The efficiency in creating and altering charts can be improved by factor three to four compared to the current best practice in top-tier business consultancies.

Motivation

Business consultancies spend a large share of their resources on client communication. Most leading consultancies employ specialists to translate their consultants' findings and recommendations into convincing client deliverables. These specialists have gained years of experience and developed a best practice building upon the industry standard Microsoft PowerPoint. Still, our own personal experience in a consulting firm and anecdotal evidence from other consultants and graphics experts indicated a large potential for improving slide creation efficiency.

Starting from these indications, we spent half a year conducting interviews and observing work flows to thoroughly understand the problem. We then used test scenarios to quantify our qualitative impression. We strongly focused on software efficiency. We cooperated with one of the top-tier strategy consulting firms and they allowed us to publish this data anonymously. This report contains the results of our study.

Identification of improvement potentials

Exhibit 1.1 shows the distribution of graphics expert working time at one of our customers sites. 11 percent are dedicated to slide-specific drawings. A further 26 percent are spent on typing text on the slide. Both fractions offer only limited potential for improvement. Typing speed is limited by the keyboard skills of the user, while creating drawings is difficult to standardize using intelligent software.

22 percent are spent on the production of business charts from numerical data. By far the largest fraction is spent on arranging text, drawings and charts to create the final slide layout (41 percent). Both chart and layout times exclude typing of text. Including text-typing times, 30 percent of the working time is spent on charts and 59 percent on non-numerical standard slide components, excluding drawings. Both producing charts and slide layouts has a high potential for improvement, because charts and slide layouts are usually standardized within a consultancy and bound by common design rules, which can be formalized into a computer program.

We focus the rest of this study on the impact of using the software think-cell chart that was designed to exploit the described efficiency gain potential in chart production. As a first step we took a closer look at the types of charts used by consultancies. Exhibit 1.2 shows that only a few chart types account for a large fraction of all used charts in the cooperating consultancy. We compared this result with results obtained from other consultancies, and found it to hold everywhere, with the dominating chart types varying slightly across different firms.
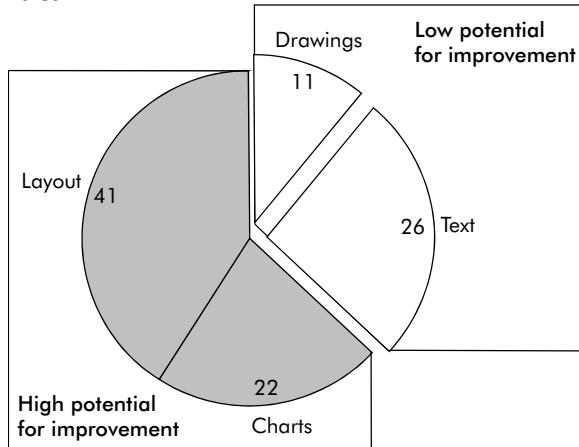
Test setup

To quantify the impact of new software on the creation and alteration of charts, we selected

Exhibit 1.1

63 percent of all production work has high potential for improvement by new software*

Percent

Exhibit 1.2

A small number of chart types accounts for almost all chart work*
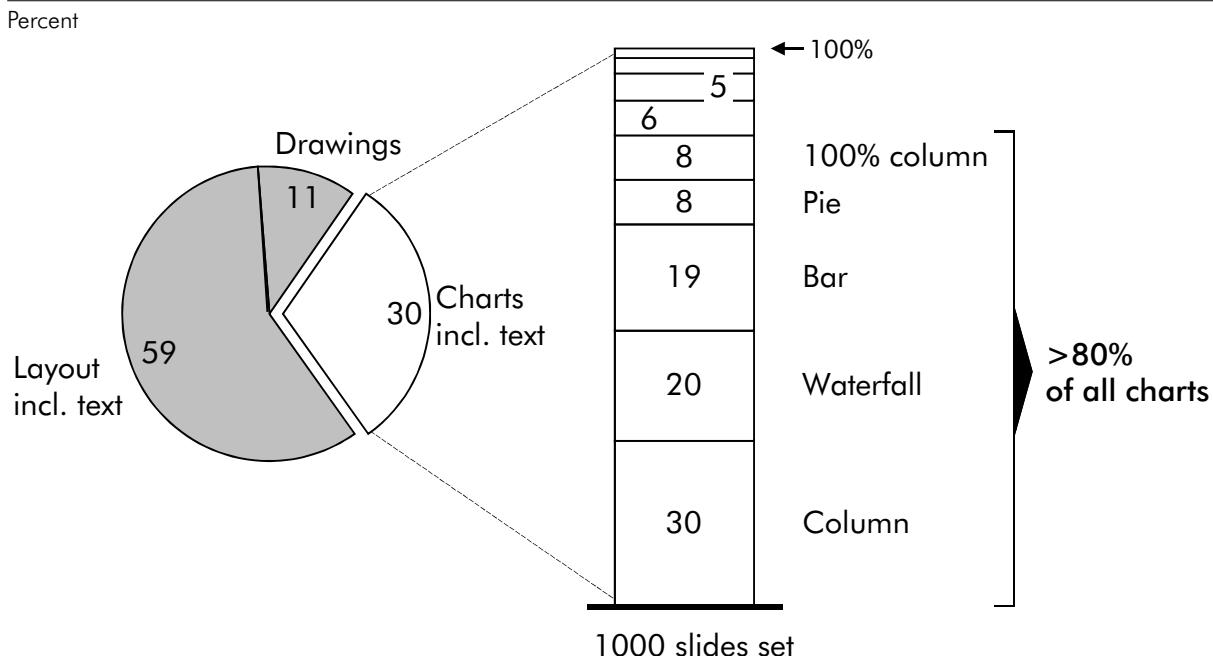
Percent

1000 slides set

*Source: Research study by Free University Berlin, 2002.

a set of 48 typical charts out of a portfolio of archived slides. You can find them attached to this report. (They have been edited for anonymity.) Exhibit 1.3 illustrates that the mixture of chart types in the test set resembles the mixture obtained by analyzing a much larger slide set. Our cooperation partner counted the number of different chart types in a set of one thousand slides picked randomly from its portfolio. 468 of these slides had a chart.
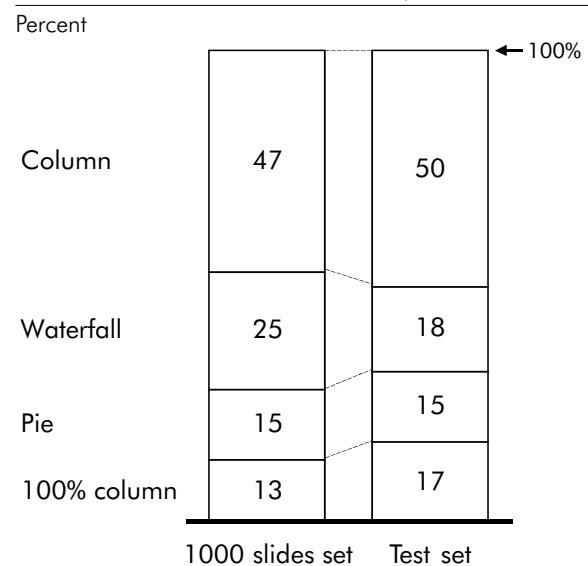
We created two scenarios from the test set. The first scenario simulated the typical creation process: A chart is sketched by a consultant, faxed to the graphics expert and turned into Power-Point. In our test, a highly experienced graphics expert from our cooperation partner turned the sketches into PowerPoint slides. He was allowed to use the firm regular set of templates for typical chart types and quantities (4-column, 5-column, …) and also the macros already in use (for legends, unit of measure and so on). We took the time required to create the charts.

For the second scenario we printed the slides created in the first scenario, annotated them with

typical changes a consultant would make, and handed them back to the graphics expert. We again took the time to incorporate the changes into the slides.
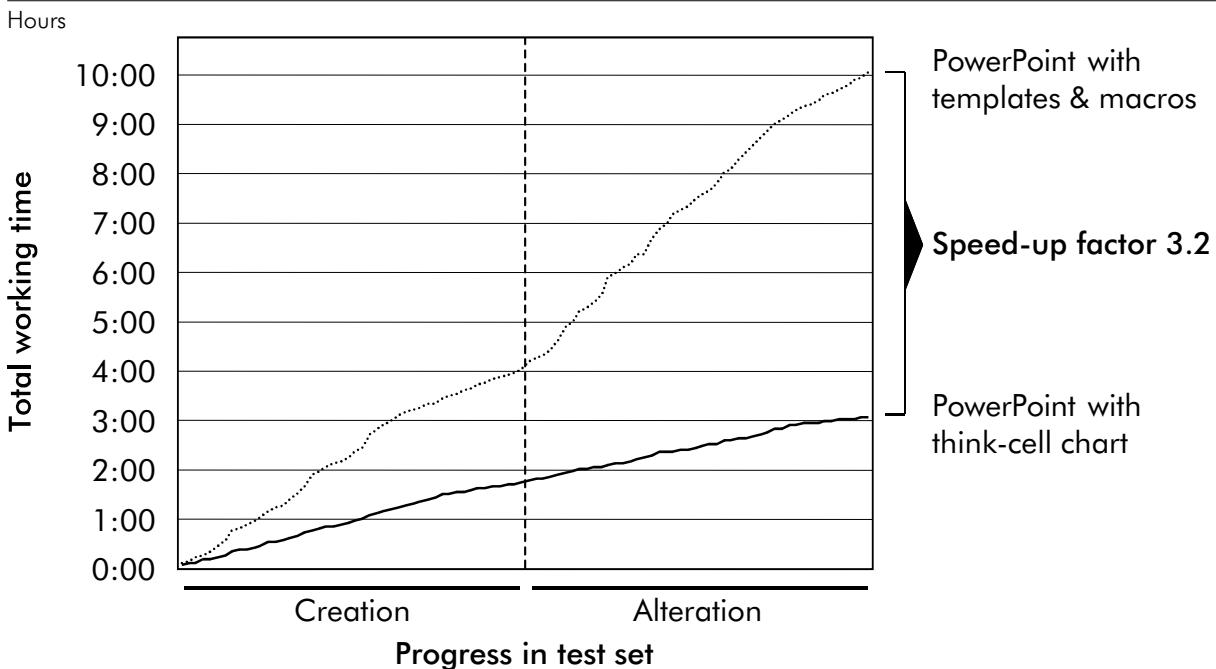
Exhibit 1.3

The chart mix of the test set is representative

Percent

Exhibit 1.4

Using think-cell chart total working time is cut substantially

Hours

The same two scenarios were used to evaluate the efficiency of the PowerPoint add-in think-cell chart.

Results

The tables with all the results can be found at the end of this report (Exhibits 1.7 and 1.8). The main finding is illustrated by exhibit 1.4. It shows the accumulated time for creating and changing the charts specified by our test set. At our cooperation partner, alteration accounts for approximately 60 percent of chart production time. Hence, we scaled the time for chart alteration by two. This resembles the common assumption that one creation cycle leads to at least two cycles of alteration.

The accumulated time for finishing the test set using PowerPoint together with templates and macros was over ten hours. The accumulated time for finishing the test set using PowerPoint with the think-cell chart add-in was approximately three hours. This implies an overall speed-up factor of 3.2. Exhibit 1.5 breaks this result down to the four chart types that were
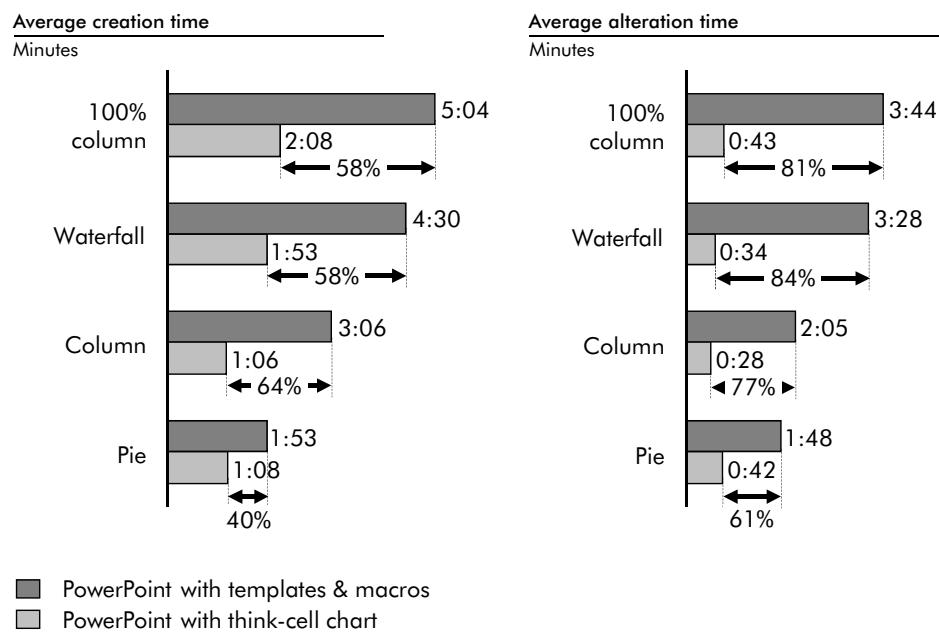
included in our test. All chart types benefit quite evenly from using think-cell chart, especially in the alteration scenario.

Exhibit 1.6 illustrates the speed-ups for each individual test chart. The variations of speed-ups are within the expected range, with no individual edit being slower with think-cell chart than with PowerPoint, and more complex charts, which take longer to create, benefiting more from think-cell chart than simpler ones.
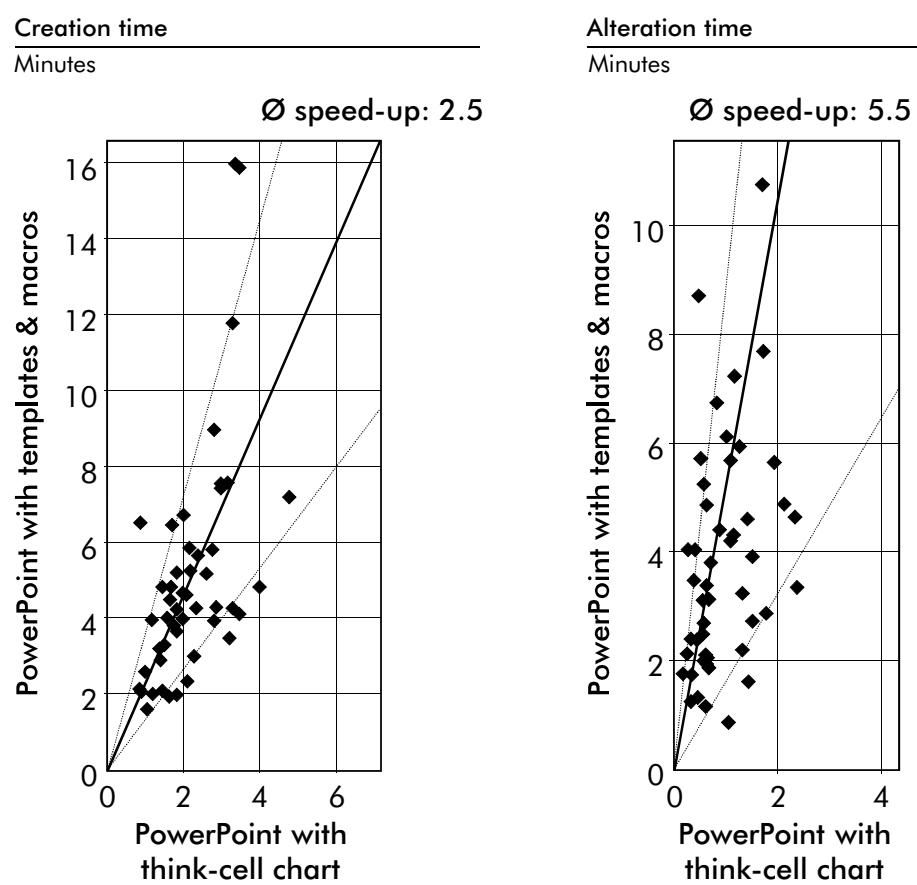
Dr. Markus Hannebauer is Managing Director at think-cell Software GmbH in Berlin, Germany. **Volker Schöch** is a master student of Computer Science at Free University Berlin, Germany.

Exhibit 1.5

All chart types are sped up, especially alteration

Average creation time	Average alteration time
Minutes	Minutes

Average creation time
Minutes

- 100% column: 5:04 / 2:08 — 58%
- Waterfall: 4:30 / 1:53 — 58%
- Column: 3:06 / 1:06 — 64%
- Pie: 1:53 / 1:08 — 40%

Average alteration time
Minutes

- 100% column: 3:44 / 0:43 — 81%
- Waterfall: 3:28 / 0:34 — 84%
- Column: 2:05 / 0:28 — 77%
- Pie: 1:48 / 0:42 — 61%

- ▪ PowerPoint with templates & macros
- ▫ PowerPoint with think-cell chart

Exhibit 1.6

All chart instances are sped up

Creation time
Minutes

Ø speed-up: 2.5

PowerPoint with templates & macros (y-axis: 0, 2, 4, 6, 8, 10, 12, 14, 16)

PowerPoint with think-cell chart (x-axis: 0, 2, 4, 6)

Alteration time
Minutes

Ø speed-up: 5.5

PowerPoint with templates & macros (y-axis: 0, 2, 4, 6, 8, 10)

PowerPoint with think-cell chart (x-axis: 0, 2, 4)

Exhibit 1.7

Results of customer graphics expert using PowerPoint together with macros and templates

Hour:Min:Sec

Slide	Creation time (per slide)	Change time (per slide)	Col	100%	WF	Pie	Total	Col	100%	WF	Pie	Col	100%	WF	Pie
				Chart type number					Creation time (per type)				Change time (per type)		
1	0:07:12	0:05:37			1	1	2			0:03:36	0:03:36			0:02:49	0:02:49
2	0:02:21	0:01:37				1	1				0:02:21				0:01:37
3	0:03:40	0:01:52			1		1			0:03:40				0:01:52	
4	0:03:29	0:03:20				1	1				0:03:29				0:03:20
5	0:05:15	0:05:40	1				1	0:05:15				0:05:40			
6	0:06:43	0:07:39	2				2	0:06:43				0:07:39			
7	0:05:51	0:04:11			1		1			0:05:51				0:04:11	
8	0:11:46	0:05:55	4				4	0:11:46				0:05:55			
9	0:03:13	0:02:24	1				1	0:03:13				0:02:24			
10	0:04:01	0:03:06	1				1	0:04:01				0:03:06			
11	0:04:49	0:04:18				1	1				0:04:49				0:04:18
12	0:04:07	0:10:42		1			1		0:04:07				0:10:42		
13	0:07:34	0:02:23			1		1			0:07:34				0:02:23	
14	0:03:59	0:03:07			1		1			0:03:59				0:03:07	
15	0:04:16	0:02:29			1		1			0:04:16				0:02:29	
16	0:04:50	0:05:42		1			1		0:04:50				0:05:42		
17	0:08:58	0:00:52		2			2		0:08:58				0:00:52		
18	0:07:26	0:08:40			1		1			0:07:26				0:08:40	
19	0:15:51	0:06:43		1			1		0:15:51				0:06:43		
20	0:03:48	0:03:22	1				1	0:03:48				0:03:22			
21	0:05:48	0:05:13			1	1	2			0:02:54	0:02:54			0:02:37	0:02:37
22	0:02:54	0:02:41	1				1	0:02:54				0:02:41			
23	0:03:56	0:02:06	2				2	0:03:56				0:02:06			
24	0:04:16	0:04:35				2	2				0:04:16				0:04:35
25	0:05:39	0:02:52	2				2	0:05:39				0:02:52			
26	0:05:12	0:02:12	2				2	0:05:12				0:02:12			
27	0:15:58	0:04:23	4				4	0:15:58				0:04:23			
28	0:07:33	0:07:12	3				3	0:07:33				0:07:12			
29	0:04:40	0:01:10	1				1	0:04:40				0:01:10			
30	0:04:37	0:06:06			1		1			0:04:37				0:06:06	
31	0:06:31	0:04:02			2		2			0:06:31				0:04:02	
32	0:04:50	0:04:51	1				1	0:04:50				0:04:51			
33	0:02:01	0:04:38				1	1				0:02:01				0:04:38
34	0:03:00	0:03:47		1			1		0:03:00				0:03:47		
35	0:04:18	0:04:52				8	8				0:04:18				0:04:52
36	0:01:56	0:01:44		1			1		0:01:56				0:01:44		
37	0:05:10	0:03:54		1		1	2		0:02:35		0:02:35		0:01:57		0:01:57
38	0:02:06	0:02:03				1	1				0:02:06				0:02:03
39	0:04:15	0:02:43	2				2	0:04:15				0:02:43			
40	0:03:19	0:01:20				1	1				0:03:19				0:01:20
41	0:01:59	0:02:00			1		1			0:01:59				0:02:00	
42	0:06:28	0:03:14		1			1		0:06:28				0:03:14		
43	0:02:09	0:01:46	1				1	0:02:09				0:01:46			
44	0:03:58	0:01:57	1				1	0:03:58				0:01:57			
45	0:01:37	0:02:07	1				1	0:01:37				0:02:07			
46	0:02:04	0:03:28	1				1	0:02:04				0:03:28			
47	0:02:36	0:01:15	1				1	0:02:36				0:01:15			
48	0:04:30	0:04:02			1		1			0:04:30				0:04:02	
Σ	4:02:29	3:01:52	33	10	12	19	74	1:42:07	0:50:39	0:53:59	0:35:44	1:08:49	0:37:17	0:41:41	0:34:05
Ø	0:05:03	0:03:47						0:03:06	0:05:04	0:04:30	0:01:53	0:02:05	0:03:44	0:03:28	0:01:48

Exhibit 1.8

Results of customer graphics expert using PowerPoint together with think-cell chart

Hour:Min:Sec

Slide	Creation time (per slide)	Change time (per slide)	Chart type number					Creation time (per type)				Change time (per type)			
			Col	100%	WF	Pie	Total	Col	100%	WF	Pie	Col	100%	WF	Pie
1	0:04:38	0:01:51			1	1	2			0:02:19	0:02:19			0:00:56	0:00:56
2	0:02:02	0:01:22				1	1				0:02:02				0:01:22
3	0:01:46	0:00:38			1		1			0:01:46				0:00:38	
4	0:03:07	0:02:16				1	1				0:03:07				0:02:16
5	0:02:07	0:01:02	1				1	0:02:07				0:01:02			
6	0:01:57	0:01:38	2				2	0:01:57				0:01:38			
7	0:02:06	0:01:02			1		1			0:02:06				0:01:02	
8	0:03:11	0:01:12	4				4	0:03:11				0:01:12			
9	0:01:20	0:00:19	1				1	0:01:20				0:00:19			
10	0:01:32	0:00:32	1				1	0:01:32				0:00:32			
11	0:01:25	0:01:06				1	1				0:01:25				0:01:06
12	0:03:22	0:01:37		1			1		0:03:22				0:01:37		
13	0:03:04	0:00:25			1		1			0:03:04				0:00:25	
14	0:01:56	0:00:38			1		1			0:01:56				0:00:38	
15	0:02:16	0:00:32			1		1			0:02:16				0:00:32	
16	0:03:52	0:00:29		1			1		0:03:52				0:00:29		
17	0:02:44	0:01:00		2			2		0:02:44				0:01:00		
18	0:02:53	0:00:27			1		1			0:02:53				0:00:27	
19	0:03:21	0:00:47		1			1		0:03:21				0:00:47		
20	0:01:42	0:00:36	1				1	0:01:42				0:00:36			
21	0:02:40	0:00:33		1		1	2		0:01:20		0:01:20		0:00:17		0:00:17
22	0:01:22	0:00:33	1				1	0:01:22				0:00:33			
23	0:02:43	0:00:35	2				2	0:02:43				0:00:35			
24	0:03:11	0:01:21				2	2				0:03:11				0:01:21
25	0:02:18	0:01:42	2				2	0:02:18				0:01:42			
26	0:01:47	0:01:15	2				2	0:01:47				0:01:15			
27	0:03:15	0:00:50	4				4	0:03:15				0:00:50			
28	0:02:53	0:01:07	3				3	0:02:53				0:01:07			
29	0:01:56	0:00:35	1				1	0:01:56				0:00:35			
30	0:02:01	0:00:58			1		1			0:02:01				0:00:58	
31	0:00:51	0:00:15			2		2			0:00:51				0:00:15	
32	0:01:38	0:00:36	1				1	0:01:38				0:00:36			
33	0:01:10	0:02:13				1	1				0:01:10				0:02:13
34	0:02:13	0:00:40		1			1		0:02:13				0:00:40		
35	0:02:46	0:02:01				8	8				0:02:46				0:02:01
36	0:01:35	0:00:20		1			1		0:01:35				0:00:20		
37	0:02:32	0:01:26		1		1	2		0:01:16		0:01:16		0:00:43		0:00:43
38	0:01:25	0:00:37				1	1				0:01:25				0:00:37
39	0:01:46	0:01:26	2				2	0:01:46				0:01:26			
40	0:01:28	0:00:26				1	1				0:01:28				0:00:26
41	0:01:47	0:00:33			1		1			0:01:47				0:00:33	
42	0:01:39	0:01:15		1			1		0:01:39				0:01:15		
43	0:00:50	0:00:10	1				1	0:00:50				0:00:10			
44	0:01:09	0:00:36	1				1	0:01:09				0:00:36			
45	0:01:01	0:00:14	1				1	0:01:01				0:00:14			
46	0:00:52	0:00:22	1				1	0:00:52				0:00:22			
47	0:00:58	0:00:19	1				1	0:00:58				0:00:19			
48	0:01:36	0:00:23			1		1			0:01:36				0:00:23	
Σ	1:41:43	0:42:50	33	10	12	19	74	0:36:17	0:21:22	0:22:35	0:21:29	0:15:39	0:07:07	0:06:46	0:13:17
Ø	0:02:07	0:00:54						0:01:06	0:02:08	0:01:53	0:01:08	0:00:28	0:00:43	0:00:34	0:00:42
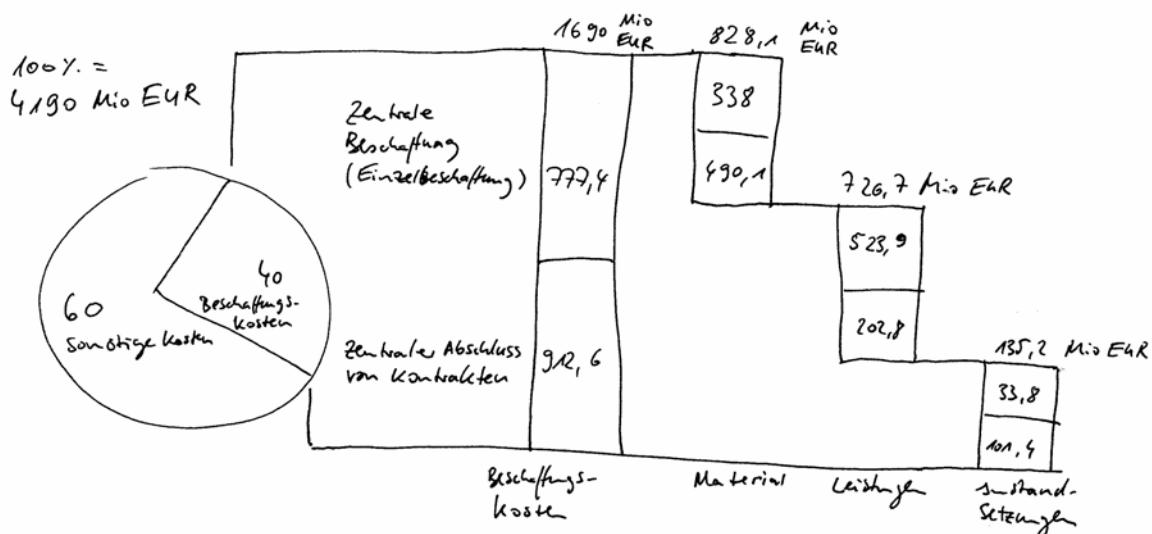
Set of test slides

On the following pages you will find the 48 creation and alteration scenarios used for this study. PPT refers to the working time needed using PowerPoint together with macros and templates. TC refers to the working time needed using PowerPoint together with think-cell chart.

Creation 1
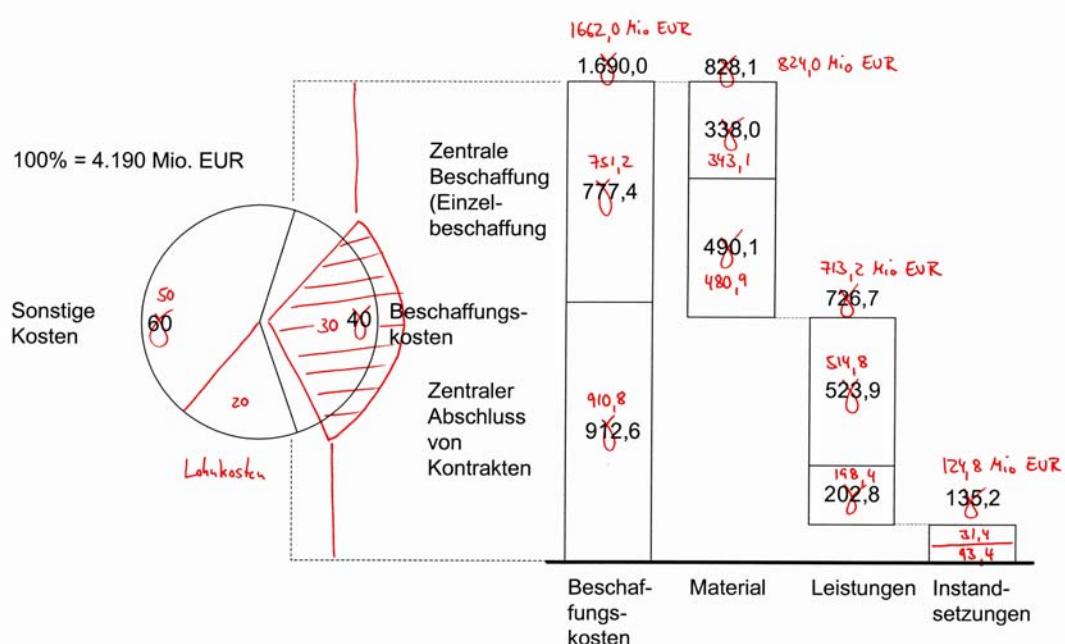
PPT   07:12
TC   04:38

Alteration 1

PPT   05:37
TC   01:51
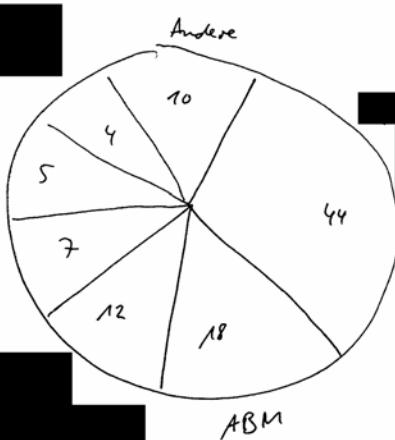
Creation 2

PPT 02:21
TC 02:02
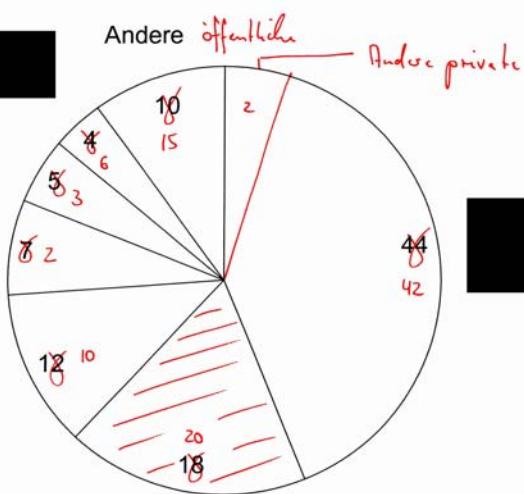
Alteration 2

PPT 01:37
TC 01:22
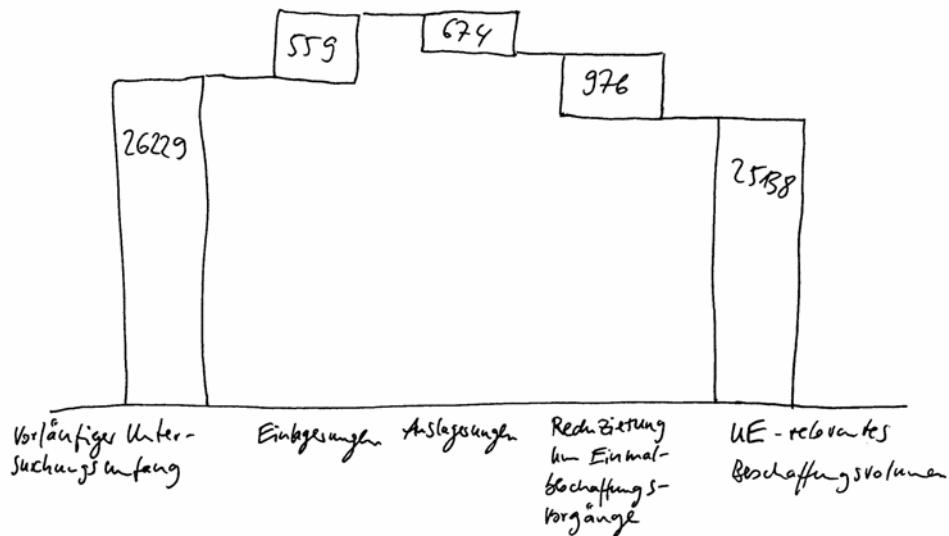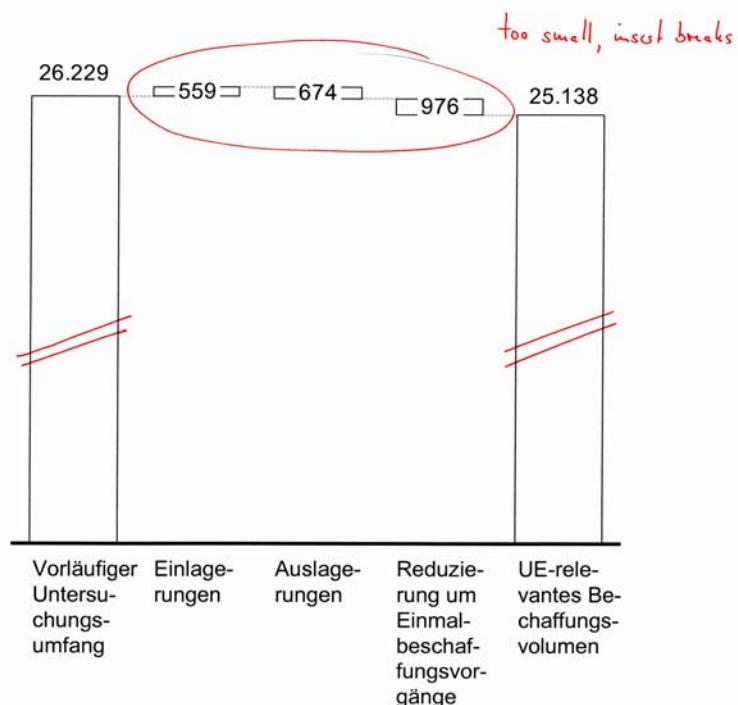
Creation 3

PPT   03:40
TC   01:46

Alteration 3

PPT   01:52
TC   00:38
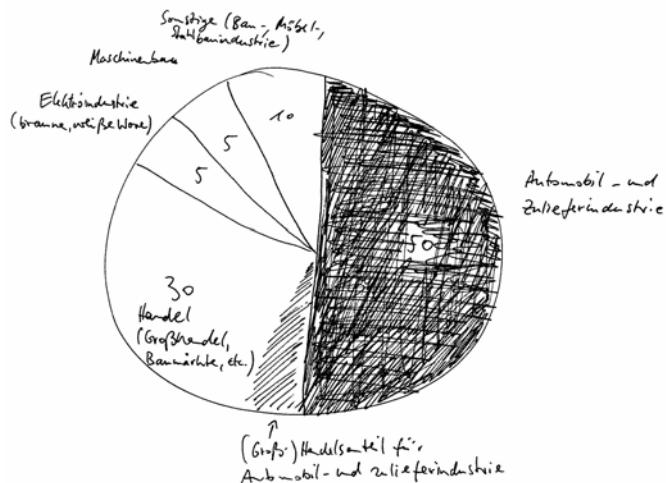
Creation 4

PPT   03:29
TC   03:07
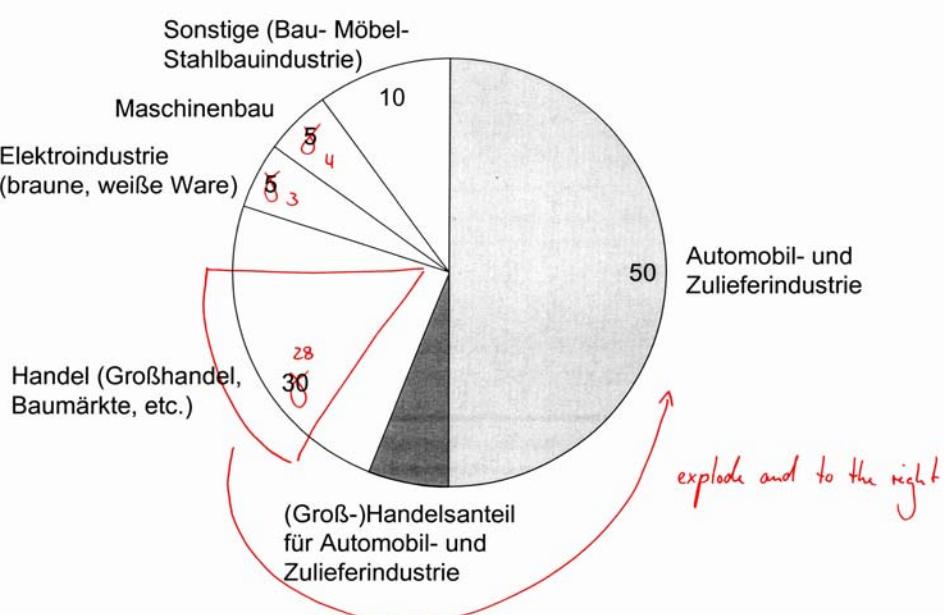
Alteration 4

PPT   03:20
TC   02:16
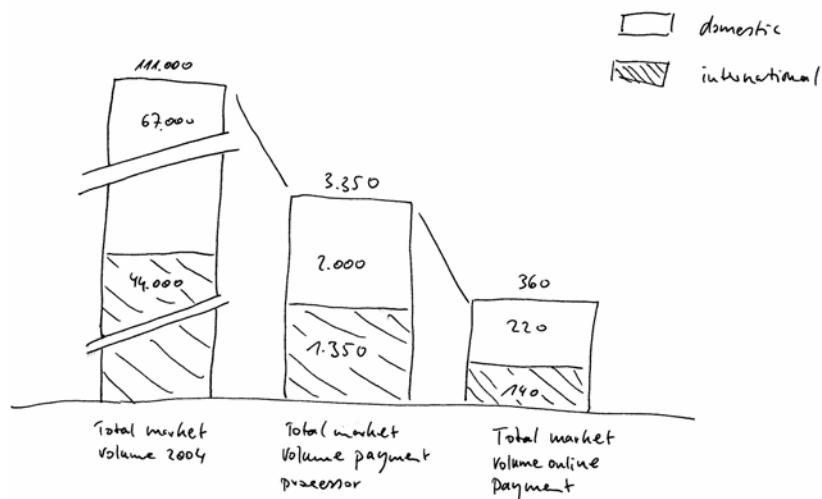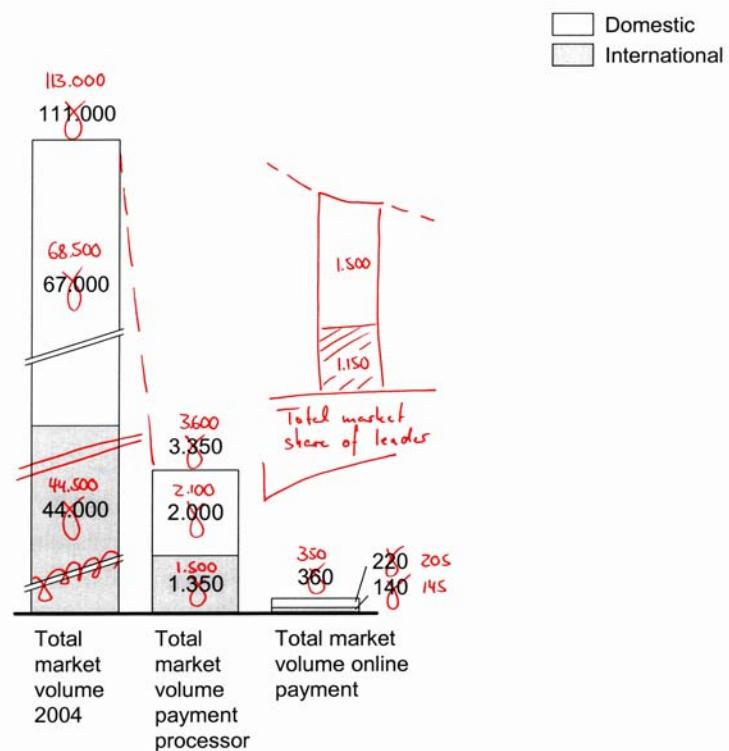
Creation 5

PPT   05:15
TC   02:07

Alteration 5

PPT   05:40
TC   01:02
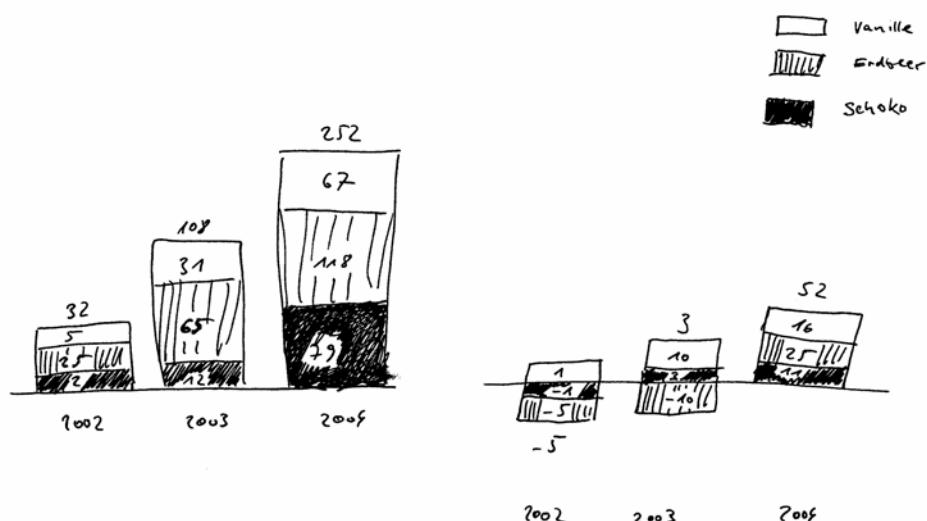
Creation 6
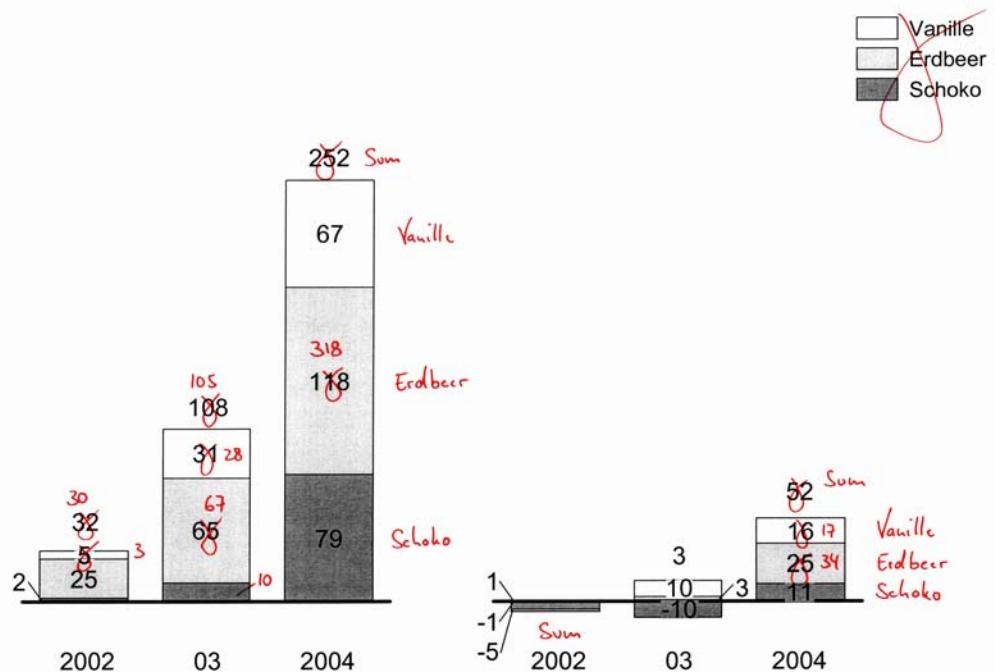
PPT   06:43
TC   01:57

Alteration 6
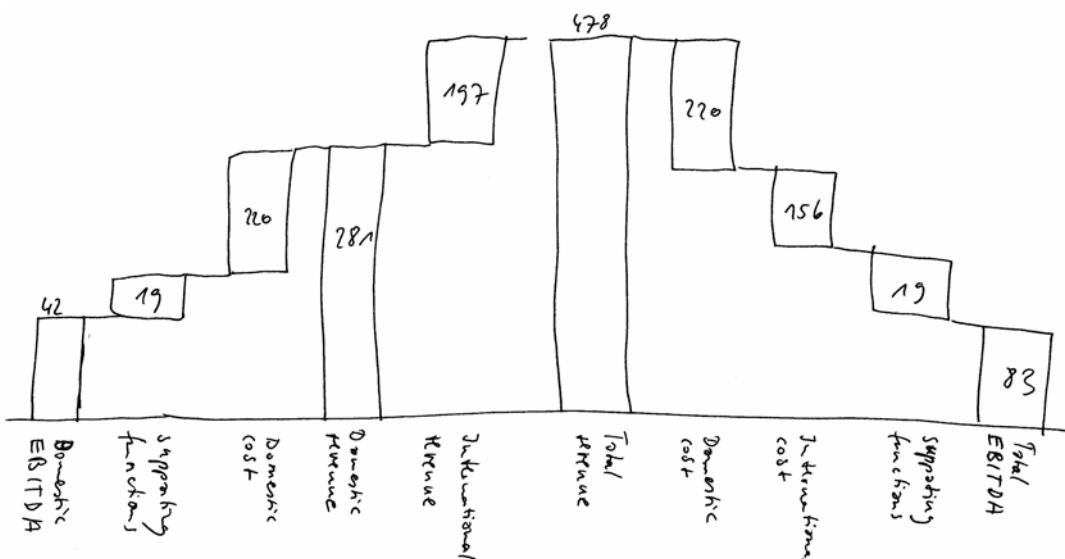
PPT   07:39
TC   01:38

Creation 7
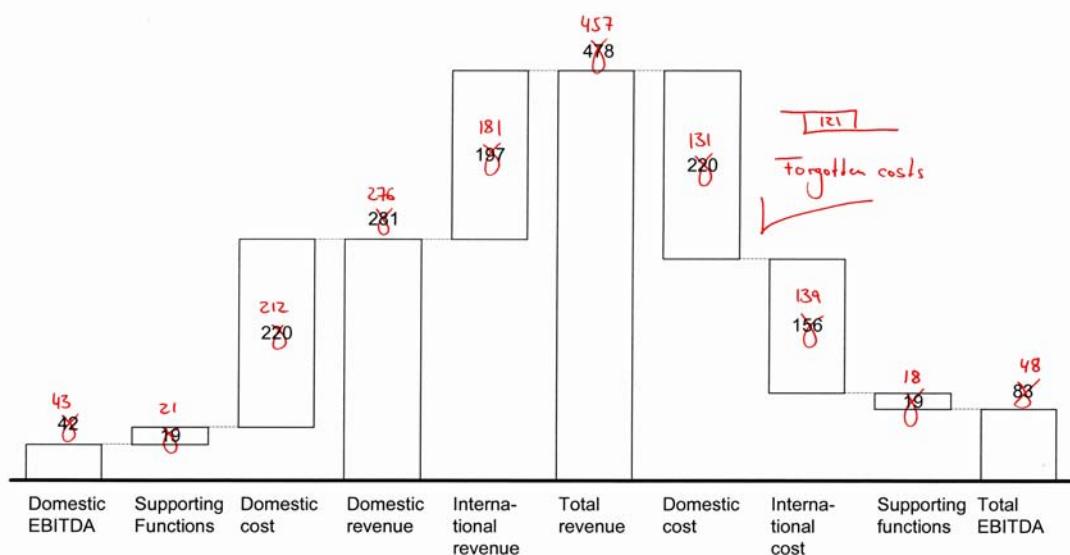
PPT   05:51
TC   02:06

Alteration 7

PPT   04:11
TC   01:02
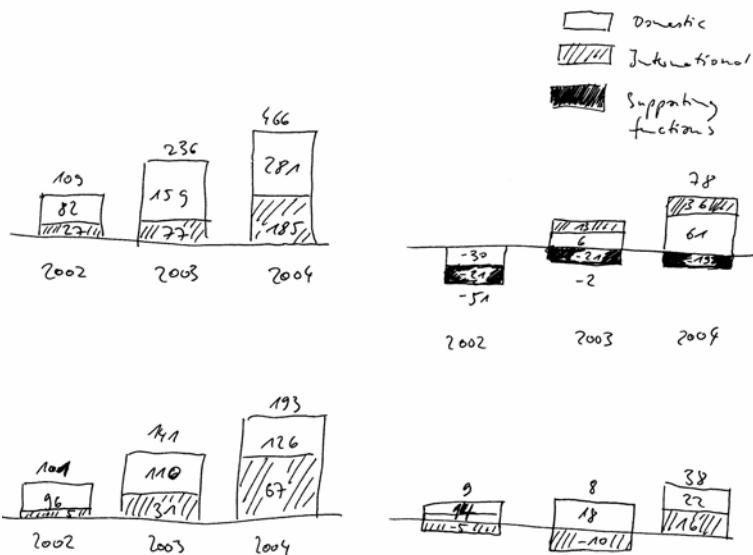
Creation 8
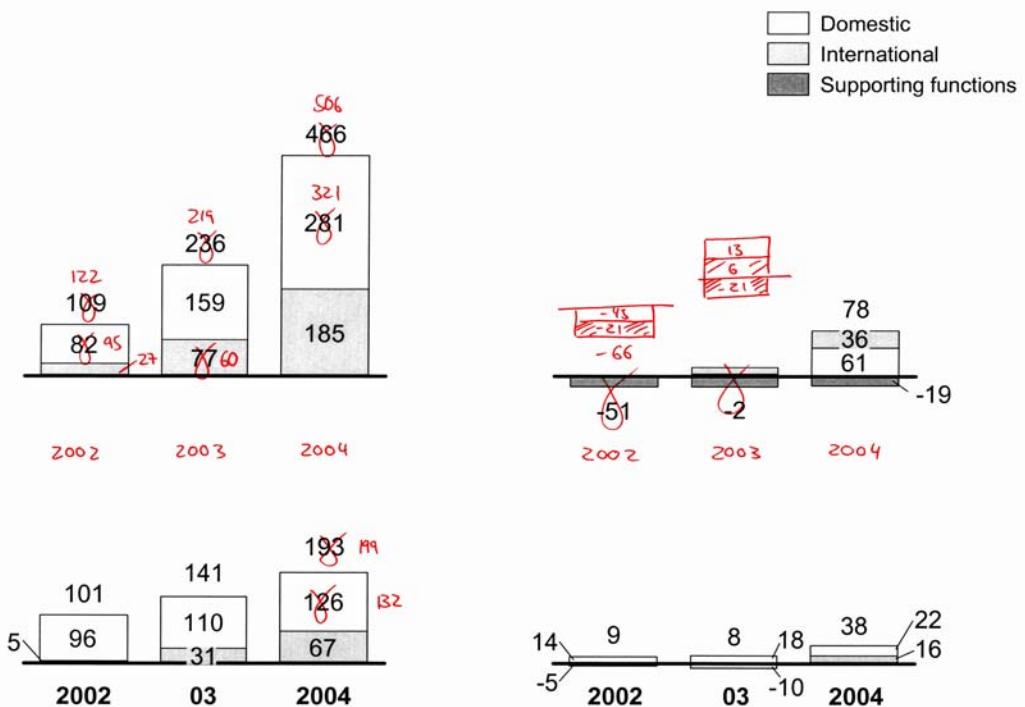
PPT   11:46
TC   03:11

Alteration 8

PPT   05:55
TC   01:12
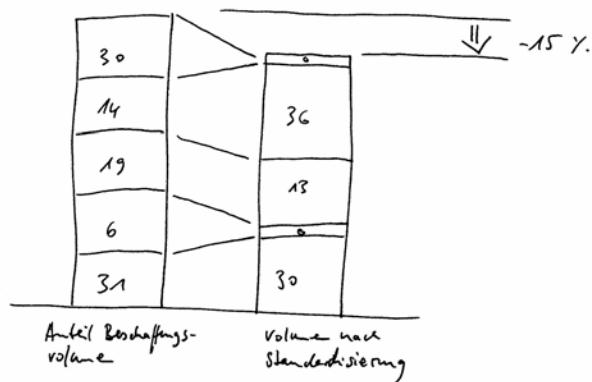
Creation 9

PPT   03:13
TC   01:20
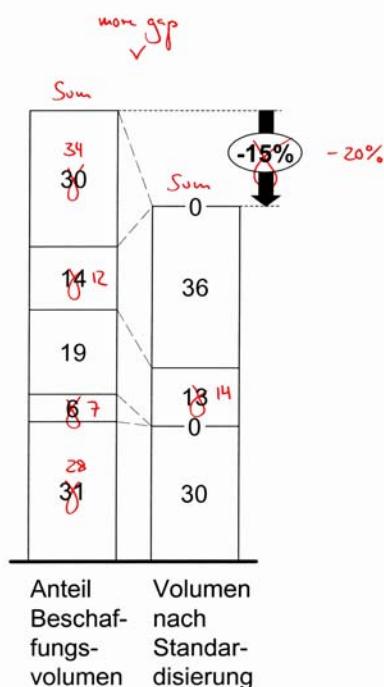
Alteration 9

PPT   02:24
TC   00:19
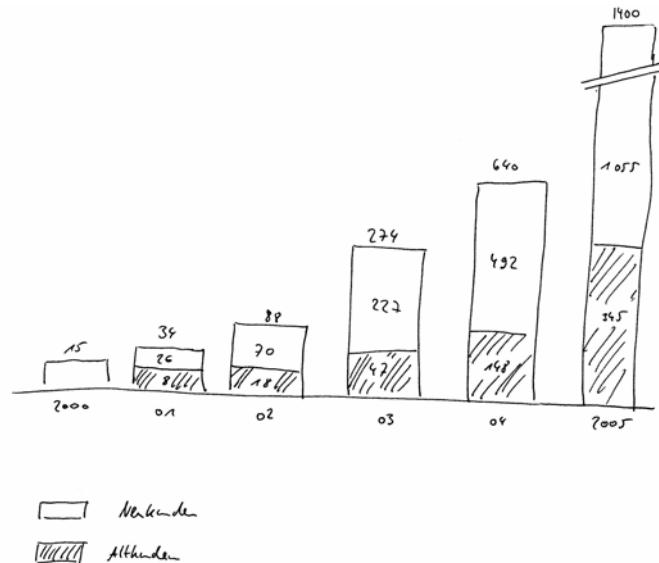
Creation 10

PPT   04:01
TC   01:32
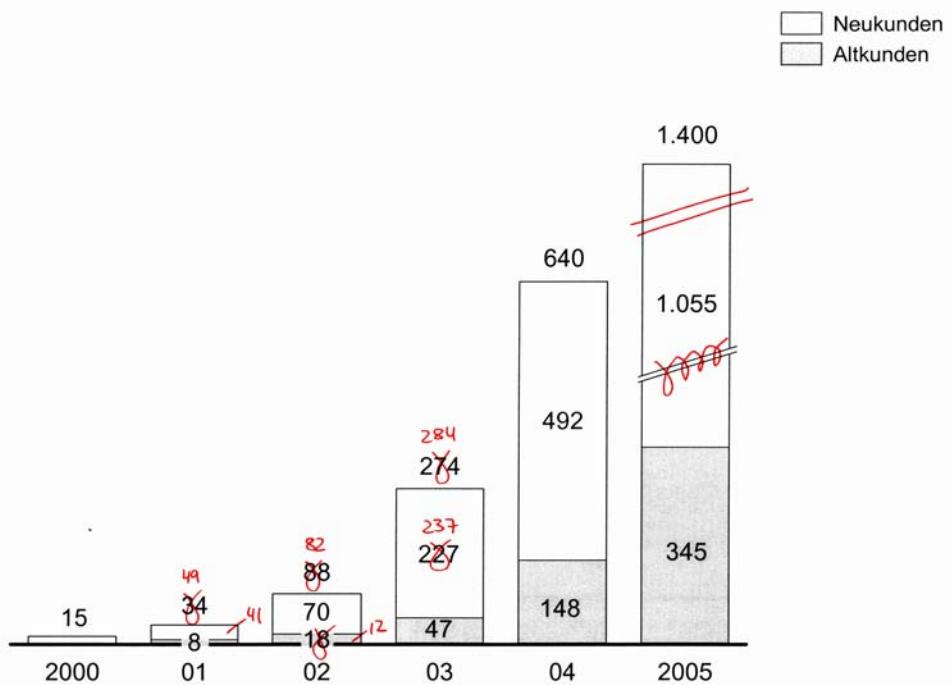
Alteration 10
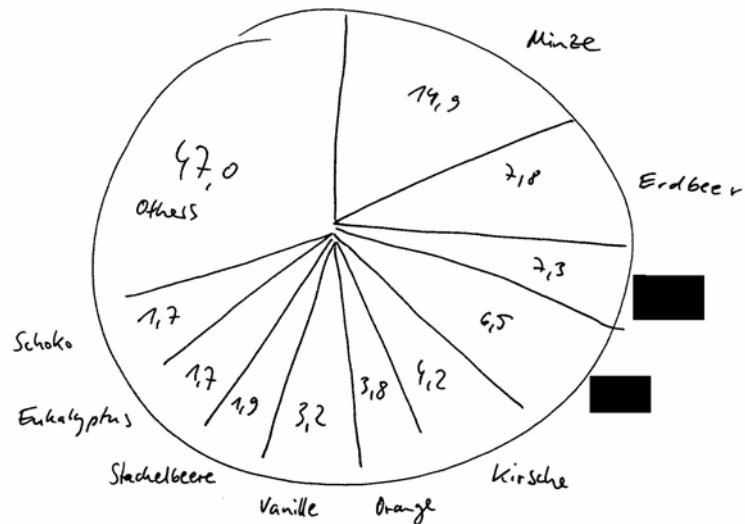
PPT   03:06
TC   00:32

Creation 11
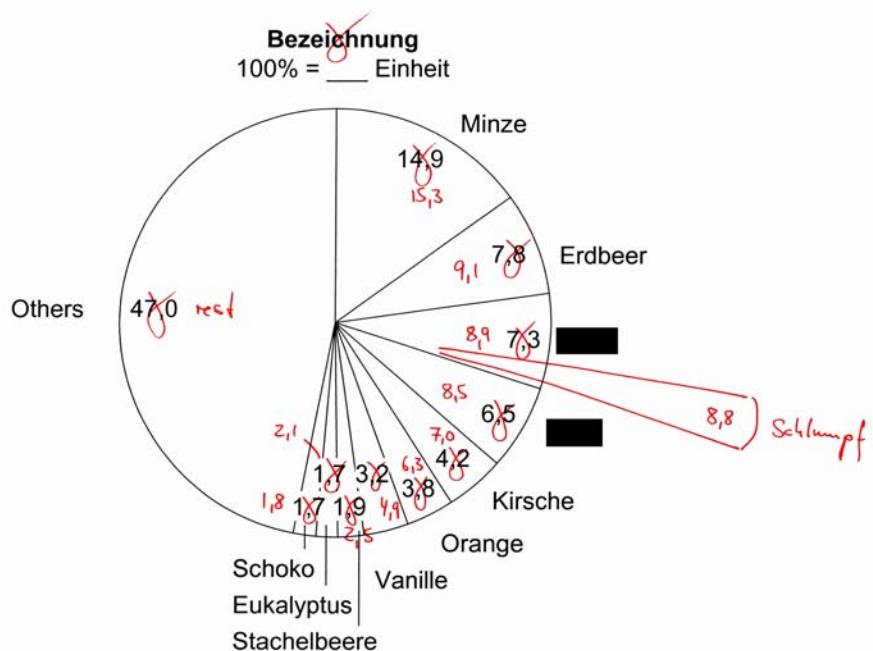
PPT   04:49
TC   01:25

Alteration 11

PPT   04:18
TC   01:06
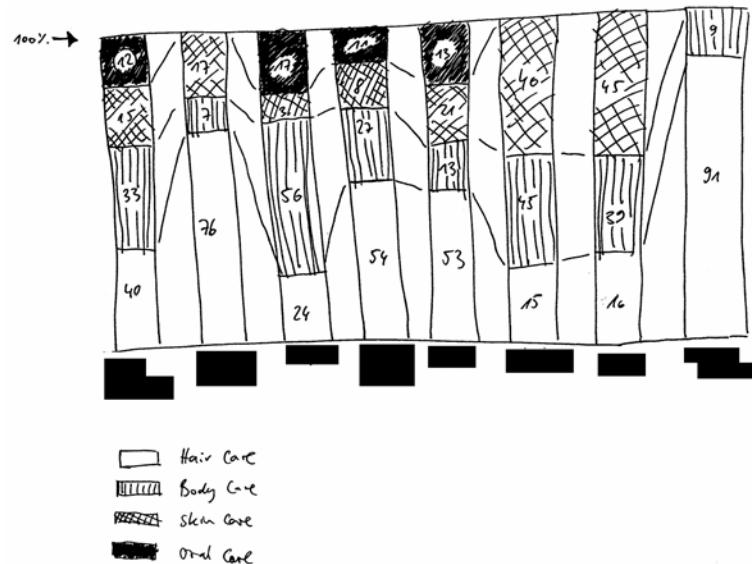
Creation 12
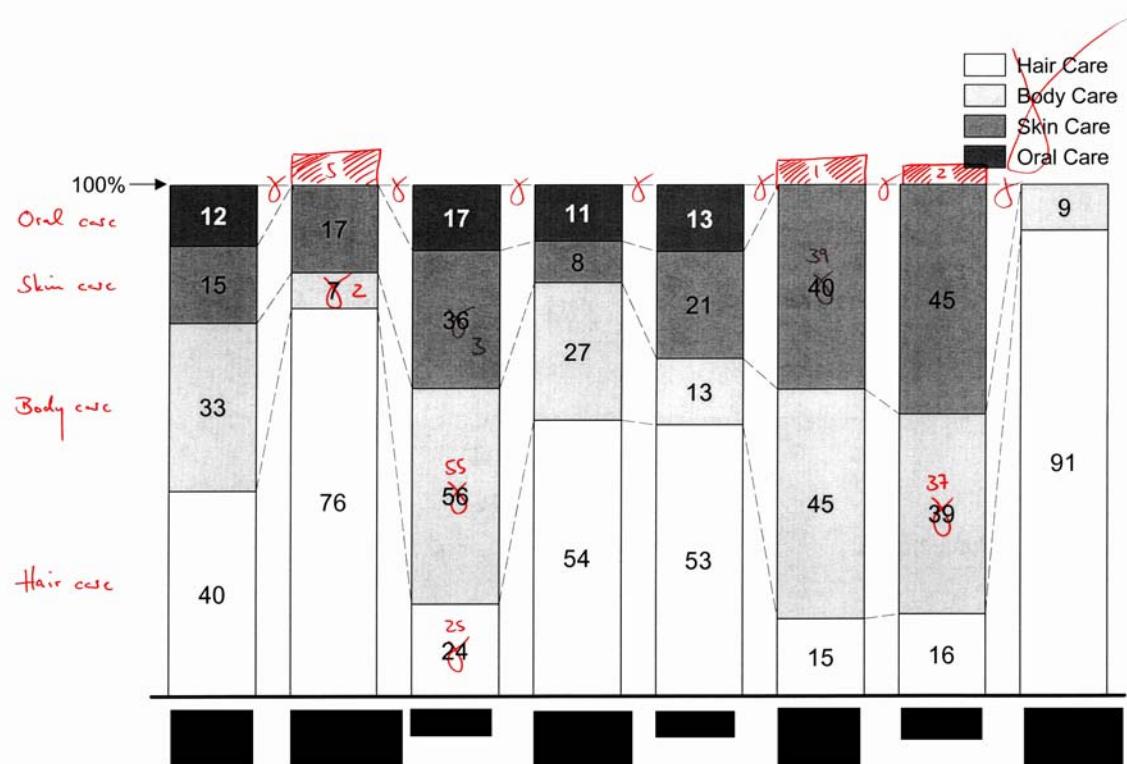
PPT   04:07
TC   03:22

Alteration 12

PPT   10:42
TC   01:37
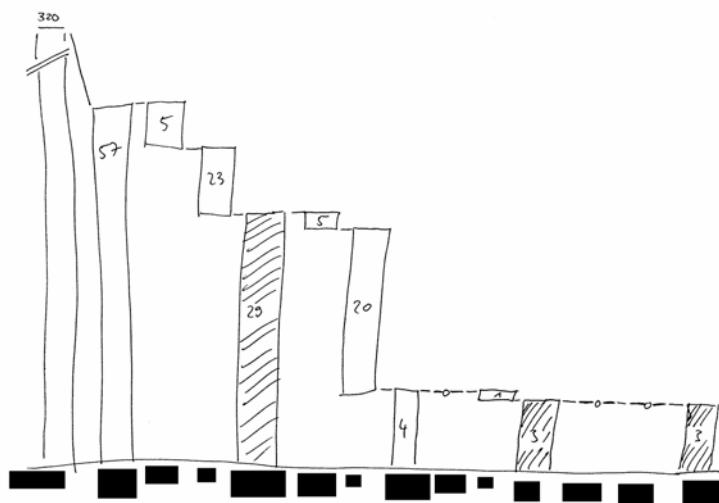
Creation 13
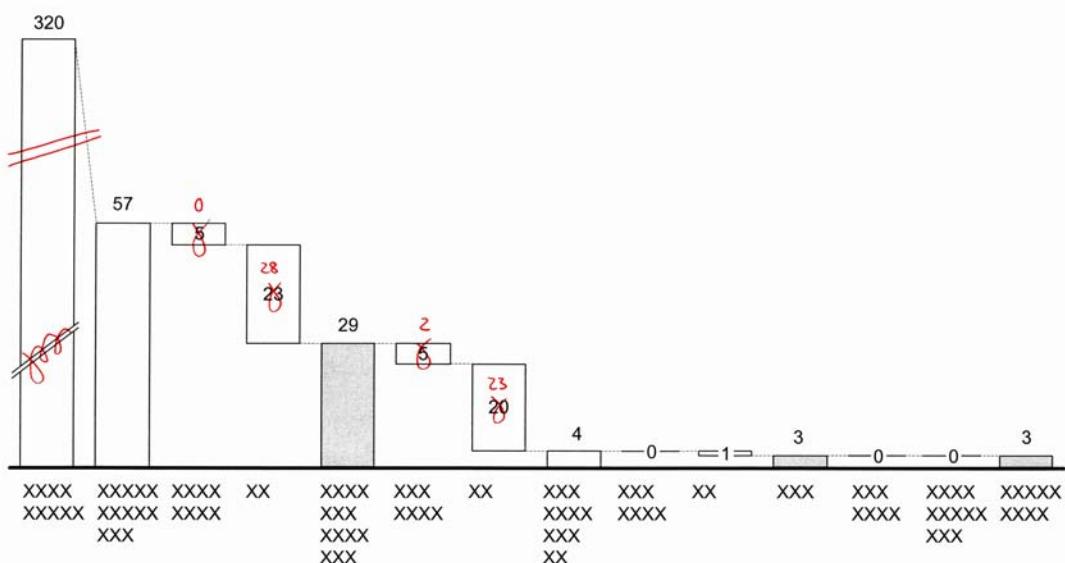
PPT   07:34
TC   03:04

Alteration 13

PPT   02:23
TC   00:25
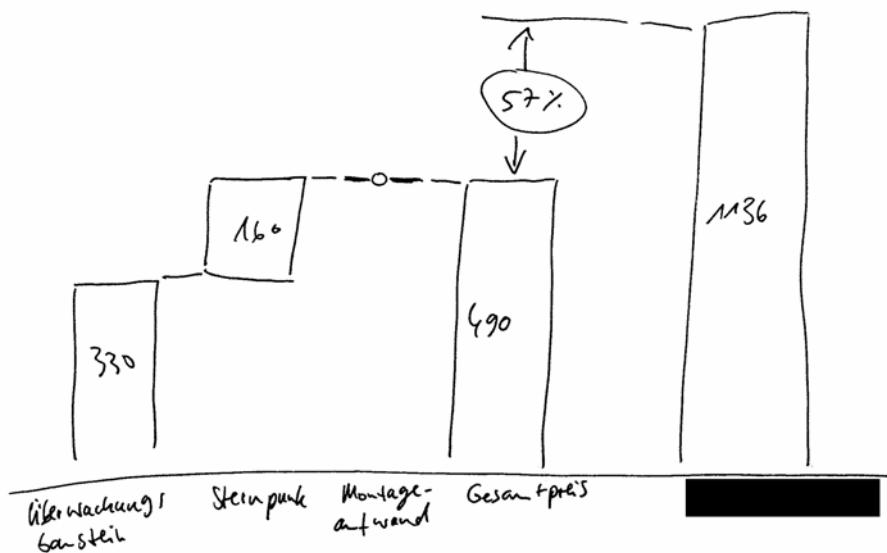
Creation 14
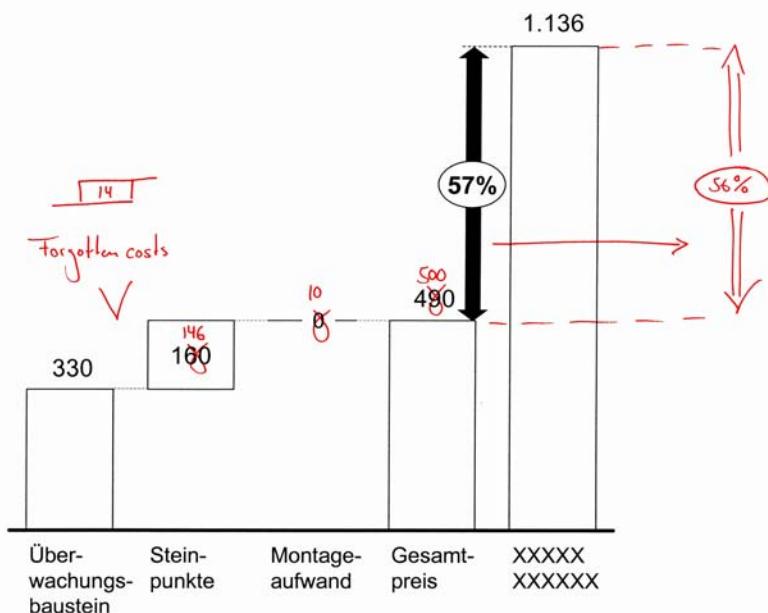
PPT   03:59
TC   01:56

Alteration 14

PPT   03:07
TC   00:38
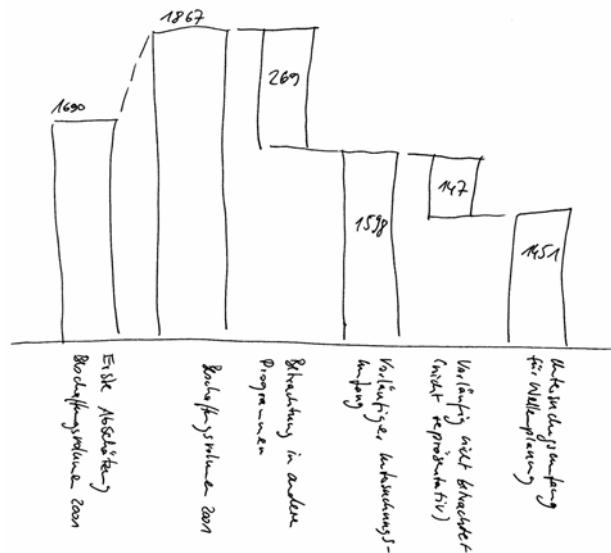
Creation 15
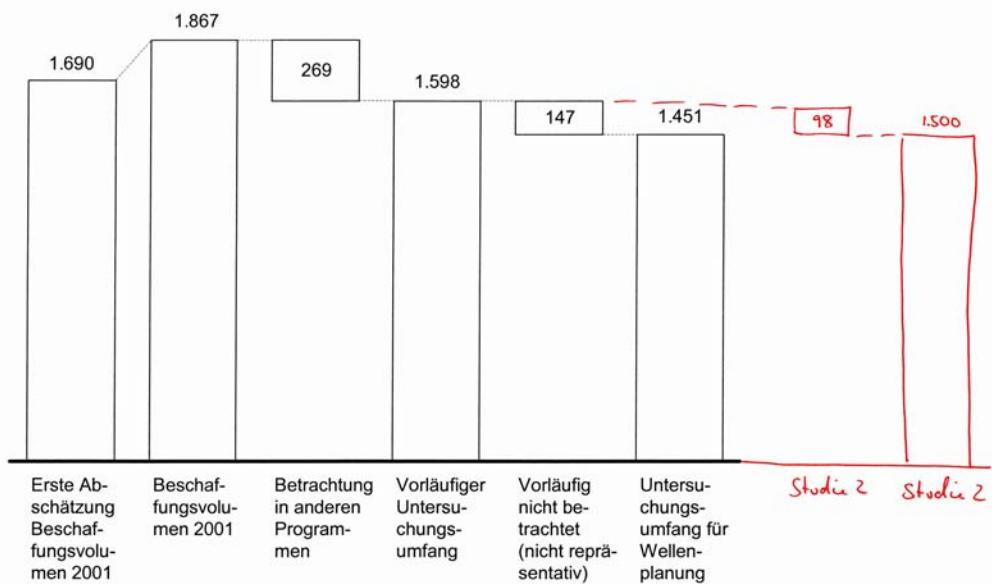
PPT   04:16
TC   02:16

Alteration 15

PPT   02:29
TC   00:32
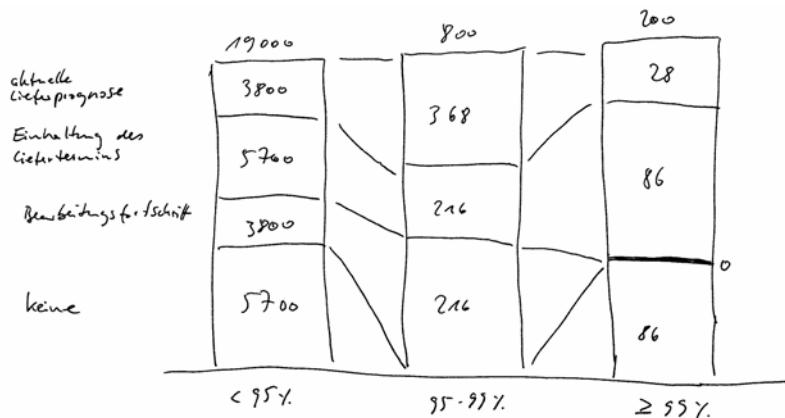
Creation 16

PPT   04:50
TC   03:52
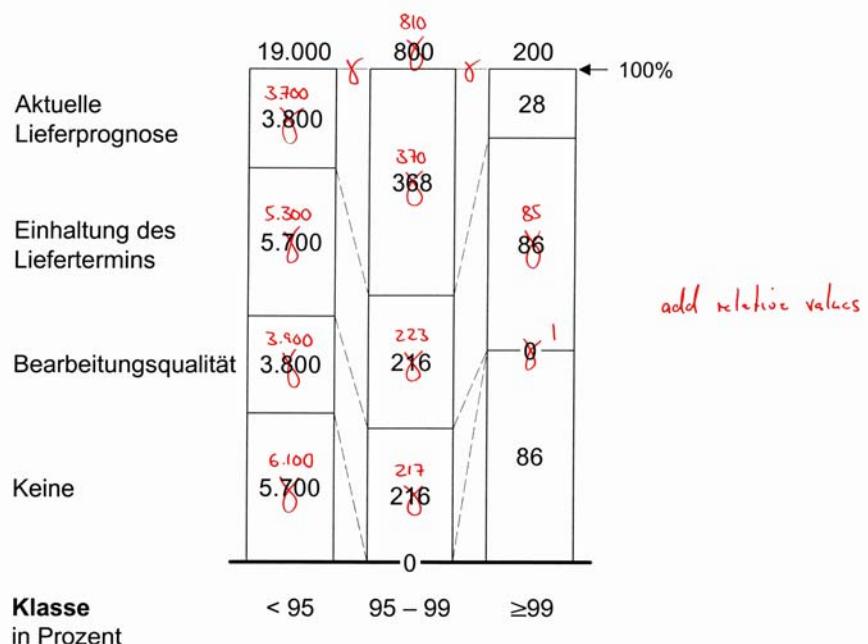
Alteration 16
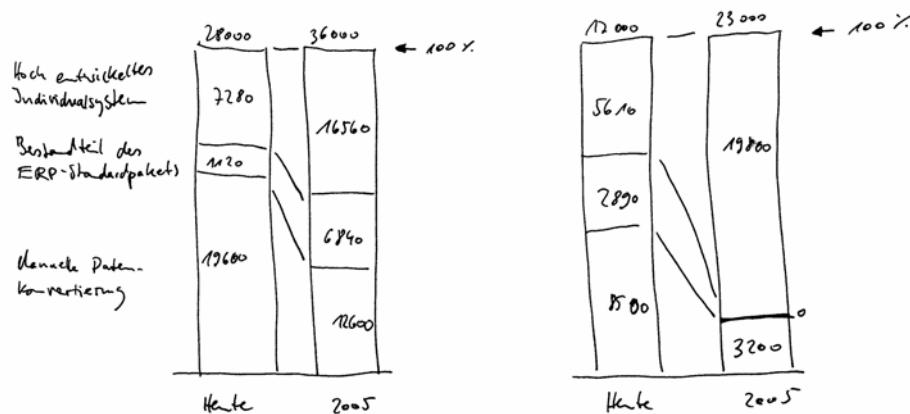
PPT   05:42
TC   00:29

Creation 17

PPT   08:58
TC   02:44
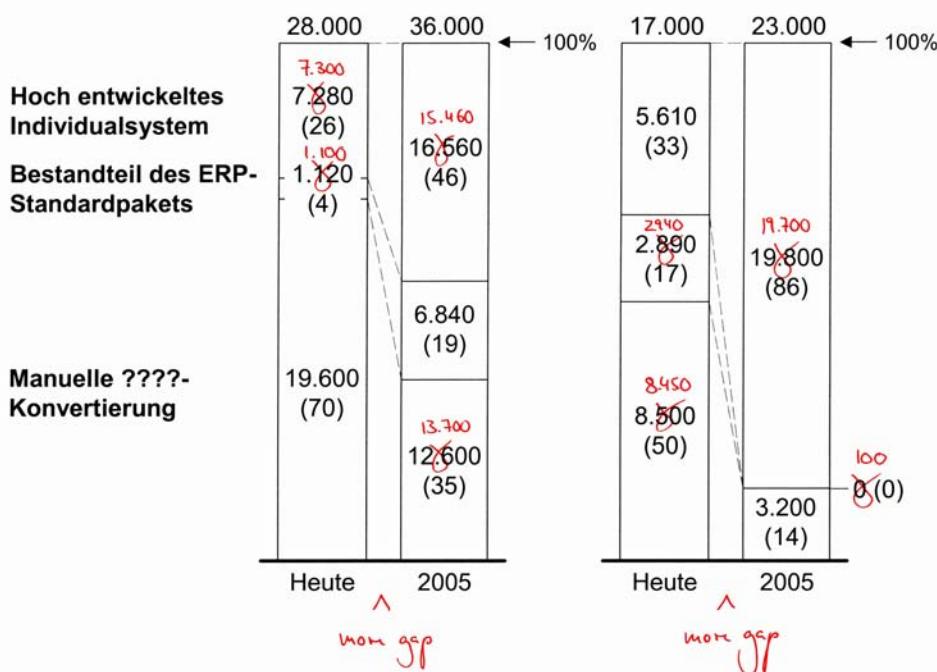
Alteration 17

PPT   00:52
TC   01:00
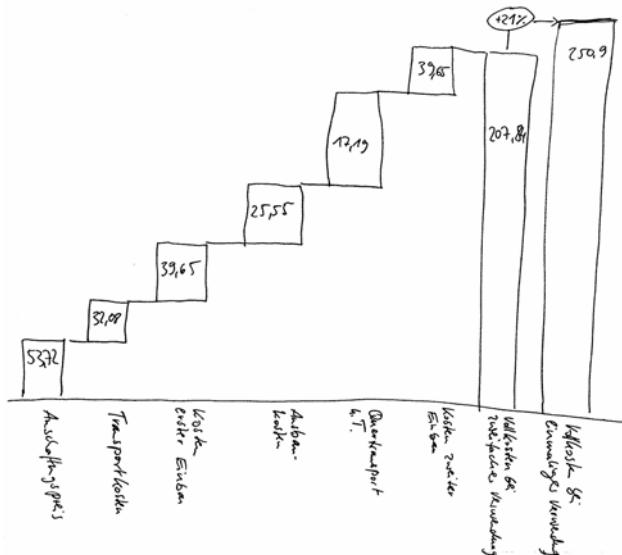
Creation 18
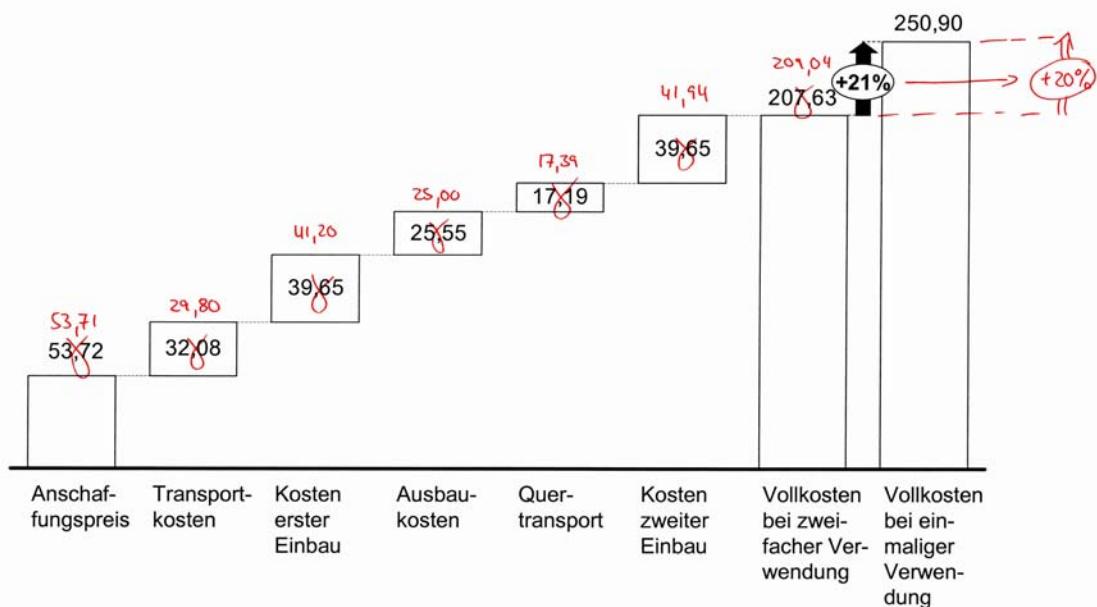
PPT   07:26
TC   02:53

Alteration 18
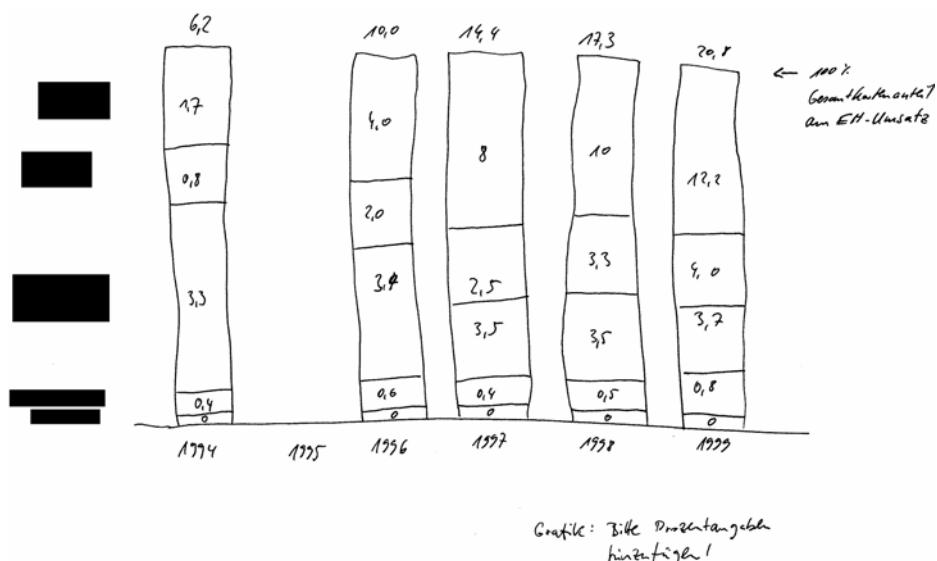
PPT   08:40
TC   00:27

Creation 19

PPT   15:51
TC   03:21
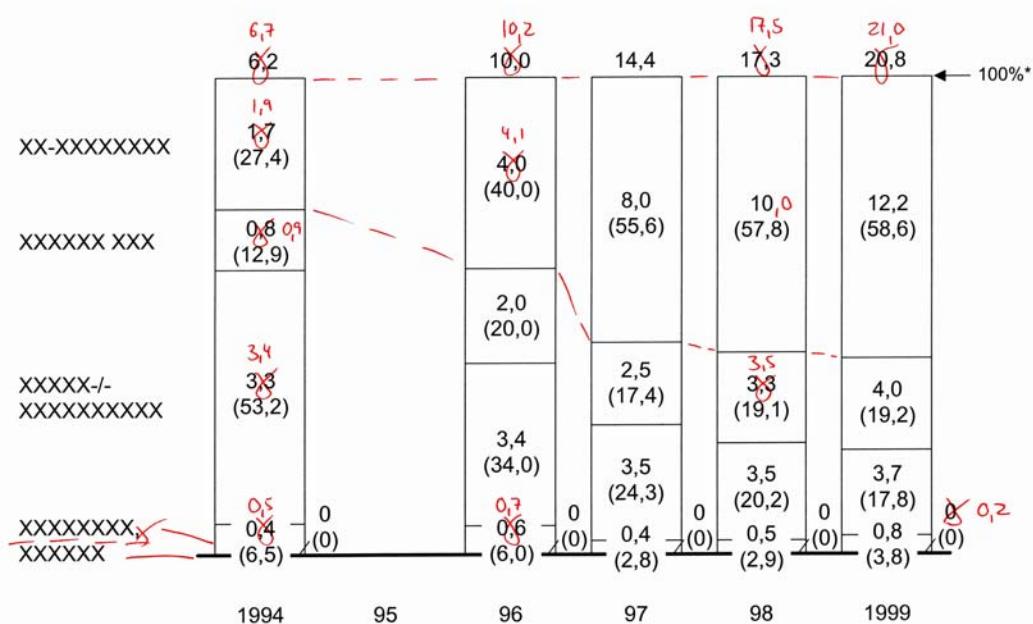
Alteration 19

PPT   06:43
TC   00:47
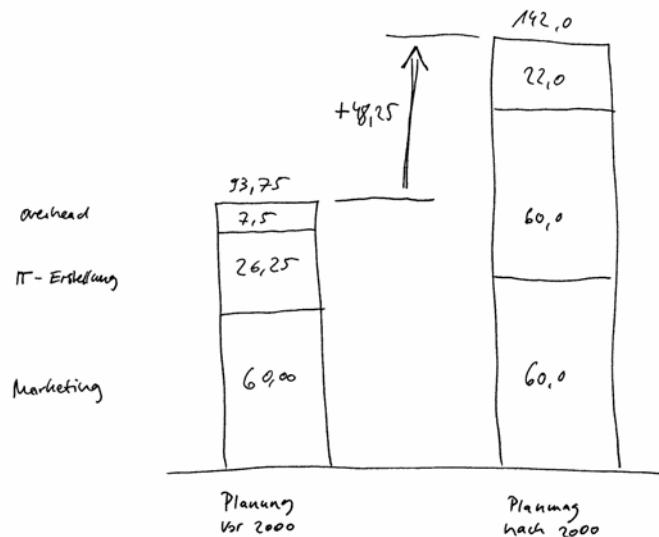
* Gesamtkostenanteil am EH-Umsatz

Creation 20
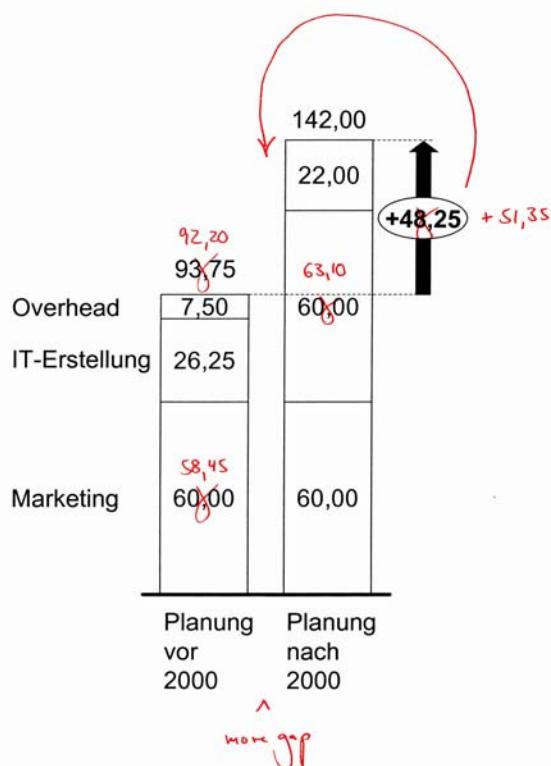
PPT	03:48
TC	01:42

Alteration 20

PPT	03:22
TC	00:36
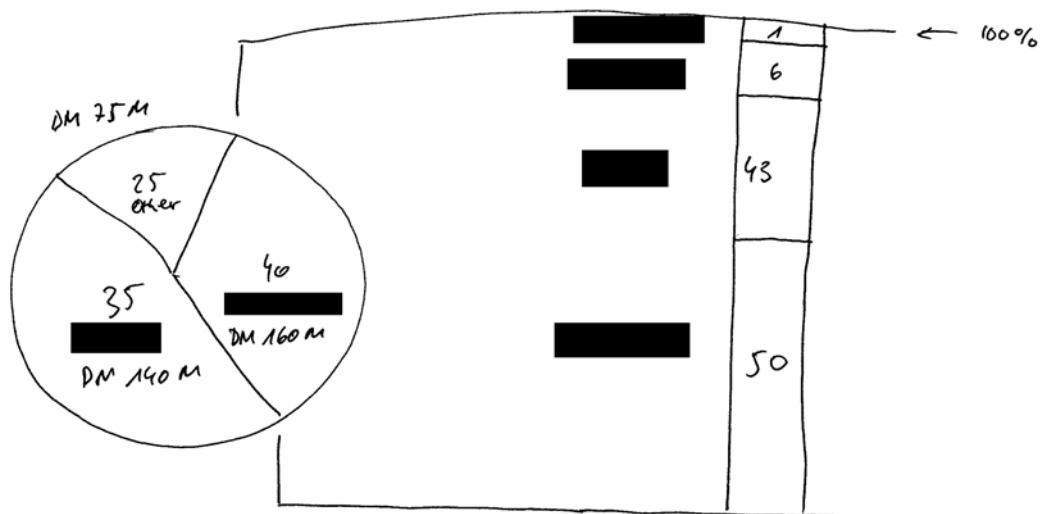
Creation 21
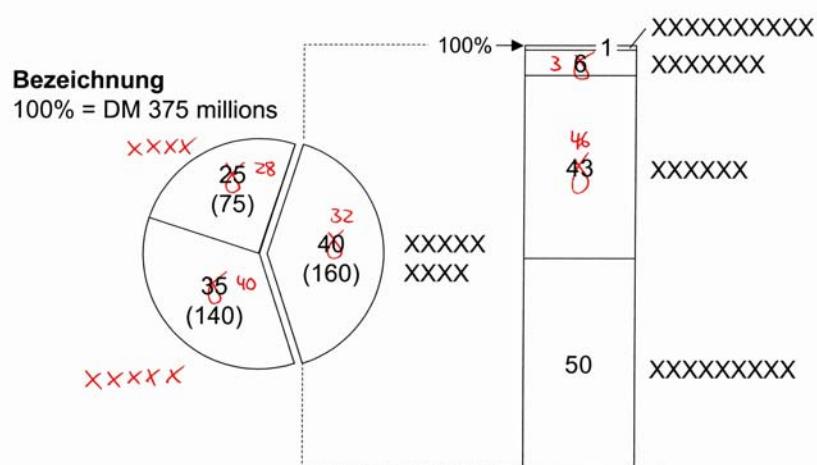
PPT   05:48
TC   02:40

Alteration 21

PPT   05:13
TC   00:33
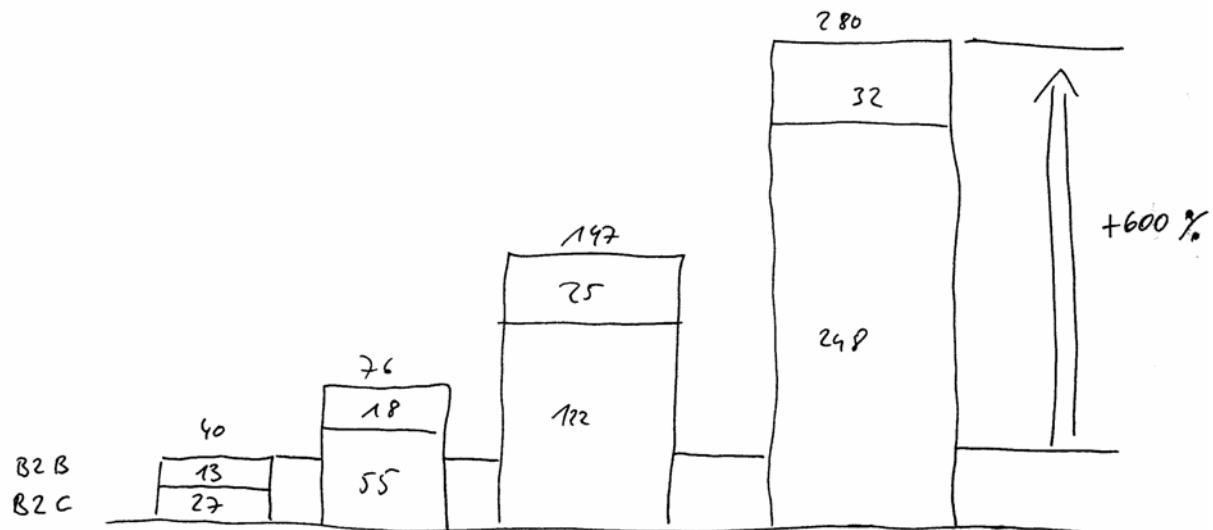
Creation 22
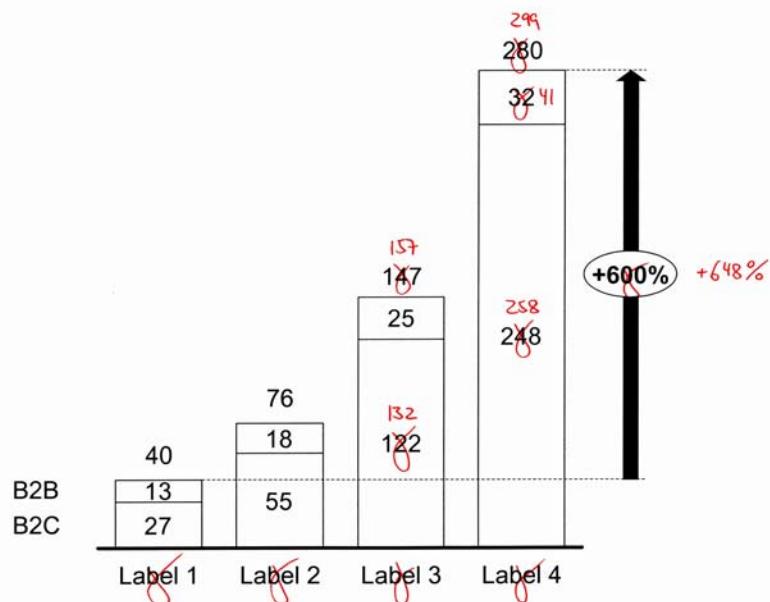
PPT   02:54
TC   01:22

Alteration 22
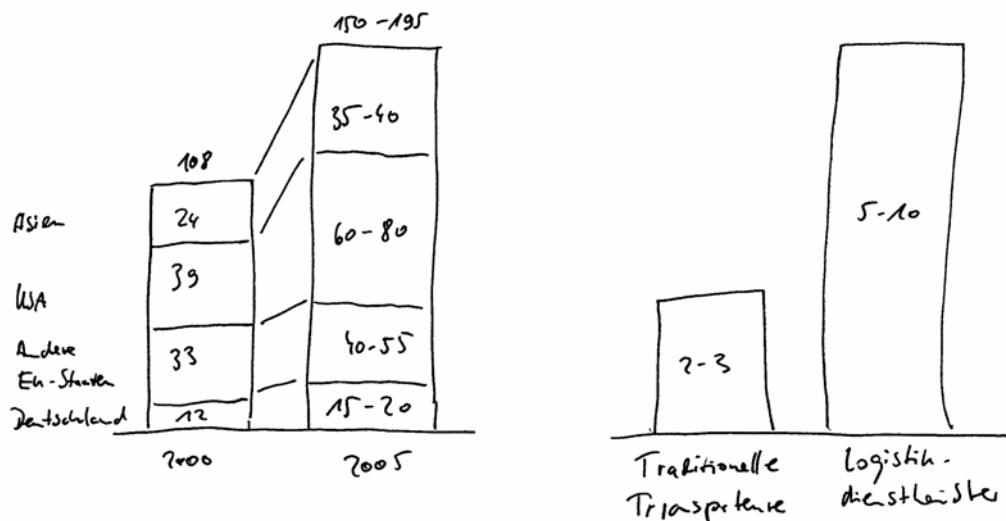
PPT   02:41
TC   00:33
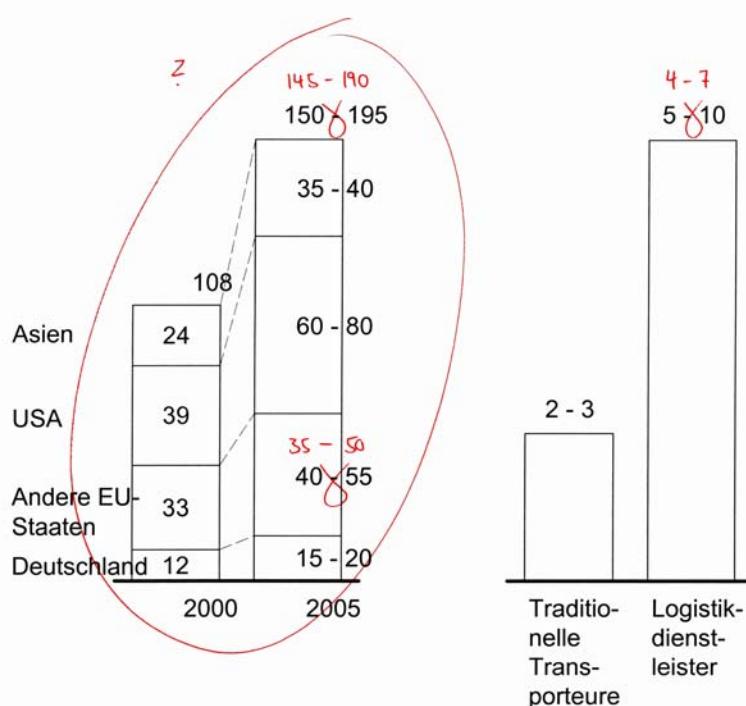
Creation 23

PPT   03:56
TC   02:43

Alteration 23

PPT   02:06
TC   00:35
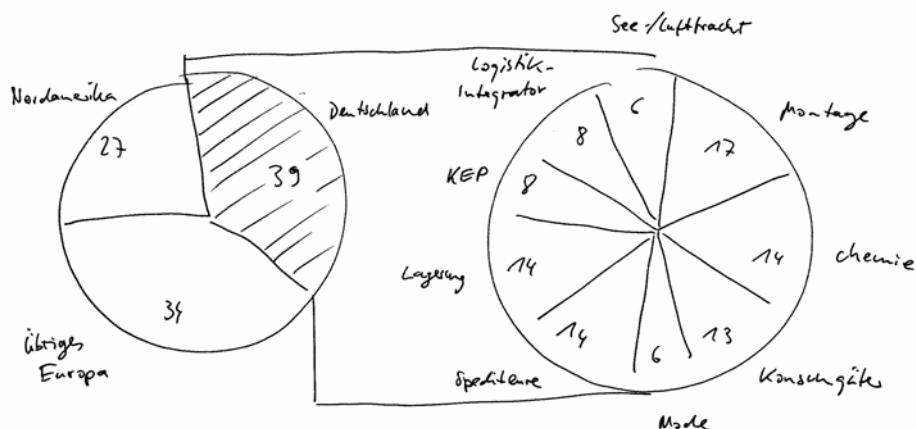
Creation 24

PPT   04:16
TC   03:11
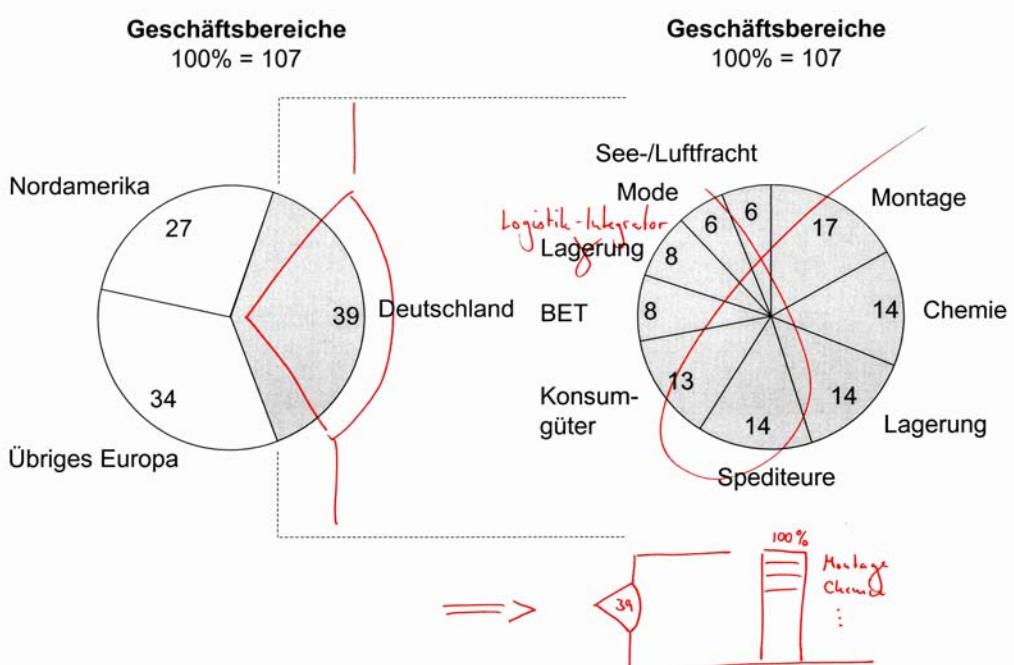
Alteration 24
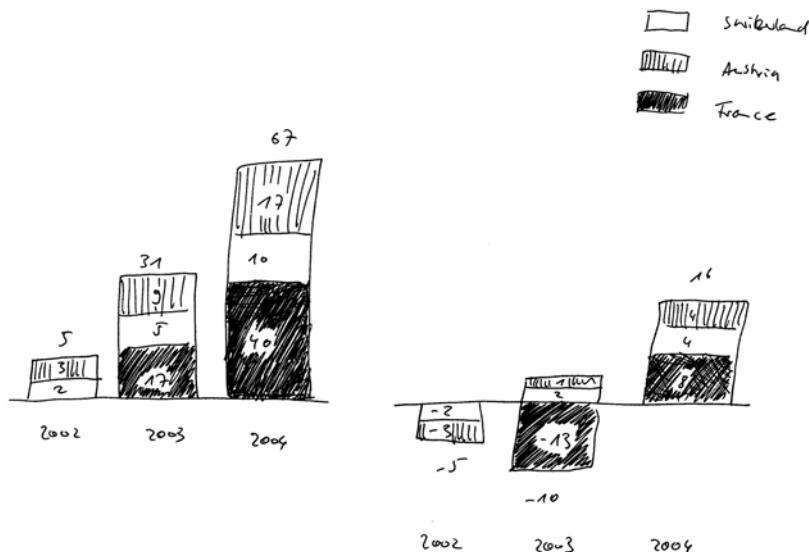
PPT   04:35
TC   01:21

Creation 25
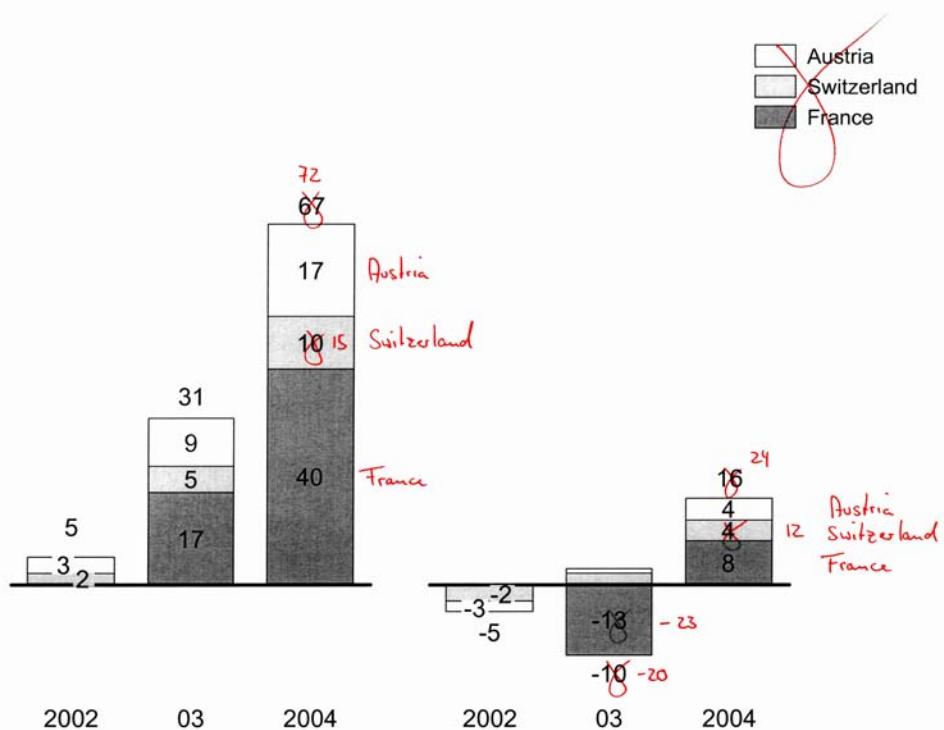
PPT   05:39
TC   02:18

Alteration 25

PPT   02:52
TC   01:42
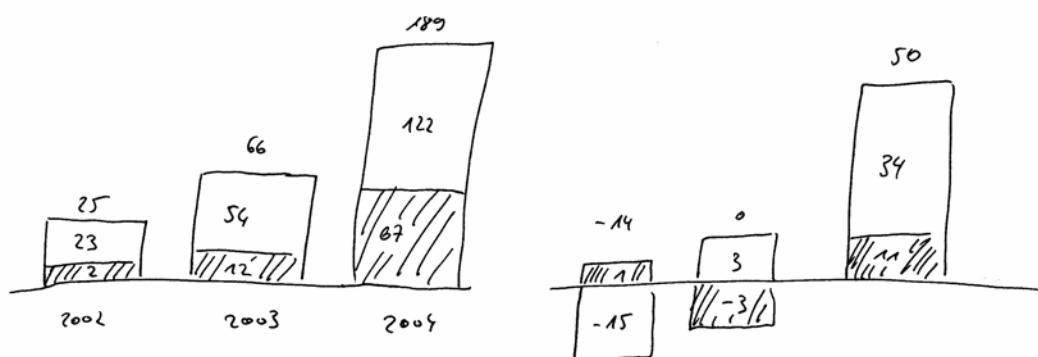
Creation 26

PPT   05:12
TC   01:47
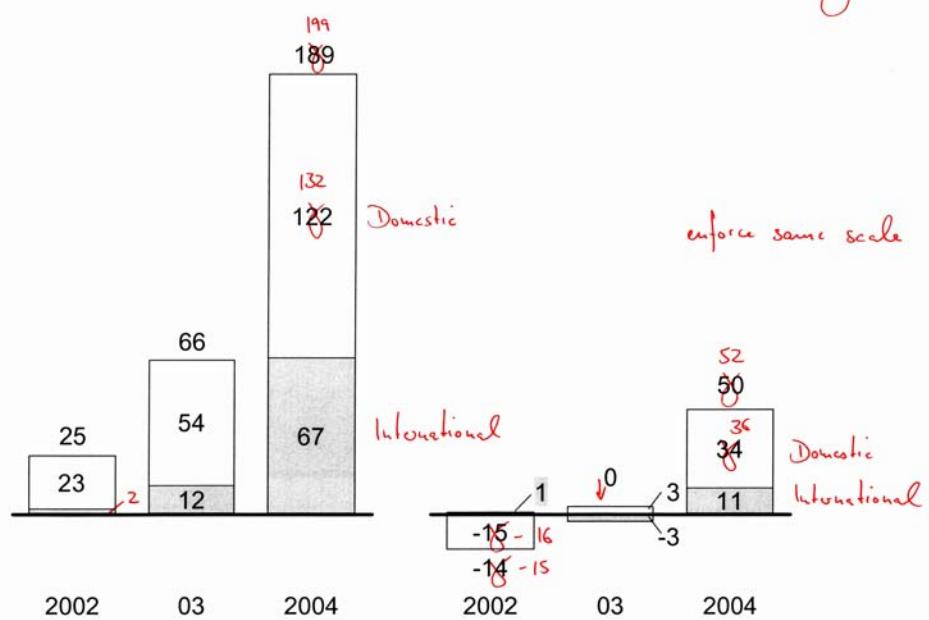
Alteration 26

PPT   02:12
TC   01:15
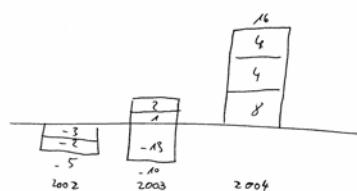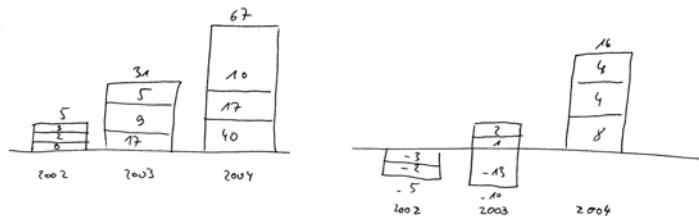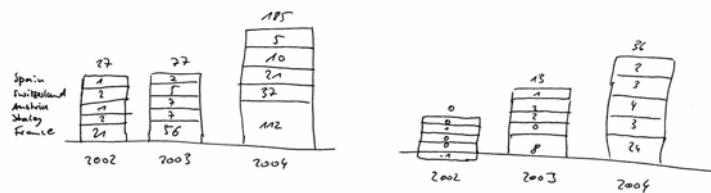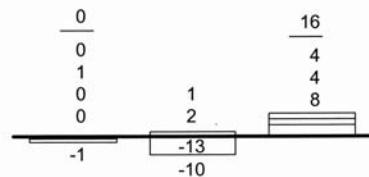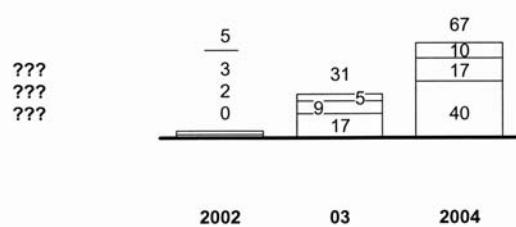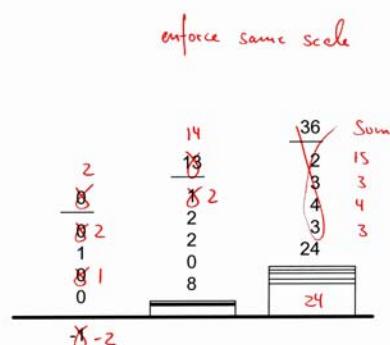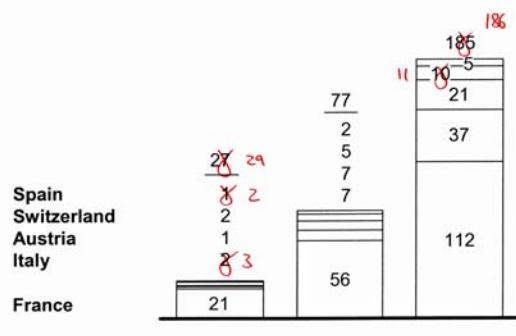
Creation 27

PPT   15:58
TC   03:15

Alteration 27

PPT   04:23
TC   00:50
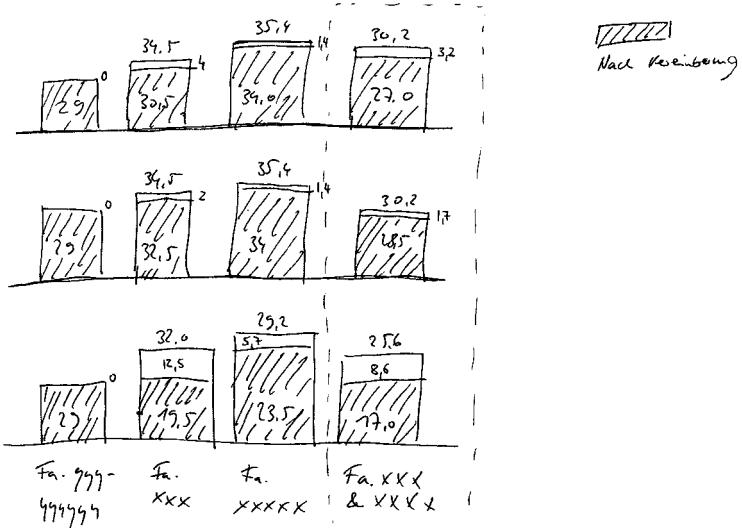
Creation 28
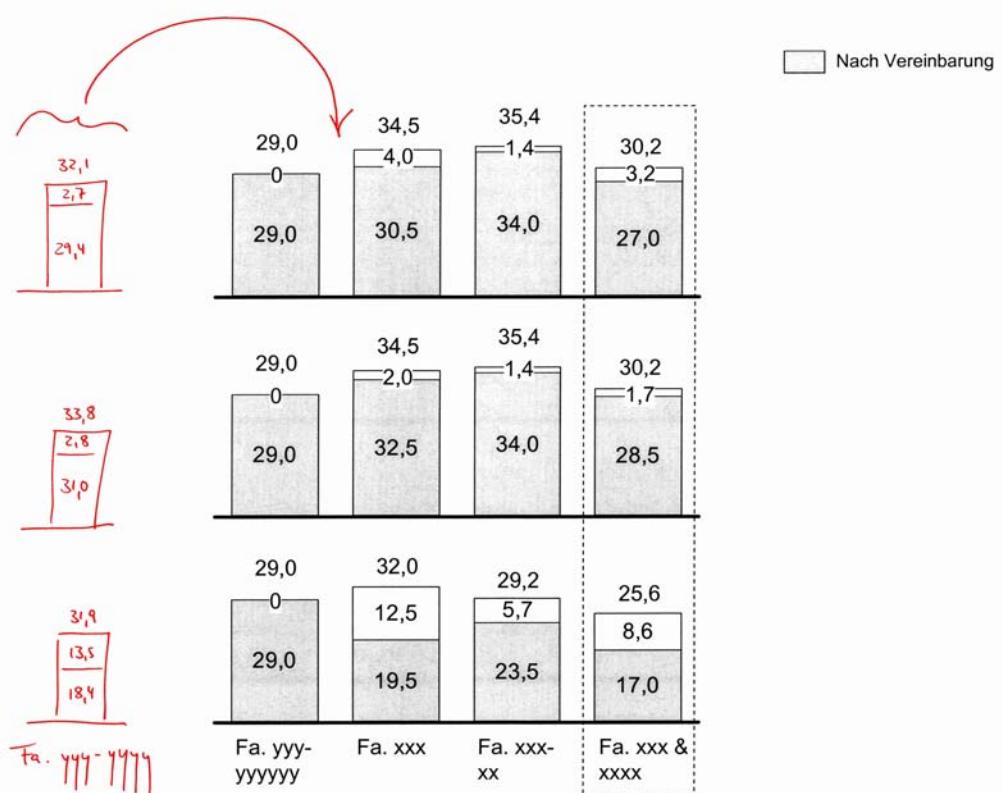
PPT   07:33
TC   02:53

Alteration 28
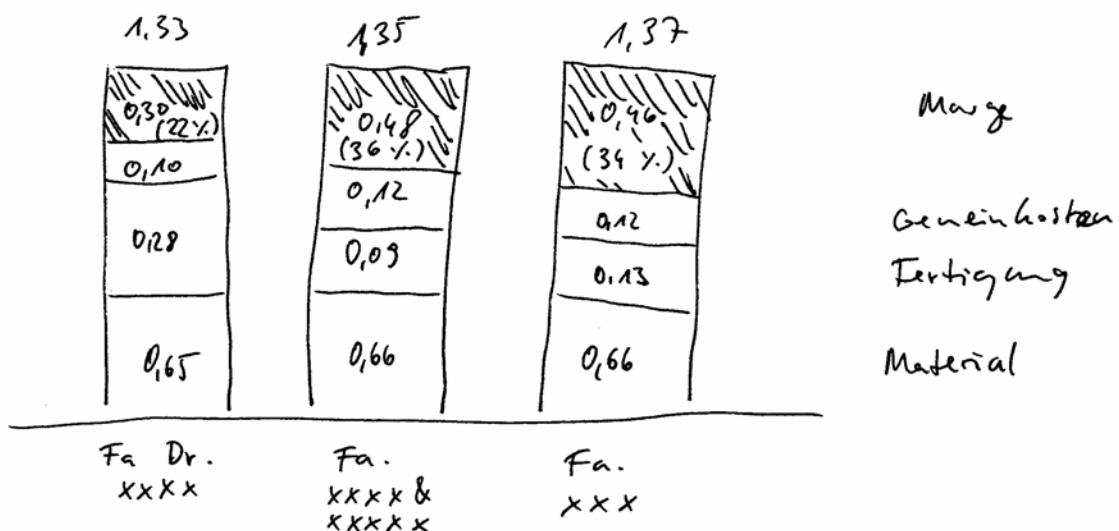
PPT   07:12
TC   01:07

Creation 29
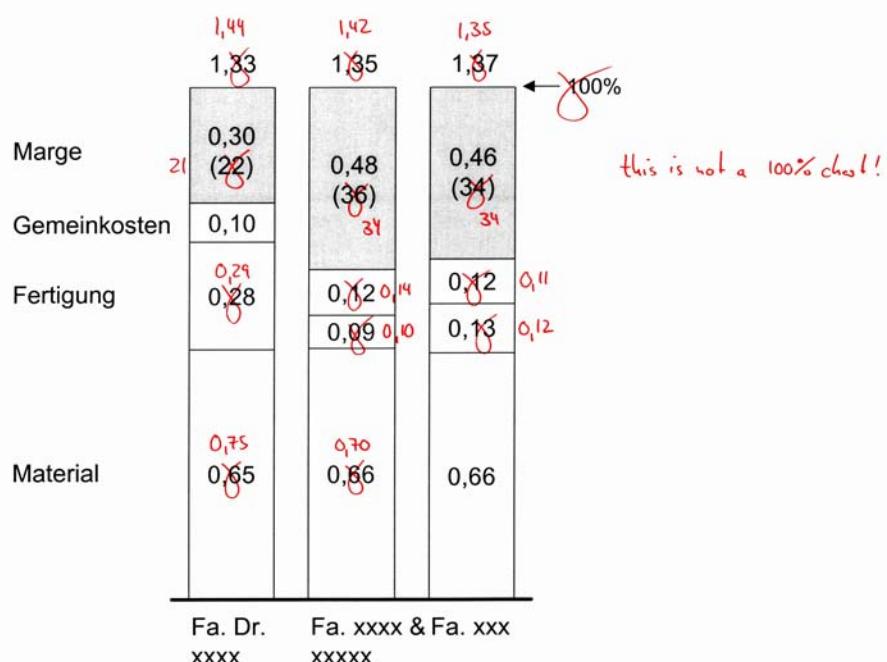
PPT   04:40
TC   01:56

Alteration 29

PPT   01:10
TC   00:35
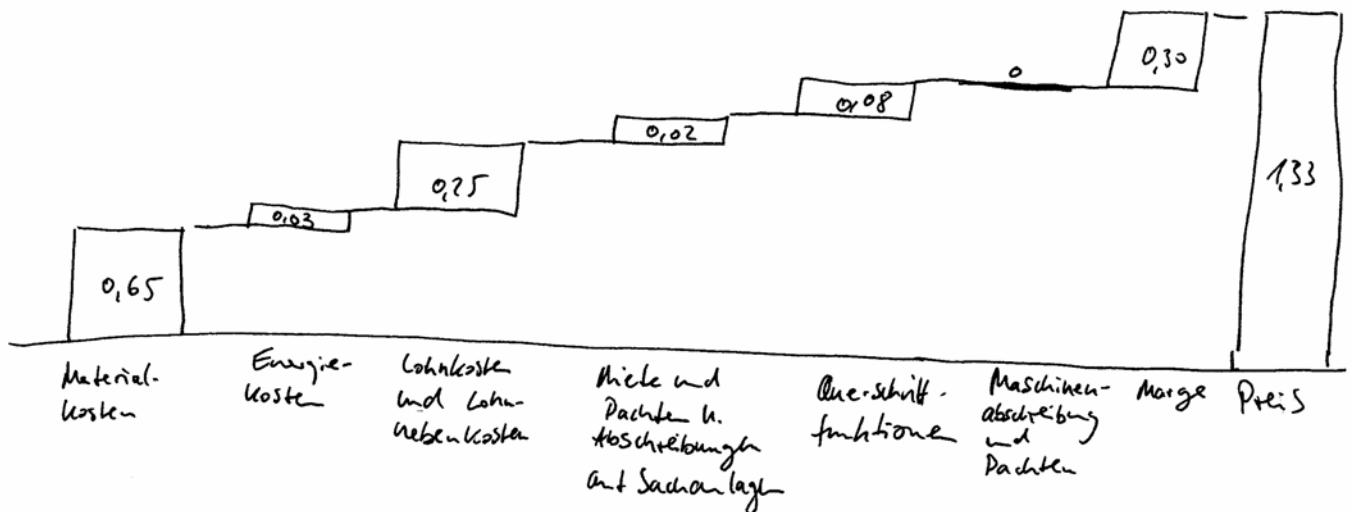
Creation 30
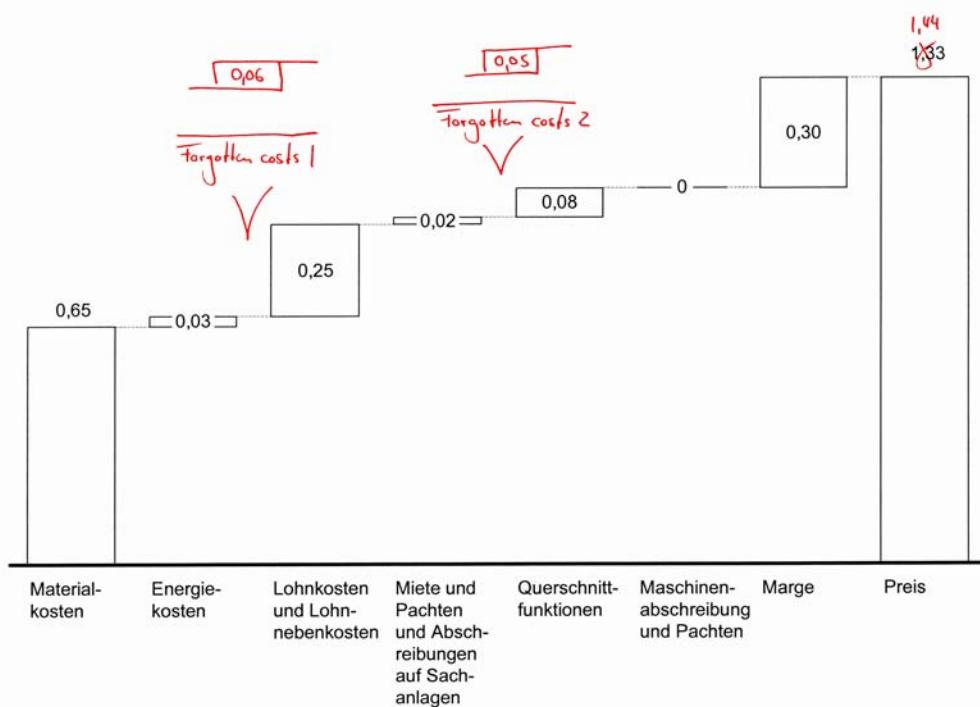
PPT   04:37
TC   02:01

Alteration 30

PPT   06:06
TC   00:58
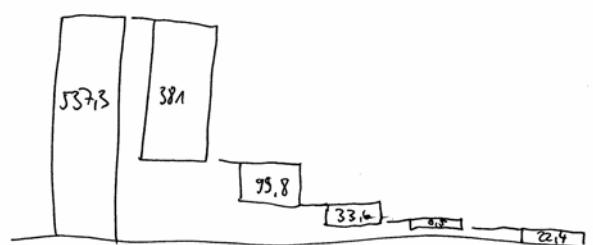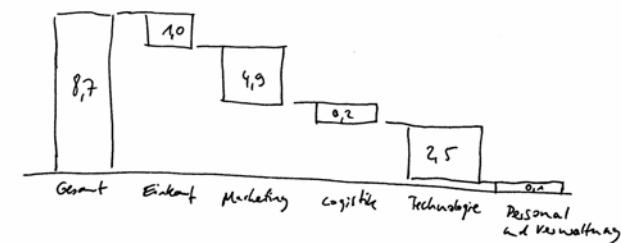
Creation 31
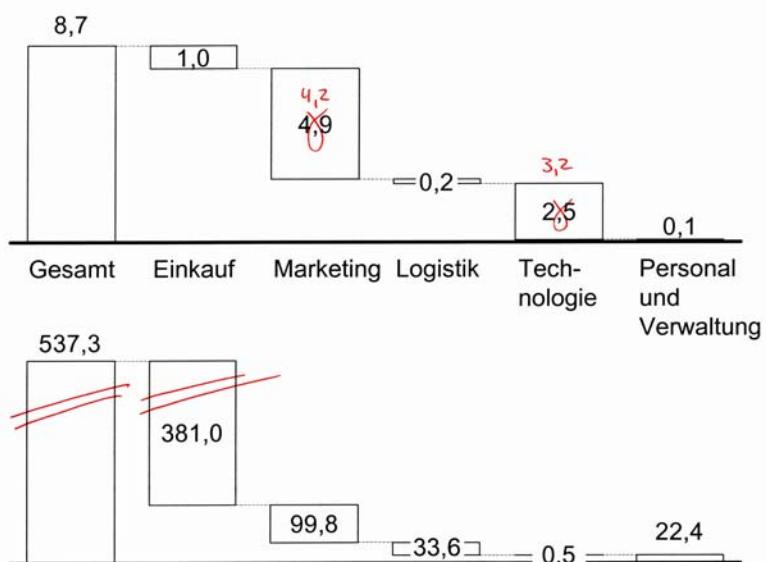
PPT   06:31
TC   00:51

Alteration 31

PPT   04:02
TC   00:15
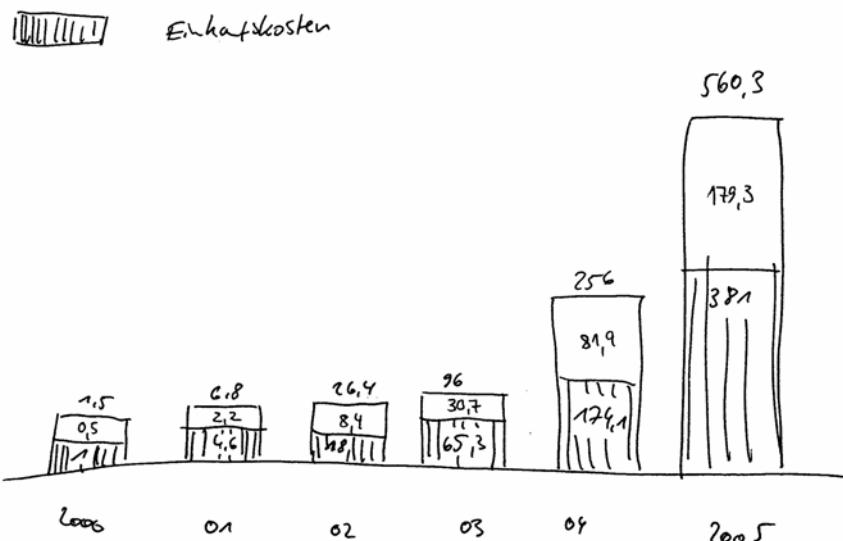
Creation 32
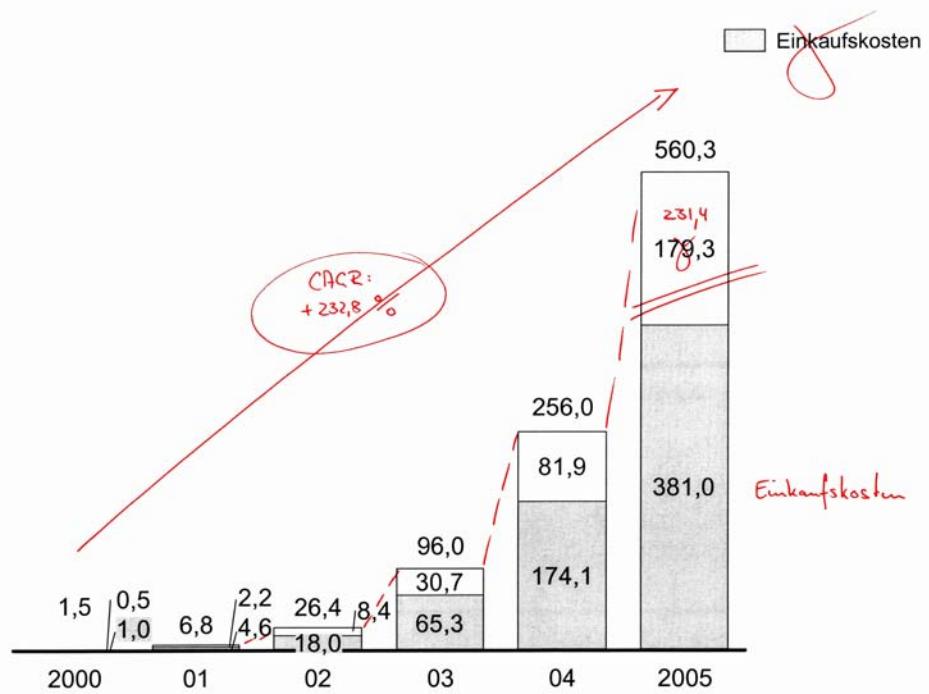
PPT   04:50
TC   01:38

Alteration 32
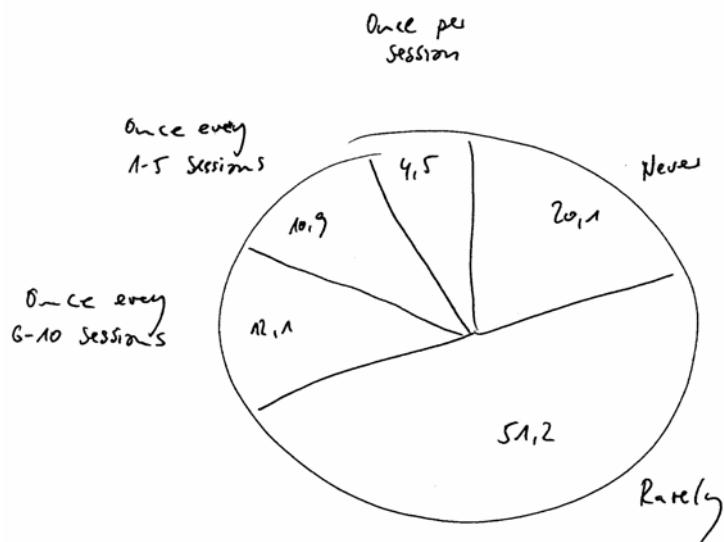
PPT   04:51
TC   00:36

Creation 33
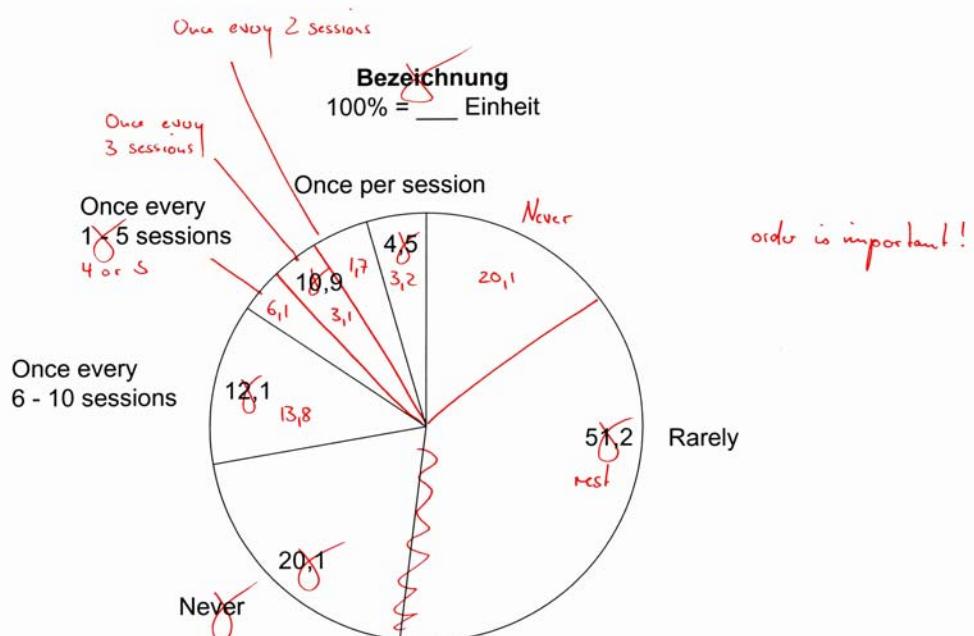
PPT	02:01
TC	01:10

Alteration 33

PPT	04:38
TC	02:13
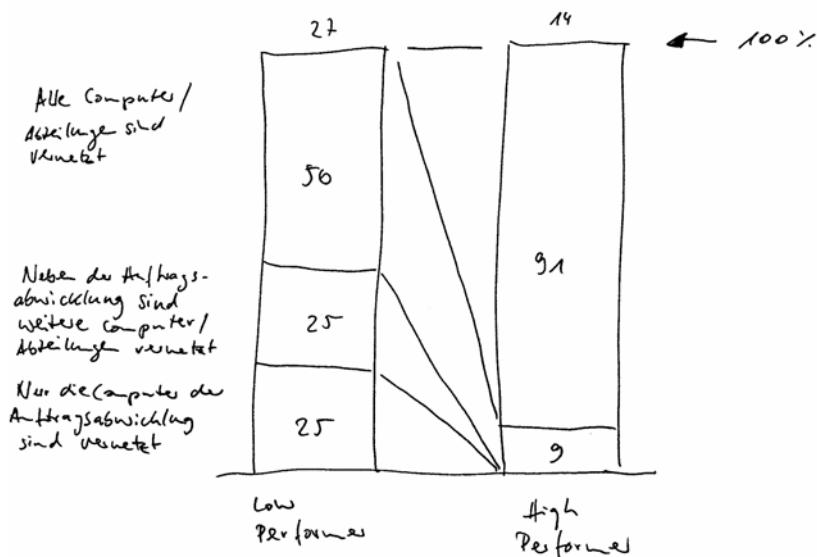
Creation 34
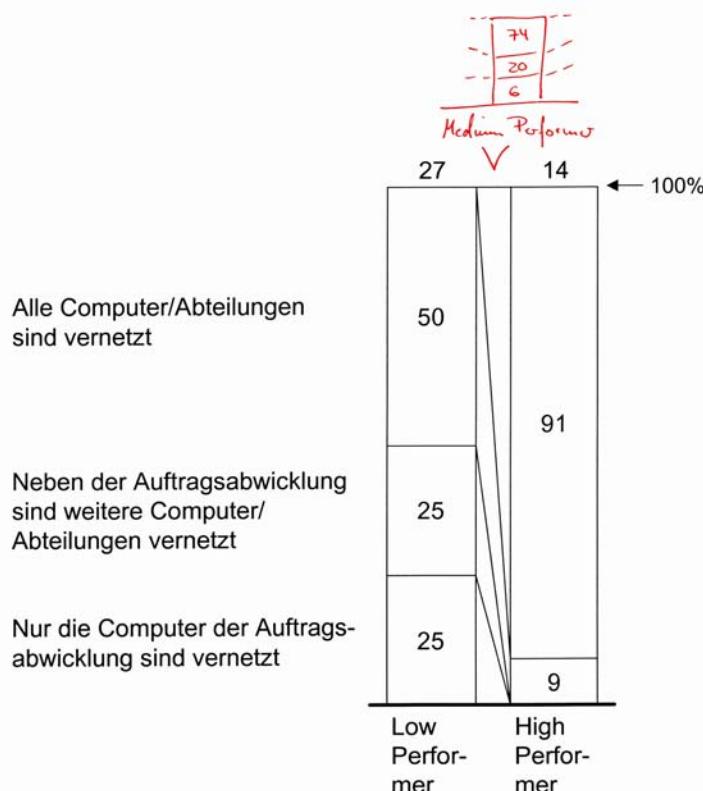
PPT   03:00
TC   02:13

Alteration 34
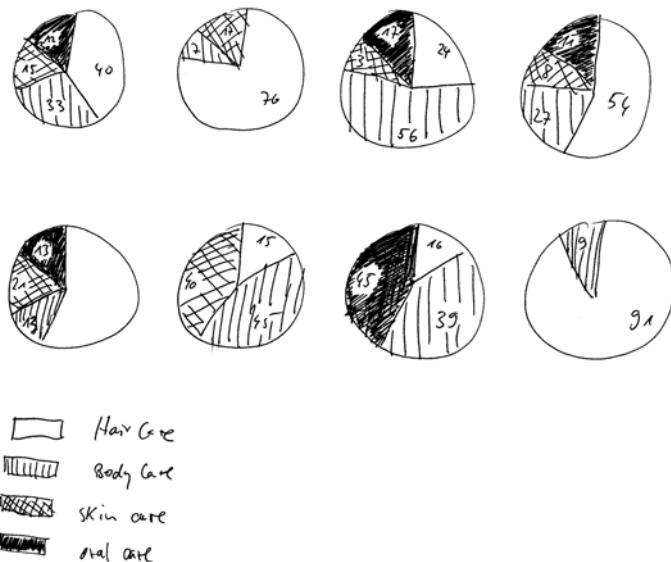
PPT   03:47
TC   00:40

Creation 35
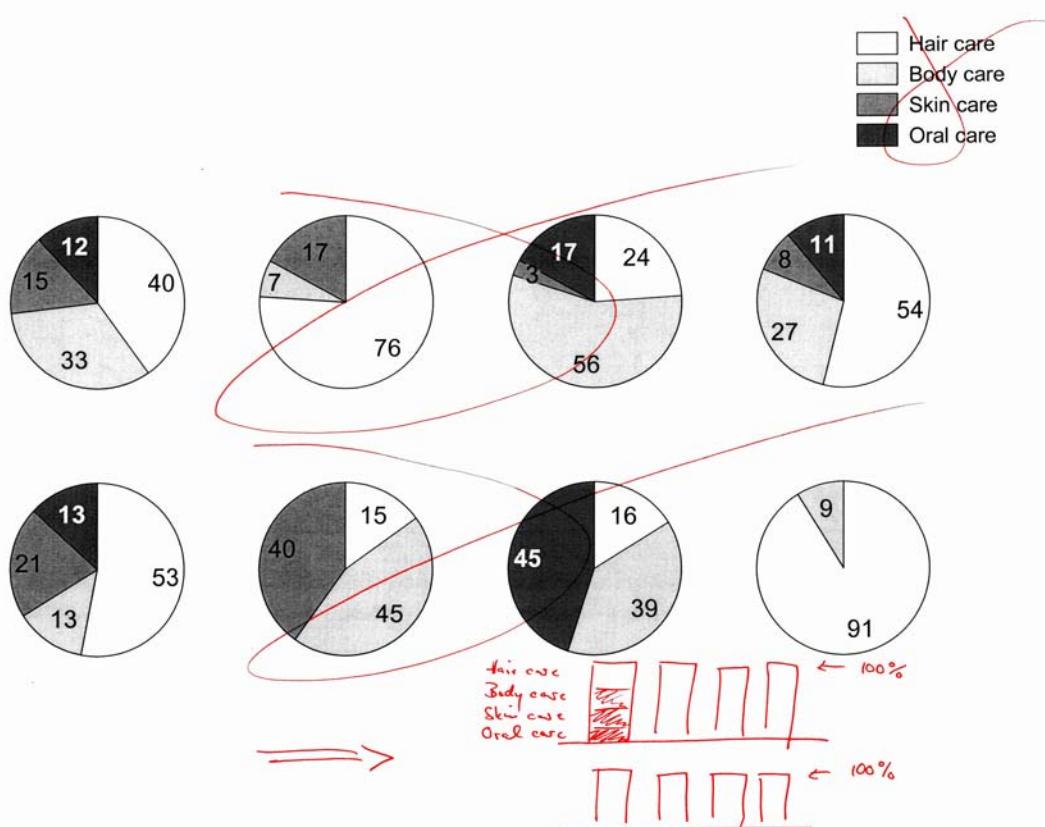
PPT   04:18
TC   02:46

Alteration 35

PPT   04:52
TC   02:01
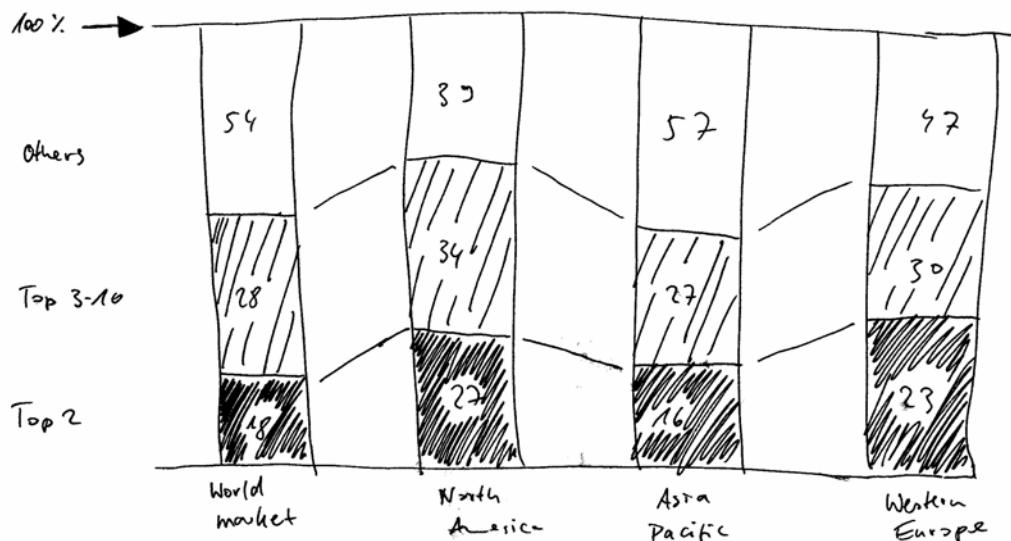
Creation 36
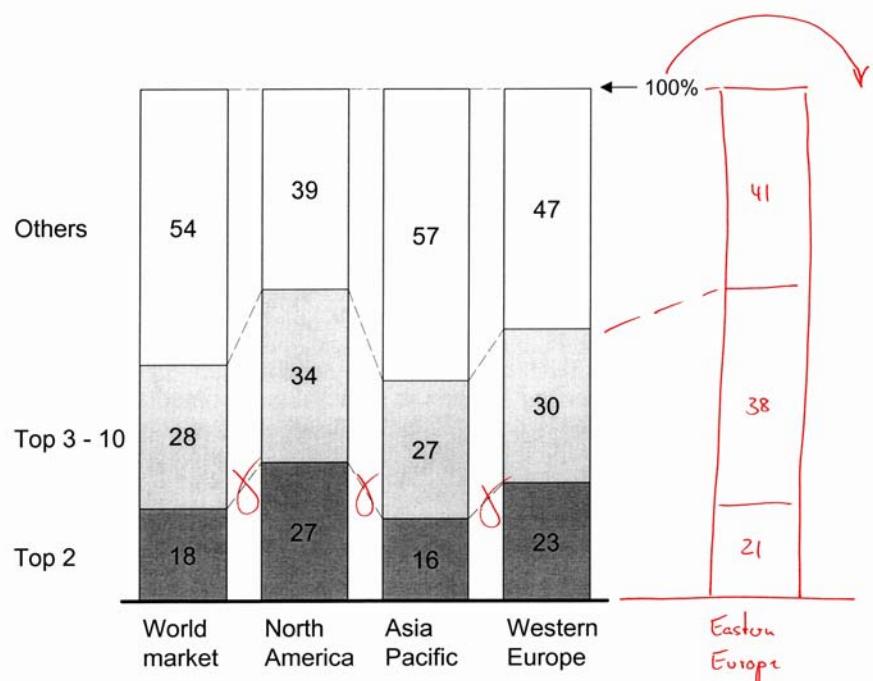
PPT   01:56
TC   01:35

Alteration 36
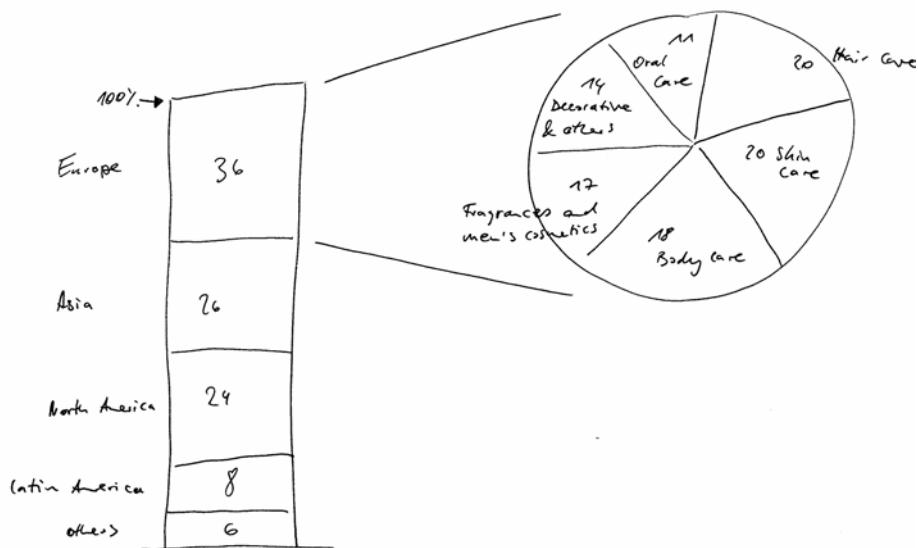
PPT   01:44
TC   00:20

Creation 37
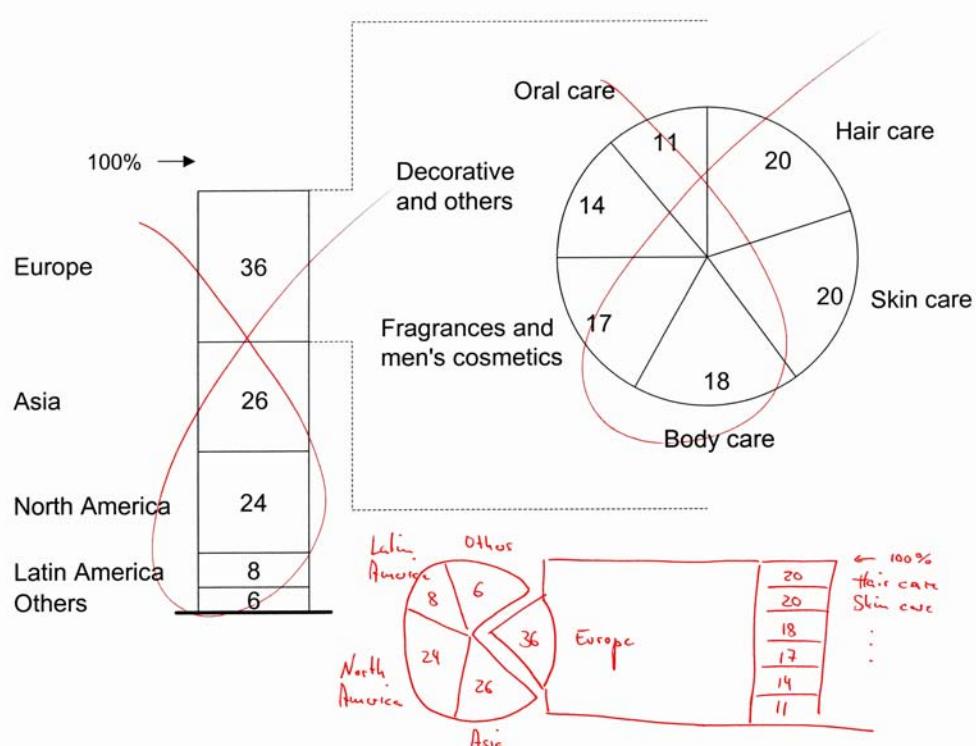
PPT   05:10
TC   02:32

Alteration 37

PPT   03:54
TC   01:26
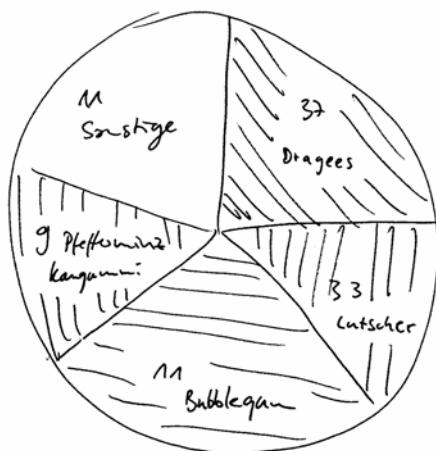
Creation 38

PPT   02:06
TC   01:25
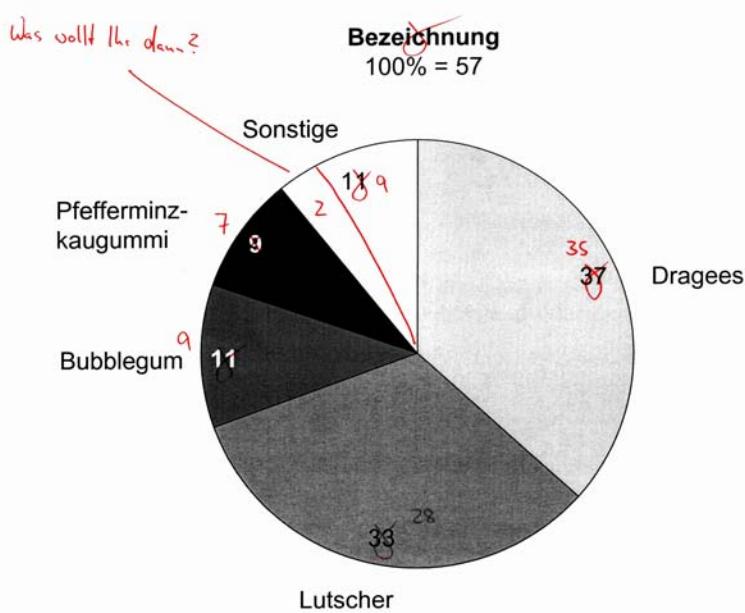
Alteration 38
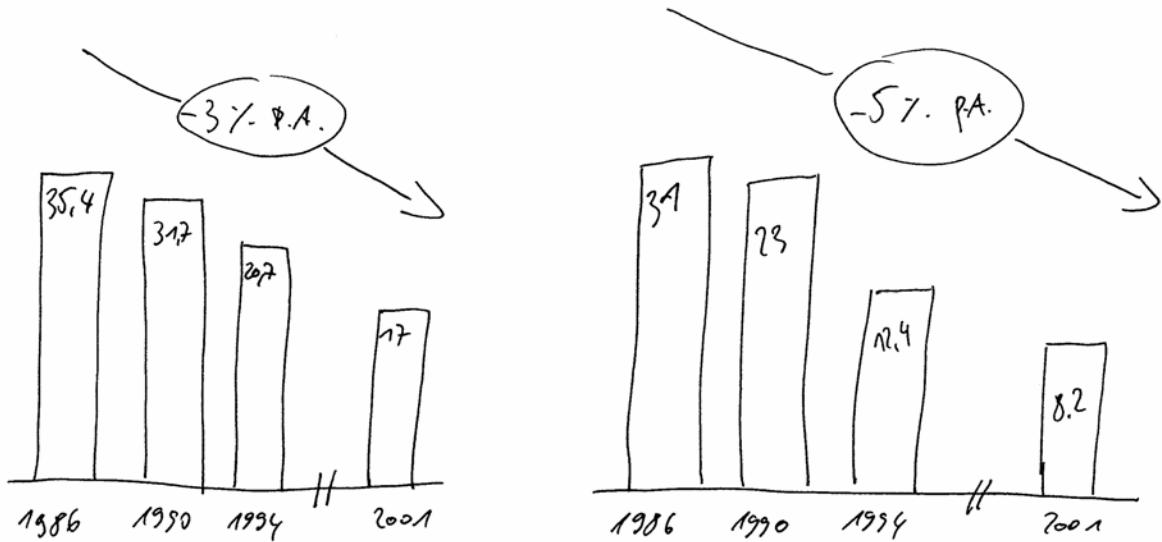
PPT   02:03
TC   00:37

Creation 39
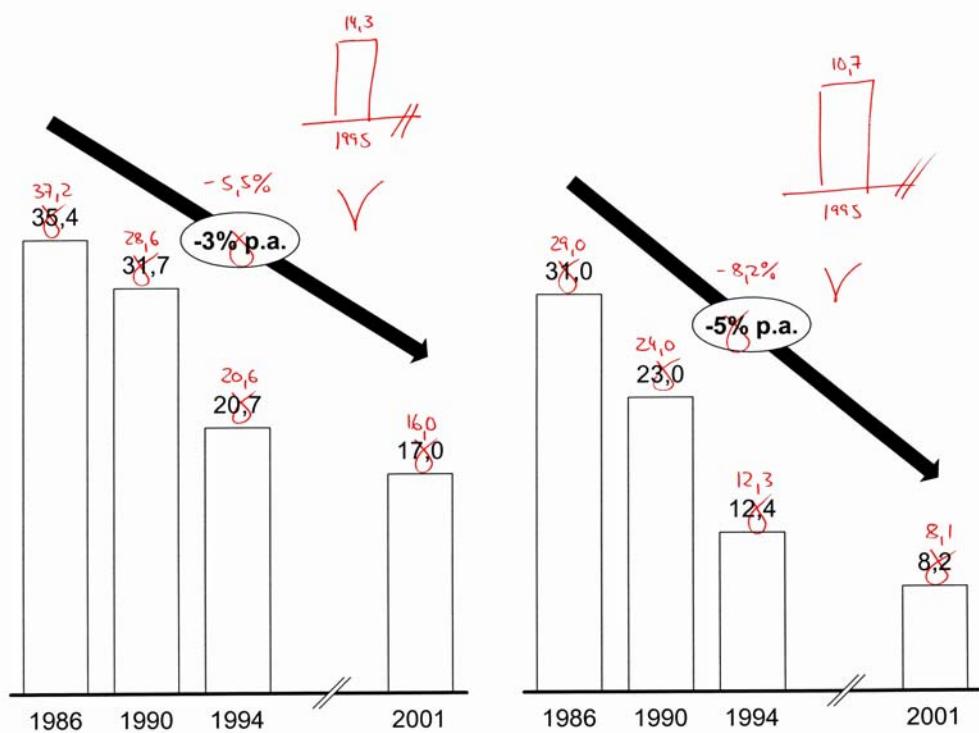
PPT   04:15
TC   01:46

Alteration 39

PPT   02:43
TC   01:26
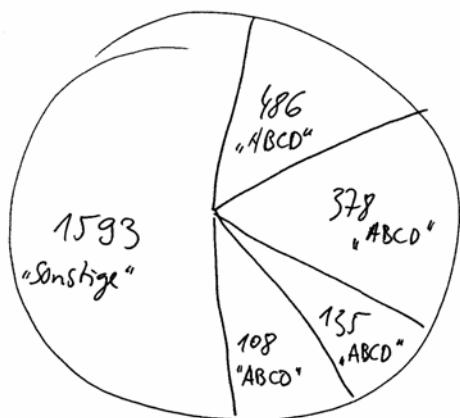
Creation 40

PPT   03:19
TC   01:28
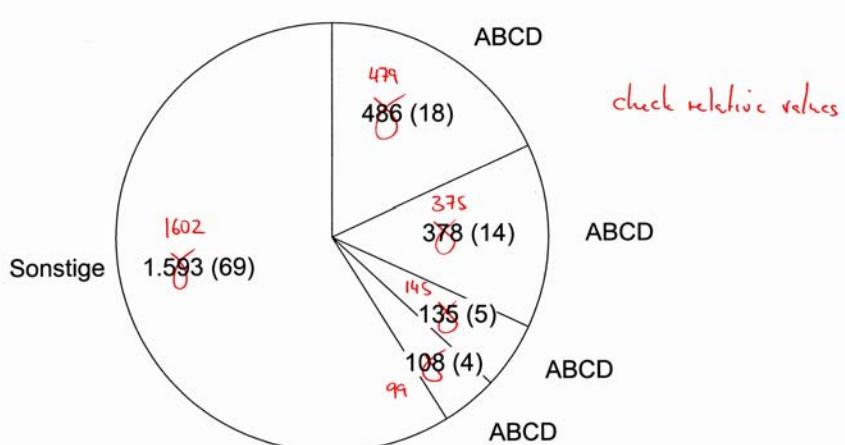
Alteration 40

PPT   01:20
TC   00:26
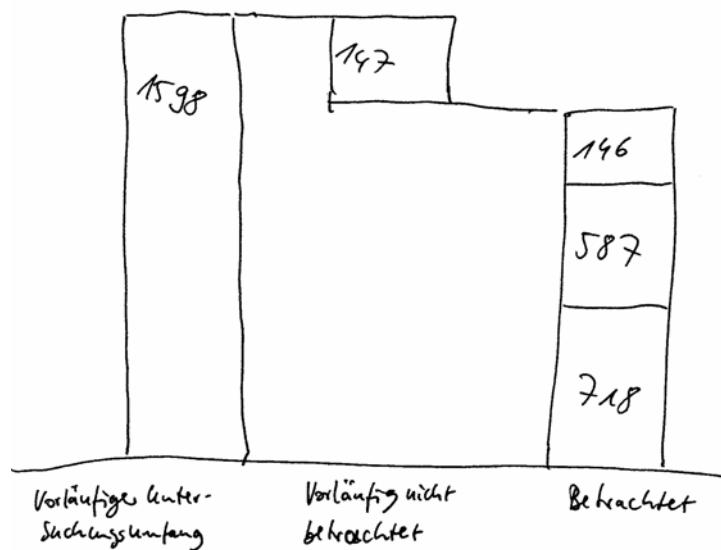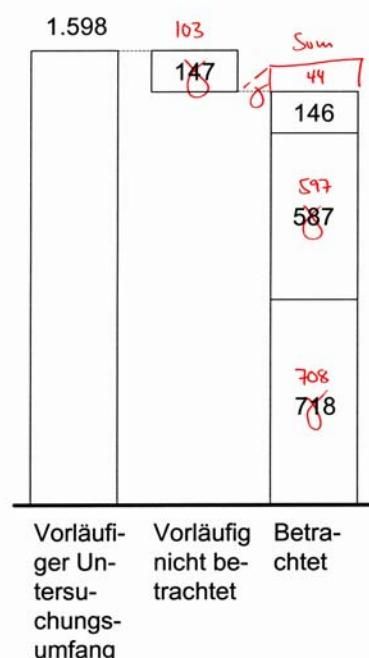
Creation 41

PPT   01:59
TC   01:47

Alteration 41

PPT   02:00
TC   00:33
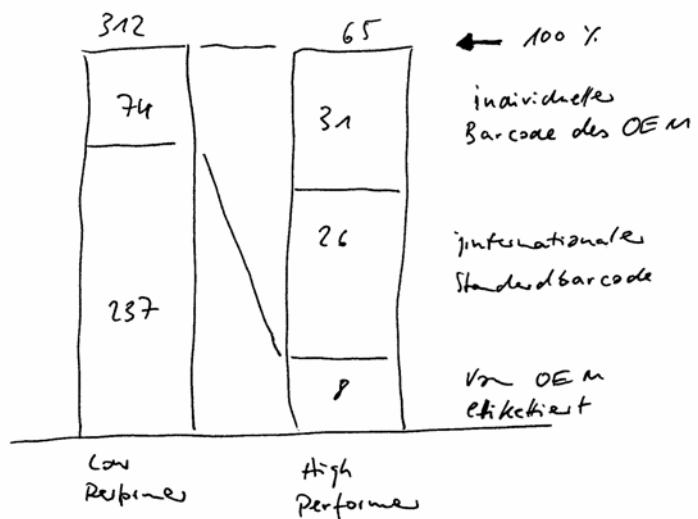
Creation 42

PPT   06:28
TC   01:39
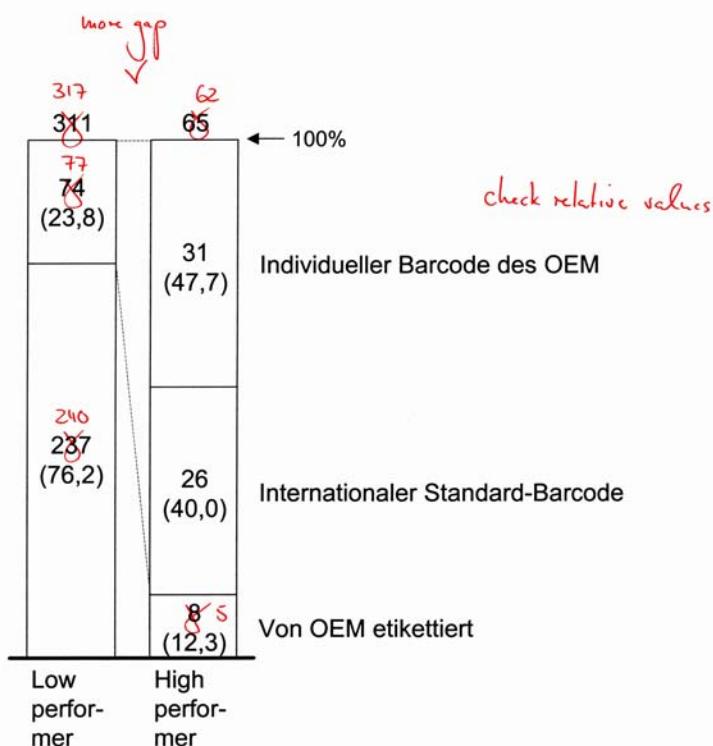
Alteration 42
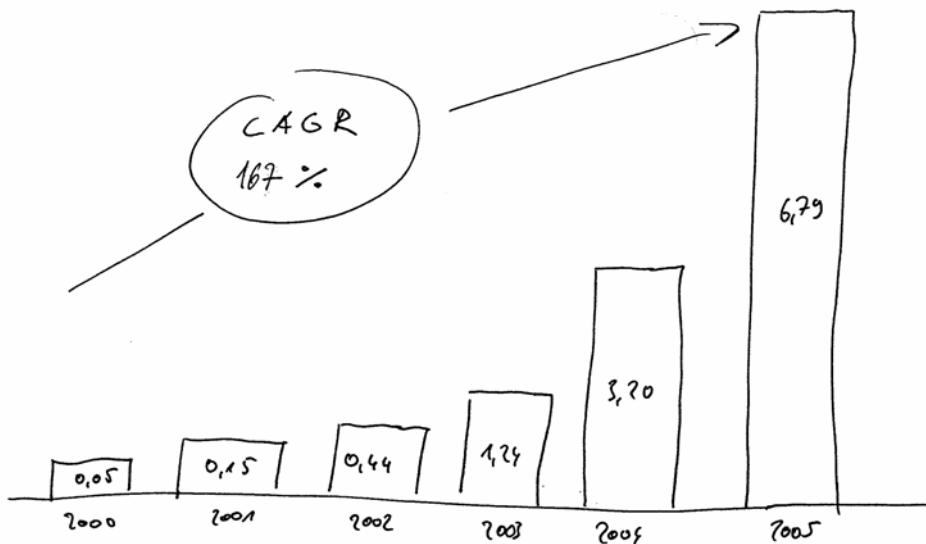
PPT   03:14
TC   01:15

Creation 43
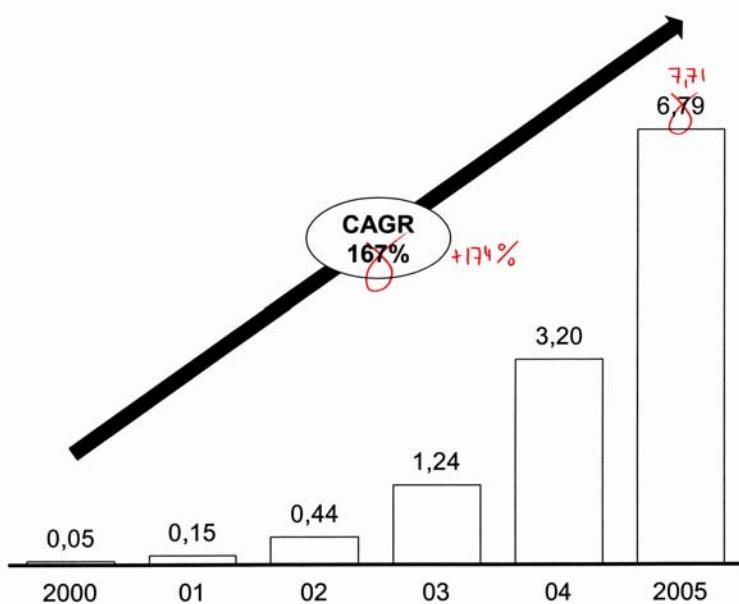
PPT   02:09
TC   00:50

Alteration 43

PPT   01:46
TC   00:10
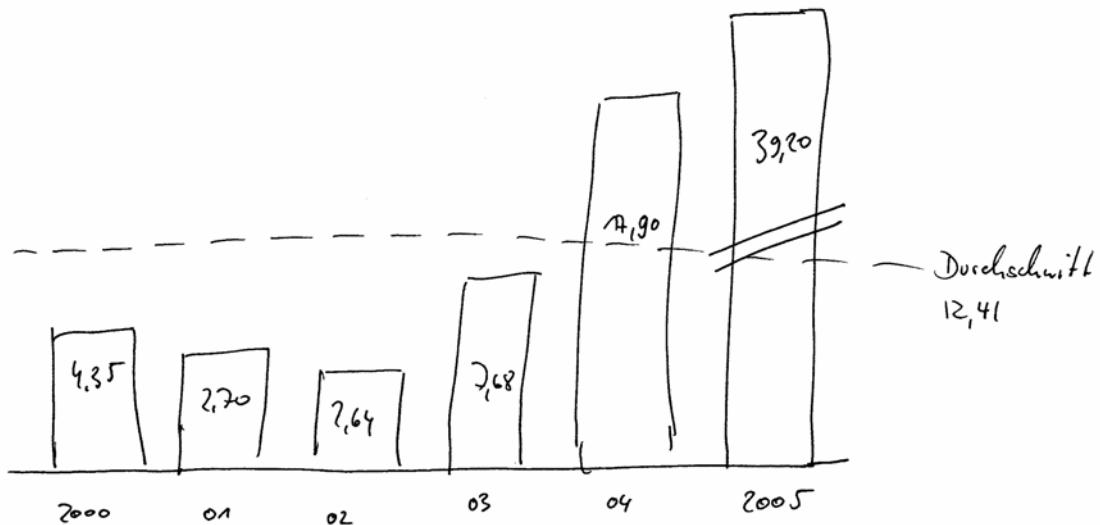
Creation 44
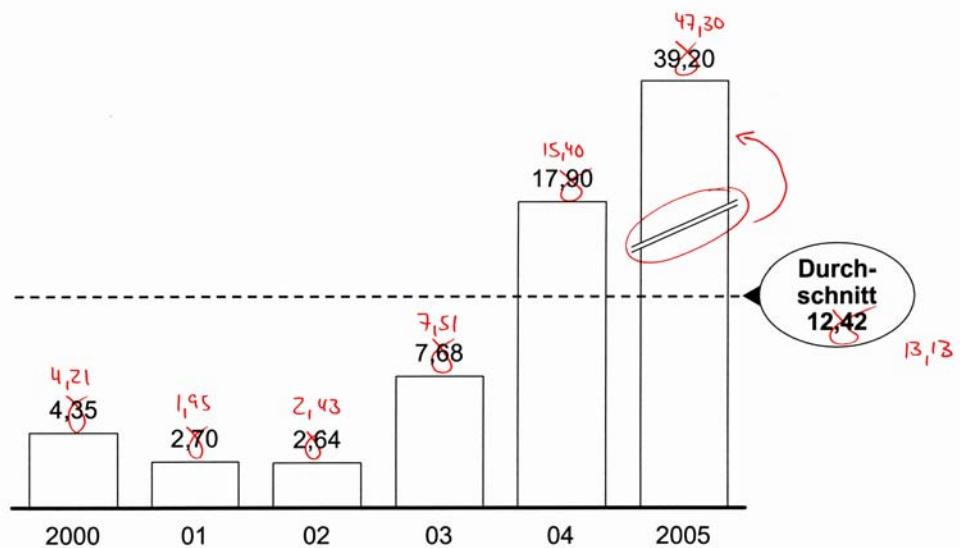
PPT   03:58
TC   01:09

Alteration 44
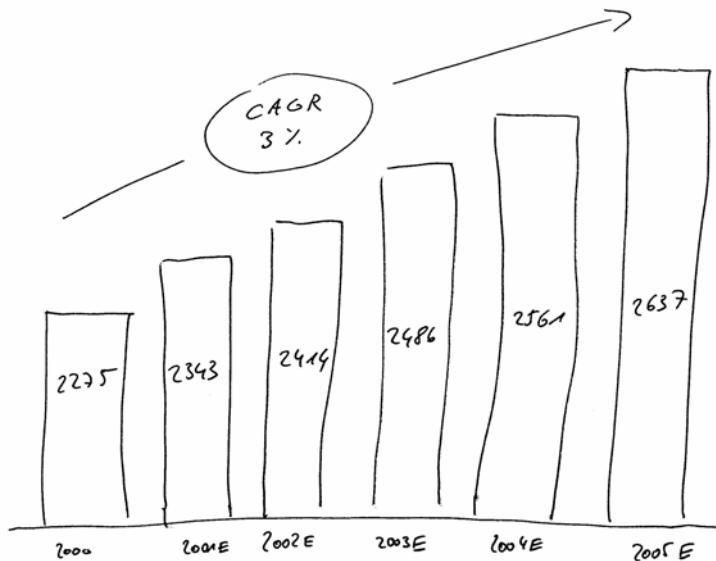
PPT   01:57
TC   00:36

Creation 45
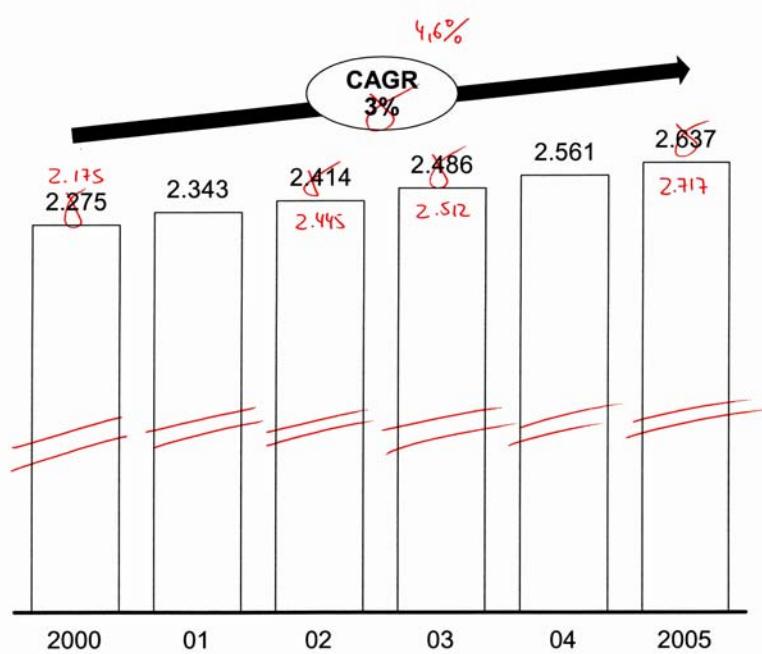
PPT   01:37
TC   01:01

Alteration 45

PPT   02:07
TC   00:14
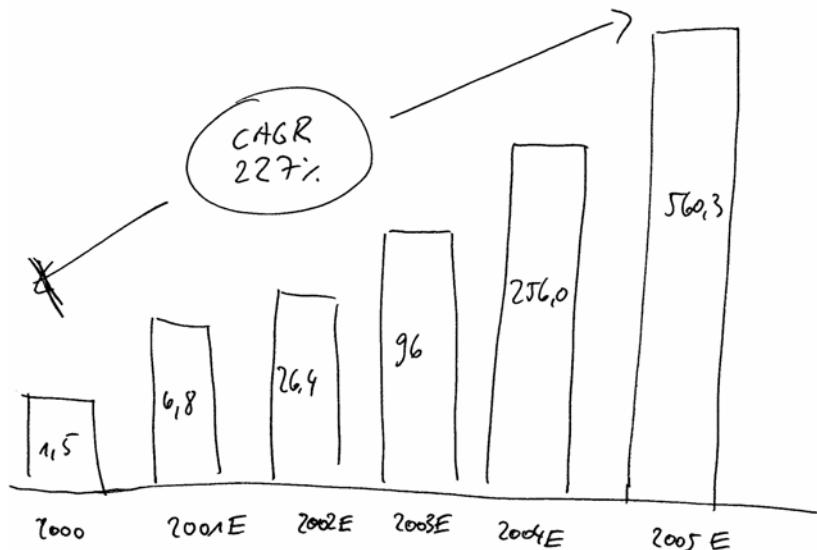
## Creation 46
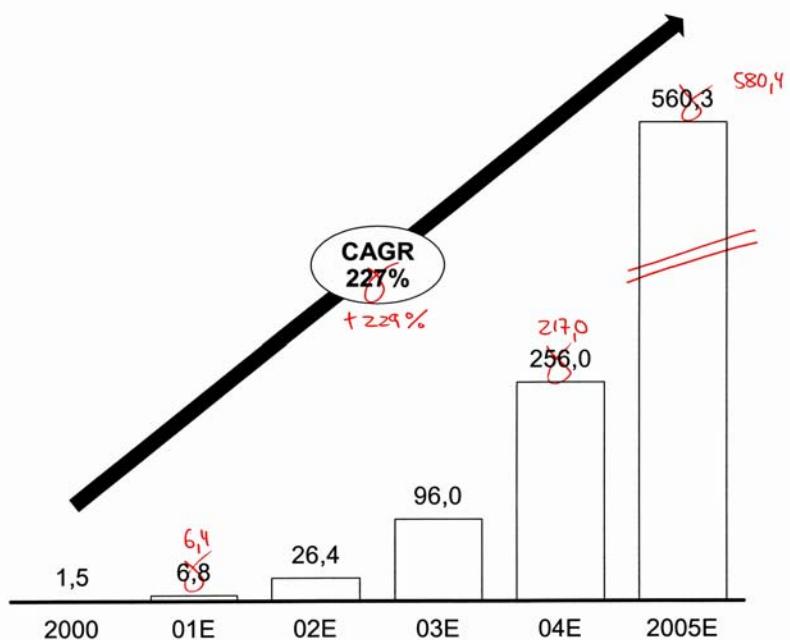
PPT   02:04
TC   00:52

Alteration 46
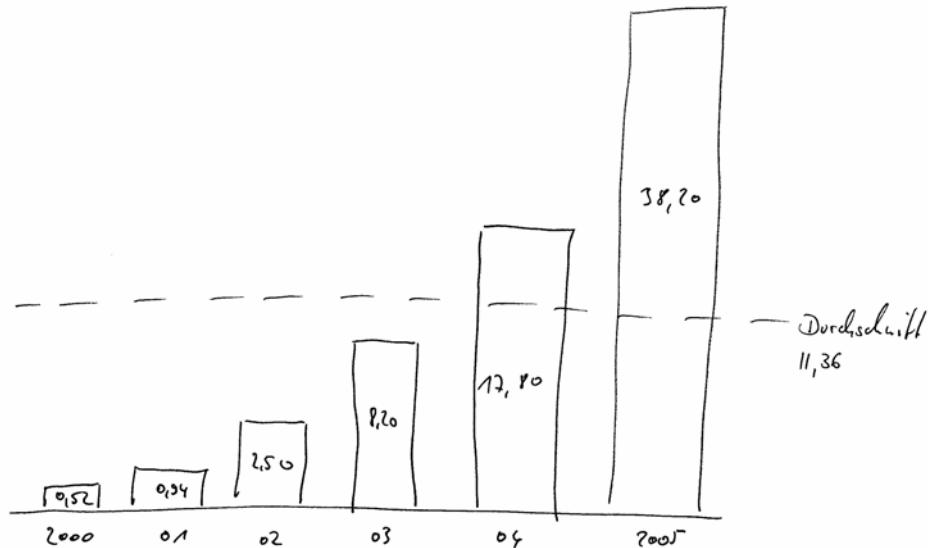
PPT   03:28
TC   00:22

Creation 47
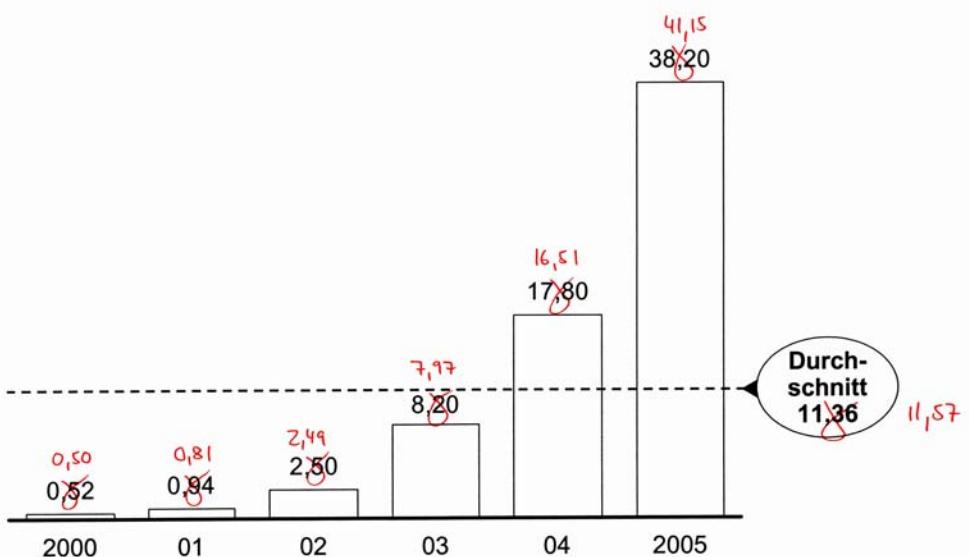
PPT   02:36
TC   00:58

## Alteration 47

PPT   01:15
TC   00:19
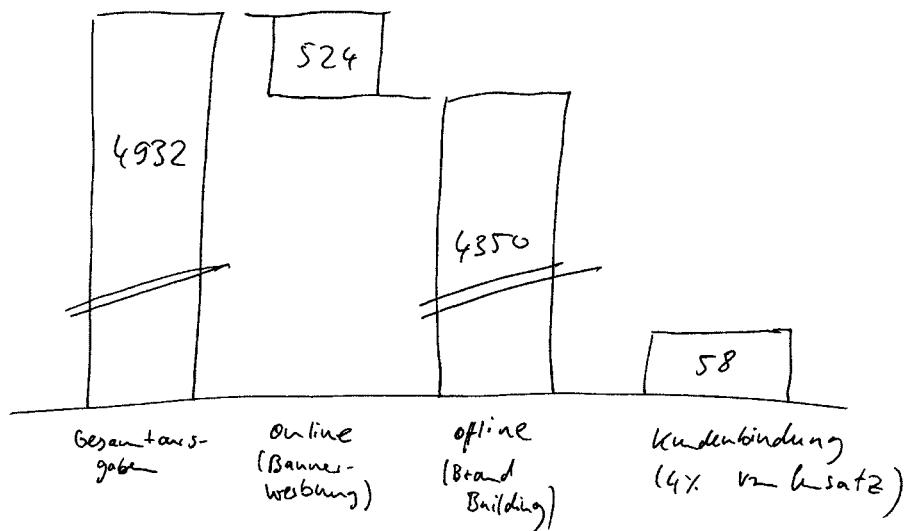
Creation 48

PPT   04:30
TC   01:36

Alteration 48

PPT   04:02
TC   00:23