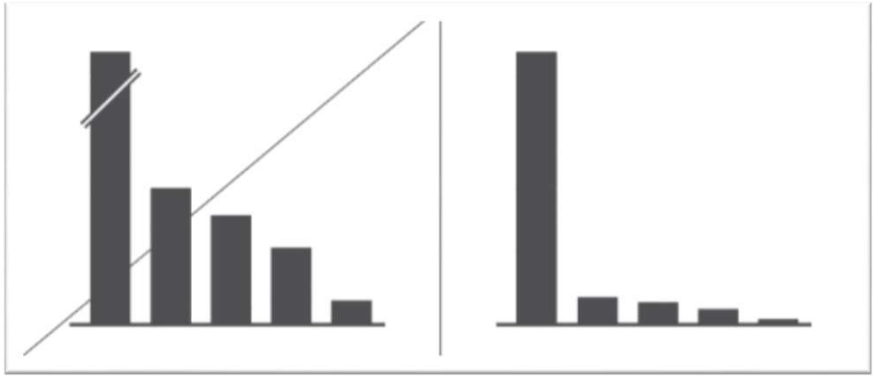


- logarithmic axis

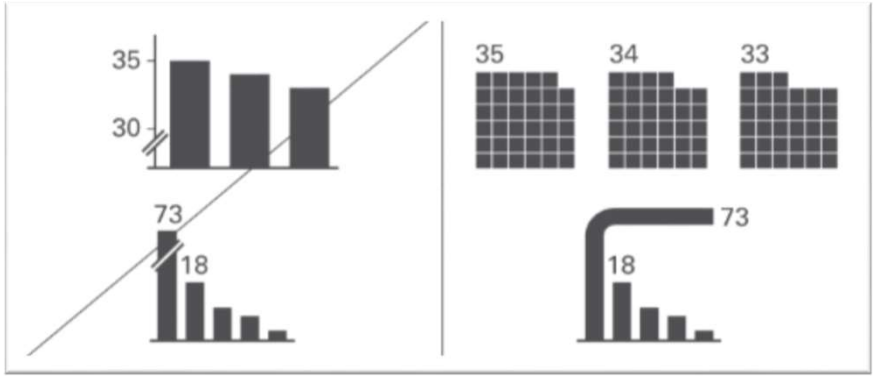


CHECK – Visualisation Elements[1]

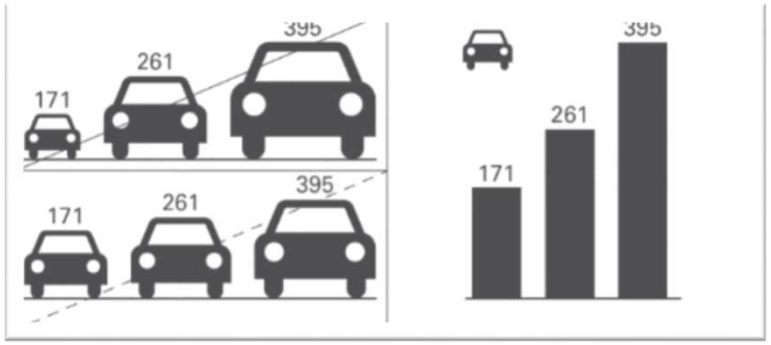
- cut elements

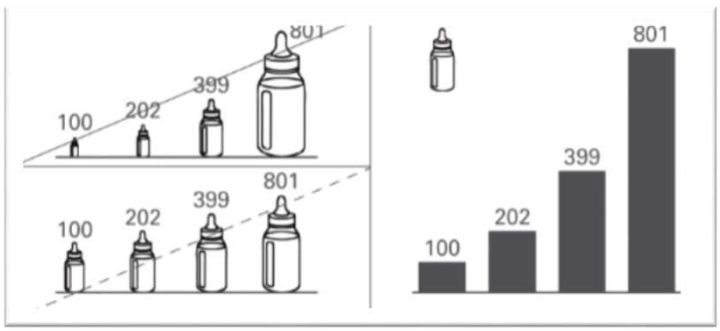


- creative scaling



- elements for area and space

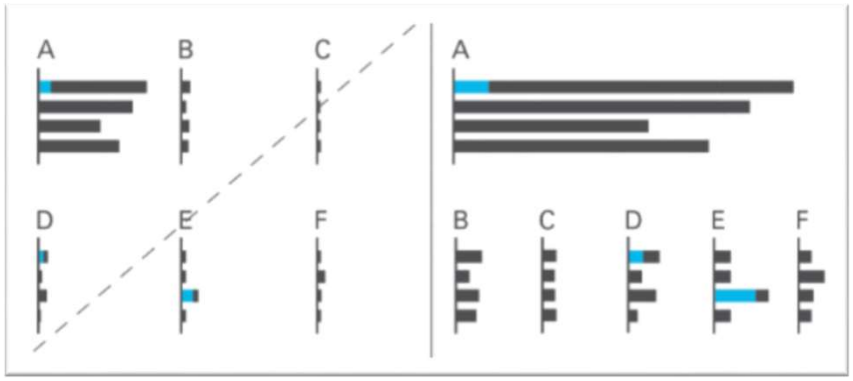




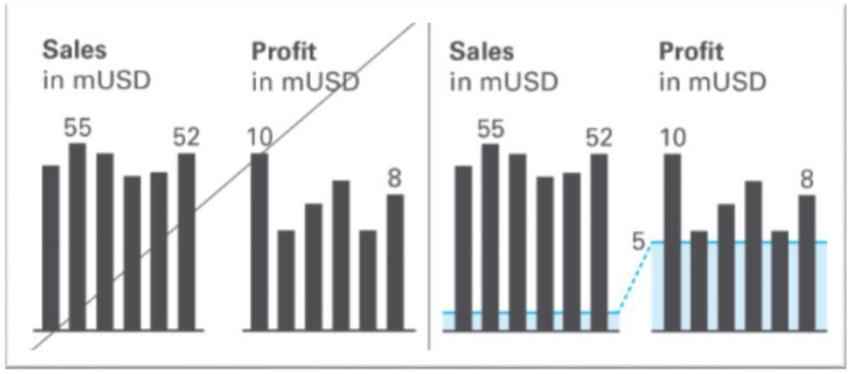
CHECK – Scaling[1]

- uniform scale

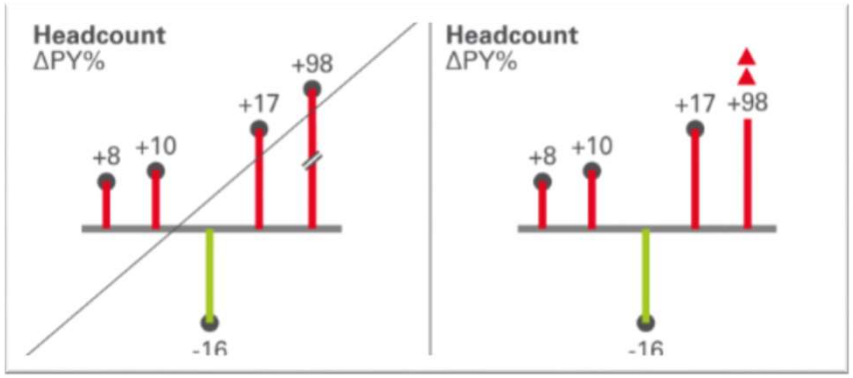
- scaling of diagrams



- scaling hint (exception)



- display of outliers



Contents

- Introduction
- **International Business Communication Standards**
  - Conceptual Rules
  - Perceptual Rules
  - **Semantic Rules**

Semantic Rules

- **UNIFY** – Apply semantic notation

UNIFY

- Determine look and meaning of shapes and colors

- Unification of
  - Terms and abbreviations
  - Measures and units
  - Diagrams, axis titles, etc.
  - Objects
  - Dimensions
  - Fonts
  - Colours
  - …

UNIFY– Terms and Description

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- Terms and abbreviations

Term	Abbreviations short	long	Definition
+ Return on investment	ROI	Ret. on inv.	ROI is defined as…
+ Accounts receivable	AR	Acc. receiv.	AR…
+ Profit before tax	PBT	Profit b. tax	PBT…
+ Profit and loss	P&L	Profit & loss	P&L…
+ Human resources	HR	Human res.	HR…
+ Net sales per capita	NS/c	NS per cap.	NS/c…

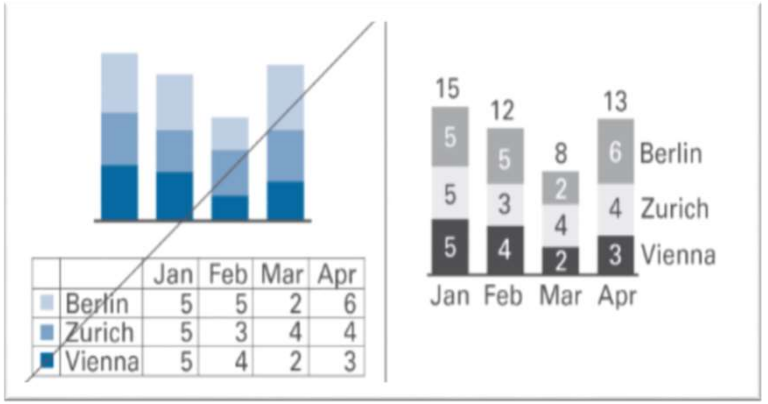
- Title and subtitles

Net Sales Development from January to July 2015 Alpha Corporation [mEUR]	Alpha Corporation **Net sales** in mEUR Jan..Jul 2015
Profit ratio: In thousand Euros per Employee in Division D Actual and Budget in 2015	ABC Corporation, Division D **Profit per employee** in kEUR 2015 AC, BU

- Measures and units

23 mtr.	100.000.000	23 m	100 000 000
34 kg.	123456	34 kg	123 456
20 sec.	1234567 CHF	20 s	1.23 mCHF
22 tons	€	22 t	EUR
[kg]	US$	kg	USD
sqm	£	m²	GBP
1.5.2015	II/2015	2015-05-01	2015-Q2
01/05/15	W17-2015	2015-05-01	2015-W17
05/01/15	Jun/2015	2015-05-01	2015-Jun

- Legend



UNIFY– Scenario Representation[1]

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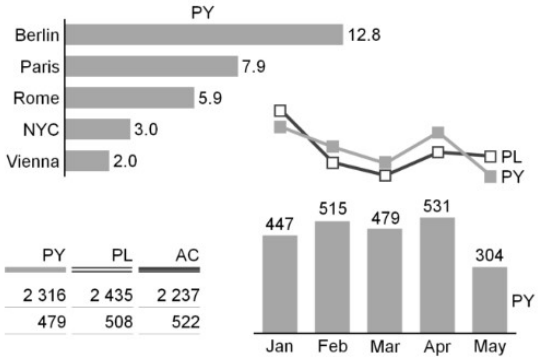
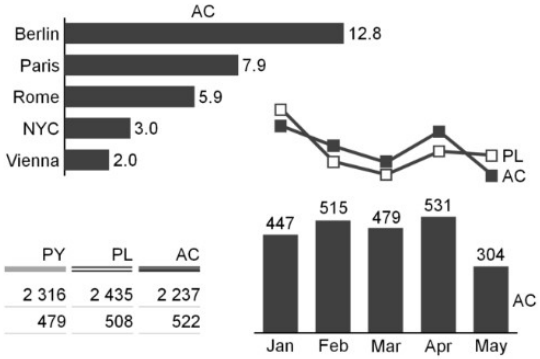
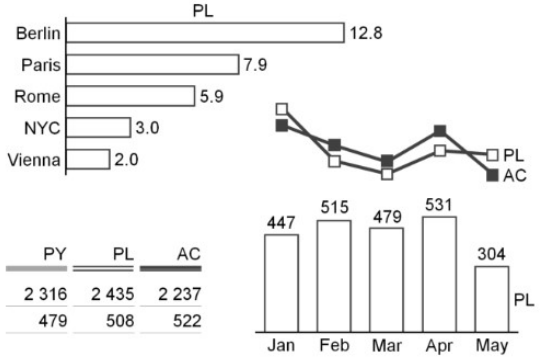
- Previous Year (PY)



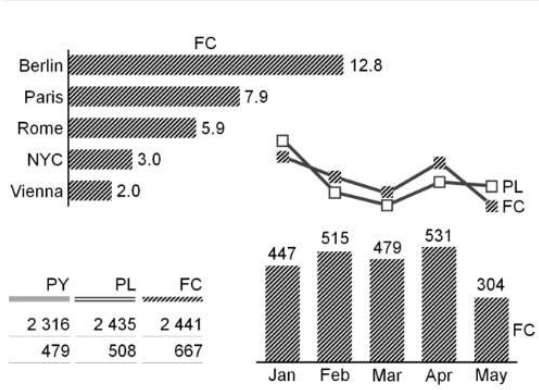
- Actual (AC)



- Plan (PL) / Budget (BG)

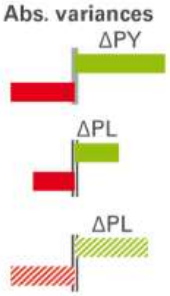


- Forecast (FC)

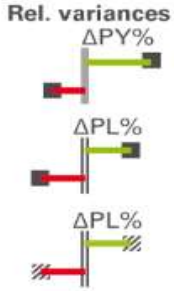


UNIFY– Scenario report[1]

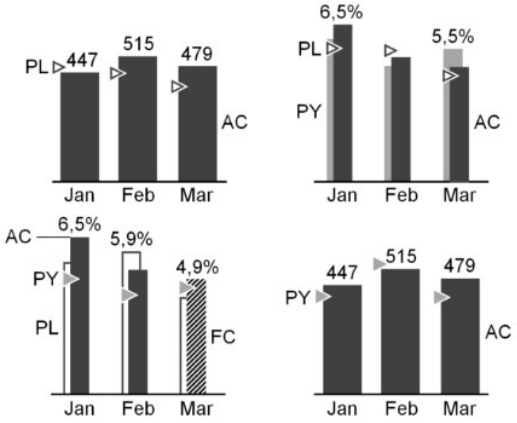
- Absolute variance (Δ)
  - Szenario 1 – Szenario 2



- Relative variance (Δ%)
  - Absolute Abweichung / Szenario 2



- Comparison

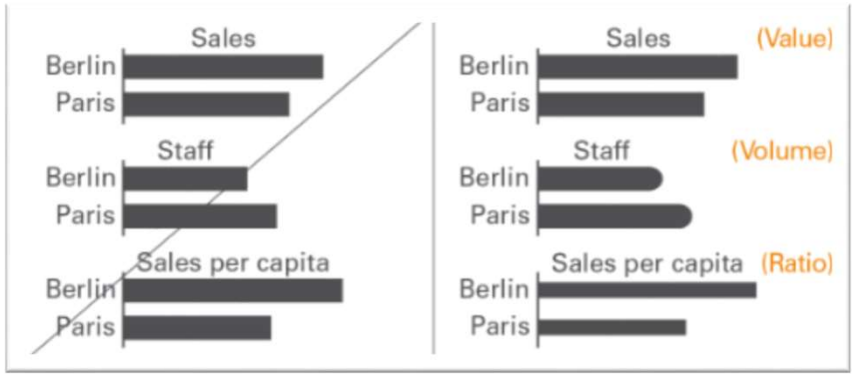


- Colouring

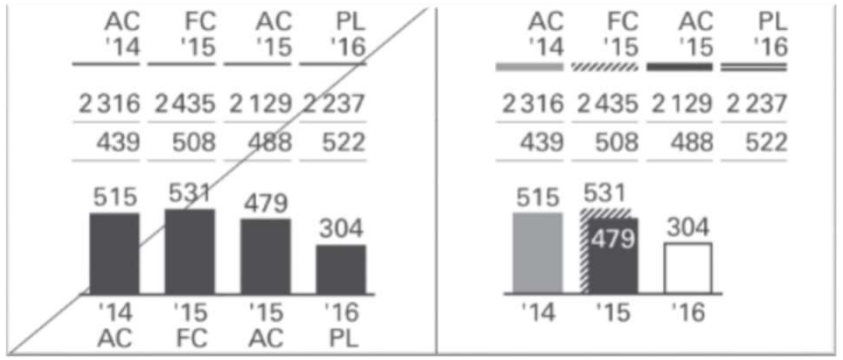
	Traffic lights	Black and white	Color vision deficiancy
Negative	Red	Dark gray	Red
Neutral	Medium gray	Medium gray	Medium gray
Positive	Green	Light gray	Blue-green

UNIFY– Dimensions

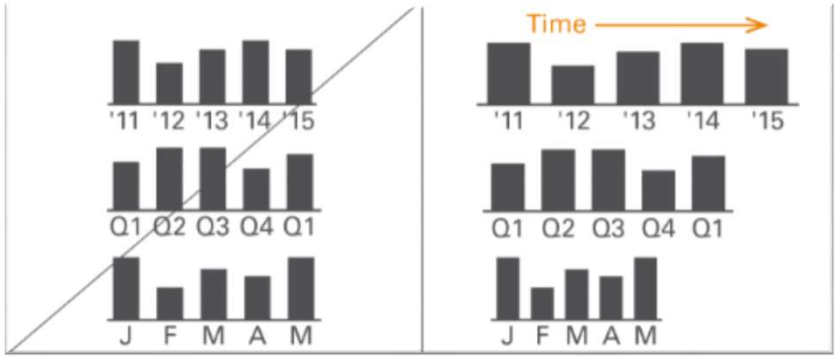
- Measures



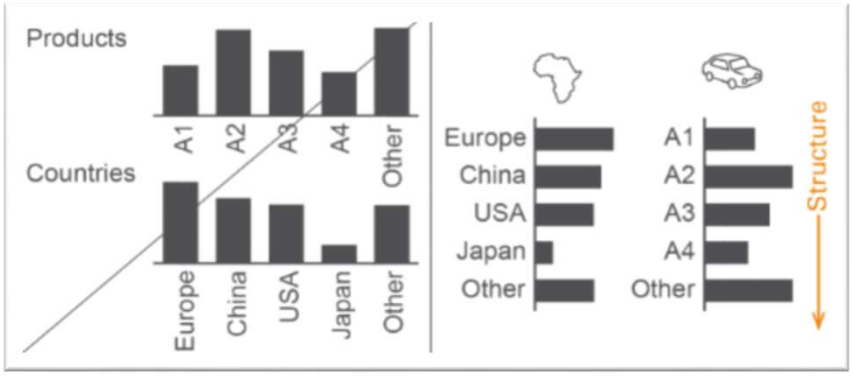
- Scenario



- Time (horizontal)



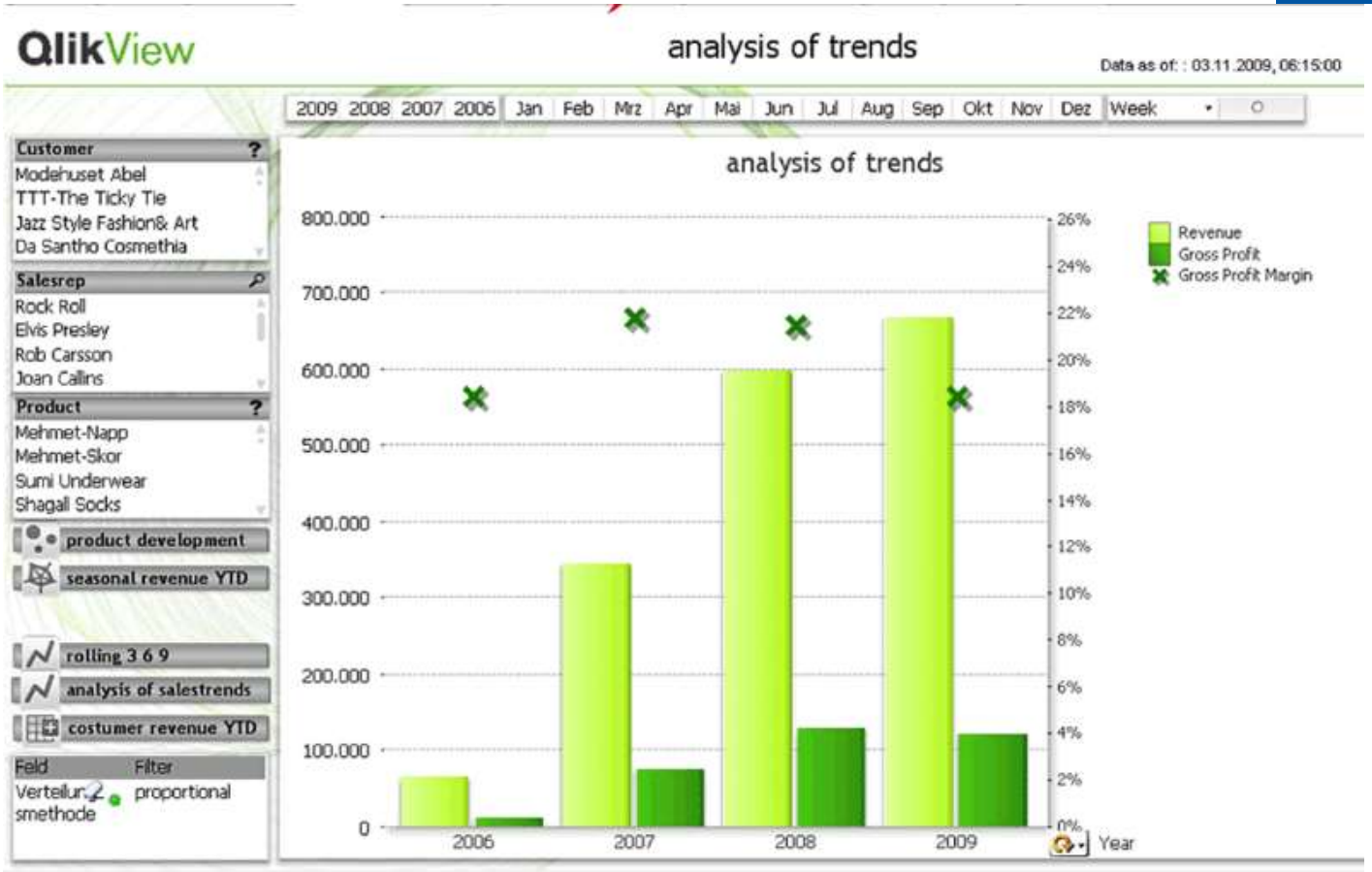
- Structure (vertical)



Suggestion

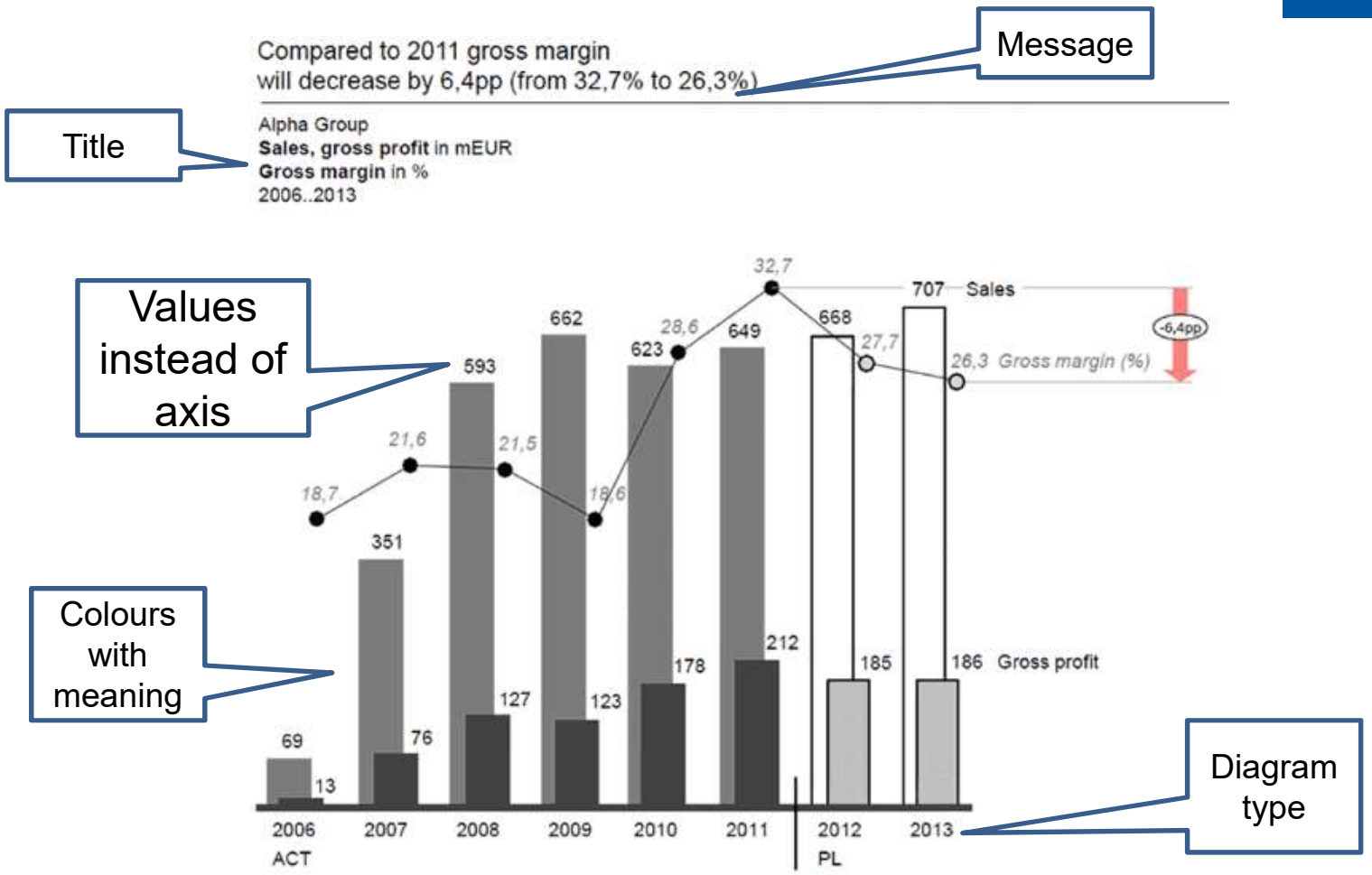
- SUCCESS shows guidelines for communication in reports with respect to diagrams and tables
  - have to be adapted to application domain
  - pareto principle (80-20) applies

Remember Dashboard Example?



source: https://www.hichert.com/de/resource/example-1-qlikview-dashboard/

Better Dashboard



source: https://www.hichert.com/de/resource/example-1-qlikview-dashboard/

Exercise

- Please work through this week‘s tutorial and try to solve the exercises.

References

1. http://www.ibcs-a.org/
2. Holger Gerths, Rolf Hichert - Geschäftsdiagramme mit Excel nach den SUCCESS-Regeln gestalten – Haufe-Lexware GmbH & Co. KG, 2011