IT QM Part1 Lecture 1

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Dr. Withalm Mar 3, 2009

IT QM Bratislava

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Lectures at the University of Bratislava/Spring 2009

12.02.2009	**Lecture 1 Impact of Quality-From Quality Control to Quality Assurance**
05.03.2009	**Lecture 2 Organization Theories-Customer satisfaction-Quality Costs**
12.03.2009	**Lecture 3 Leadership-Quality Awards**
26.03.2009	**Lecture 4 Creativity-The long Way to CMMI level 4**
02.04.2009	**Lecture 5 System Engineering Method-Quality Related Procedures**
16.04.2009	**Lecture 6 Quality of SW products**
23.04.2009	**Lecture 7 Quality of SW organization**

Vorlesungen am Technikum-Wien Sommer 2008 (5A/5B)

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04.03.2008	**Lecture 1 Impact of Quality-Quality Definition-Standards**
11.03.2008	**Lecture 2 From Quality Control to Quality Assurance**
01.04.2008	**Lecture 3 Organization Theories-Product Liability-Emphasis from Quality Control to Prevention**
08.04.2008	**Lecture 4 Customer Satisfaction-Quality Costs**
15.04.2008	**Lecture 5 Team Work-Leadership Behavior-Deal with Changes-Kind of Influencing Control-Conflict**
27.05.2008	**Lecture 6 Tasks &Responsibility of Leading Personnel-Audits-Quality Awards**
10.06.2008	**Lecture 7 Management Science-Creativity Techniques-Embedded Systems-FMEA**

Today's Agenda

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- Impact of Quality
- Quality definition
- Standards

Vorlesungen am Technikum-Wien Sommer 2008 (5B)

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02.03.2007	**Vorlesung 1 Bedeutung der Qualität, Qualitätsbegriff und Normen**
07.03.2007	**Vorlesung 2 Von der Qualitätsprüfung zur Qualitätssicherung**
21.03.2007	**Vorlesung 3 Meilenstein des Qualitätswesens-Arbeitsorganisation**
23.03.2007	**Vorlesung 4 Qualitätskosten-Führungsverhalten 1**
30.03.2007	**Vorlesung 5 Führungsverhalten 2- Q-Awards**

Impact of Quality/1
How to measure the fulfillment

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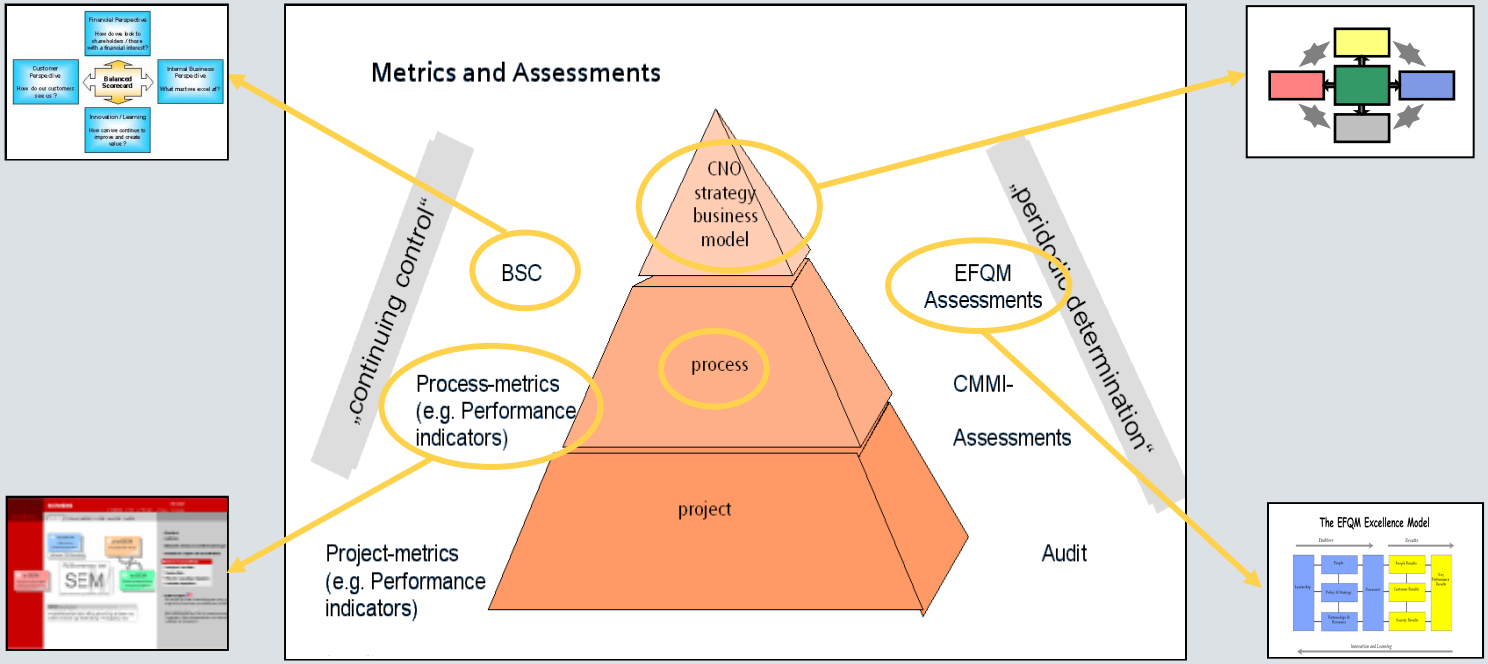

Impact of Quality/2

How to establish Business Strategies

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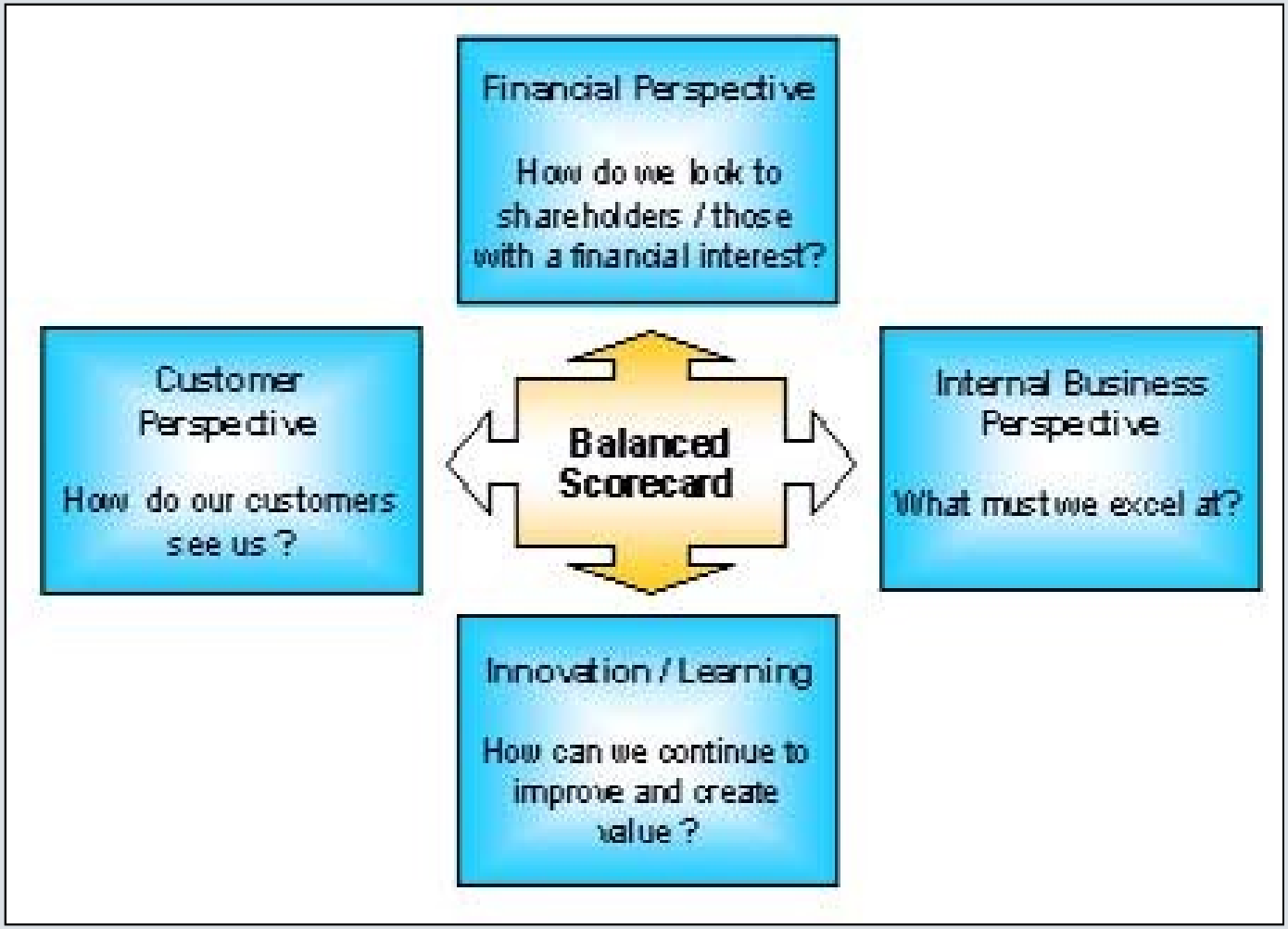

Impact of Quality/3

How to establish Business Models

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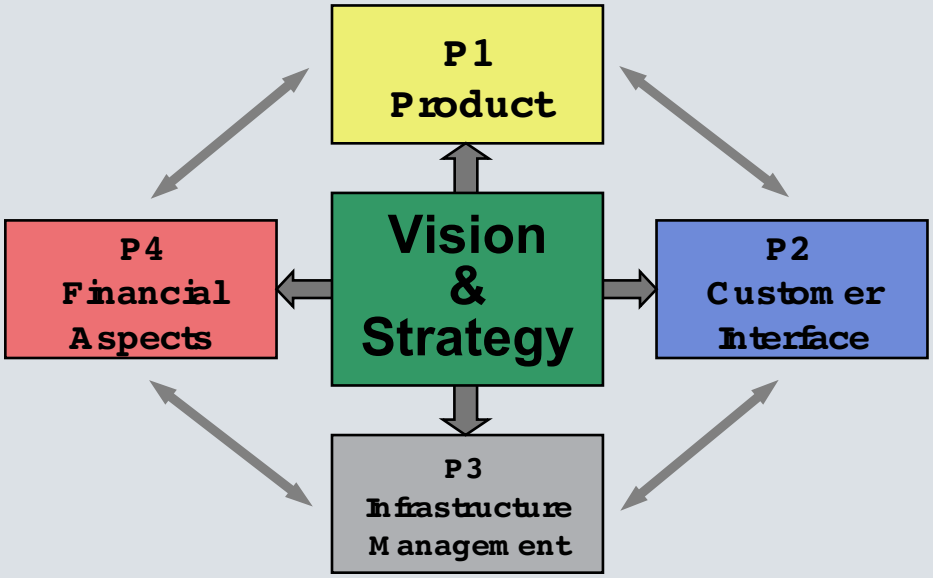

Product	Value proposition
Customer Interface	Target Customer
	Distribution Channel
	Relationship
Infra-structure	Value Configuration
	Capability
	Partnership
Financial Aspects	Cost Structure
	Revenue (Sharing)

Model

Impact of Quality/4
EFQM model-Bench marking of Enterprises

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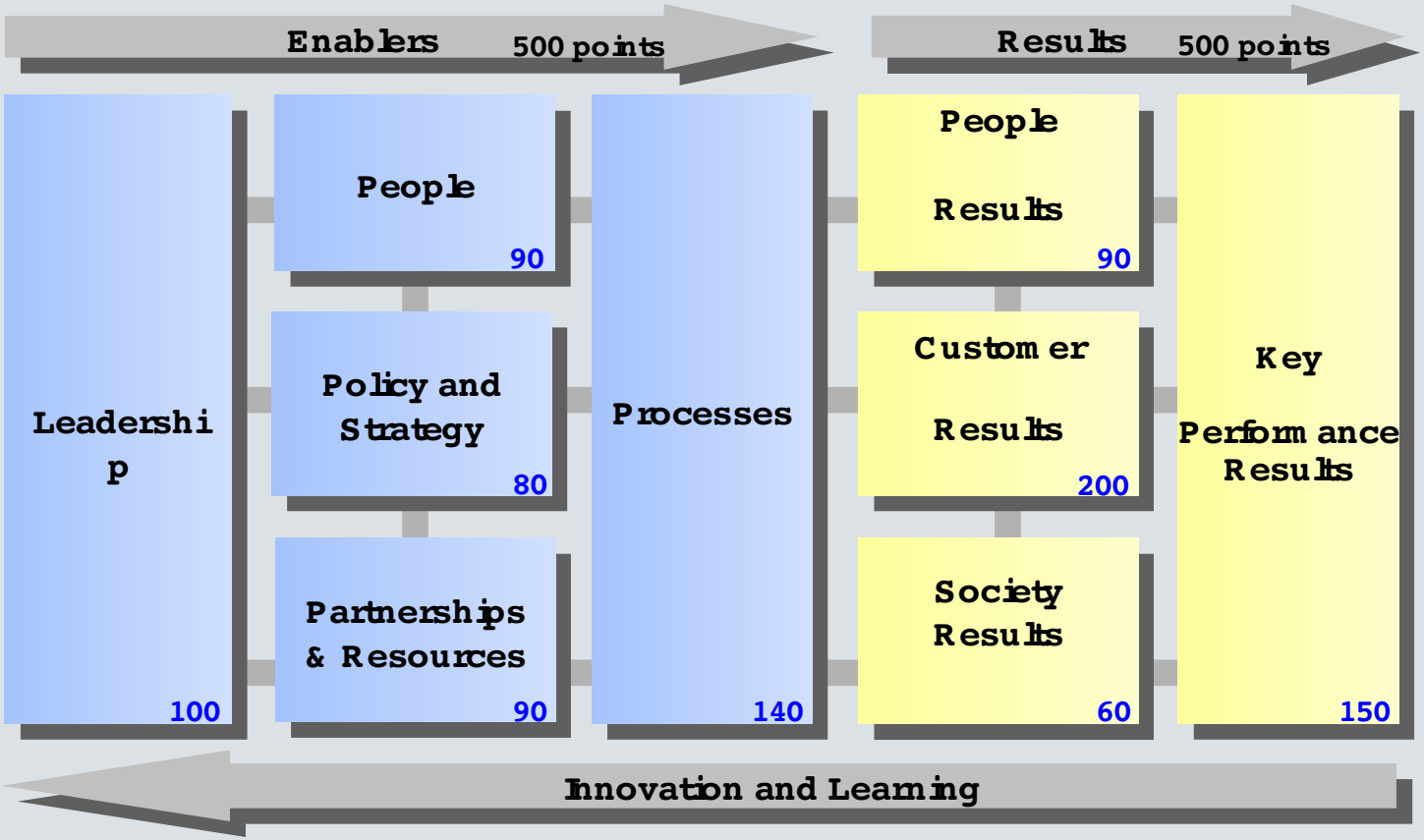

Quality wins (McKinsey)/1

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„High performance and customer‘s benefit brings you in top position“

Three Dimensions of Quality:

- Strategy
- Management of core processes
- Motivation of employees

Quality wins (McKinsey)/2

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A **strategy** is a long term plan of action designed to achieve a particular goal, as differentiated from tactics or immediate actions with resources at hand. Originally confined to military matters, the word has become commonly used in many disparate fields

Tactics is the collective name for methods of winning a small-scale conflict, performing an optimization, etc. This applies specifically to warfare, but also to economics, trade, games and a host of other fields such as negotiation.

Tactics and strategy are often confused

An example of the difference:

- The overall goal is to win a war against another country.
- The strategy is to undermine the other nation's ability to wage war by annihilating their military.
- The tactics (told to the combatants) are to do very specific things in a specific place.

Quality wins (McKinsey)/3

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"**Management**" (from Old French *ménagement* "the art of conducting, directing", from Latin *manu agere* "to lead by the hand") characterizes the process of leading and directing all or part of an organization, often a business, through the deployment and manipulation of resources (human, financial, material, intellectual or intangible). Early twentieth-century management writer Mary Parker Follett defined management as "the art of getting things done through people."

One can also think of management functionally, as the action of measuring a quantity on a regular basis and of adjusting some initial plan, and as the actions taken to reach one's intended goal. This applies even in situations where planning does not take place. From this perspective, there are five management functions: Planning, Organizing, Leading, Co-ordinating and Controlling.

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Quality wins (McKinsey)/4

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A **business process** is a recipe for achieving a commercial result. Each business process has inputs, method and outputs. The inputs are a pre-requisite that must be in place before the method can be put into practice. When the method is applied to the inputs, then certain outputs will be created.

A **business process** is a collection of related structural activities that produce something of value to the organization, its stake holders or its customers. It is, for example, the process through which an organization realizes its services to its customers..

Motivation is the set of forces that cause people to behave in certain ways. Performance of an individual depends on his ability backed by motivation

Quality wins (McKinsey)/5

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Four steps to reach top quality

1. Testing
2. Improving
3. Preventing
4. Satisfying the customer

Quality wins (McKinsey)/6

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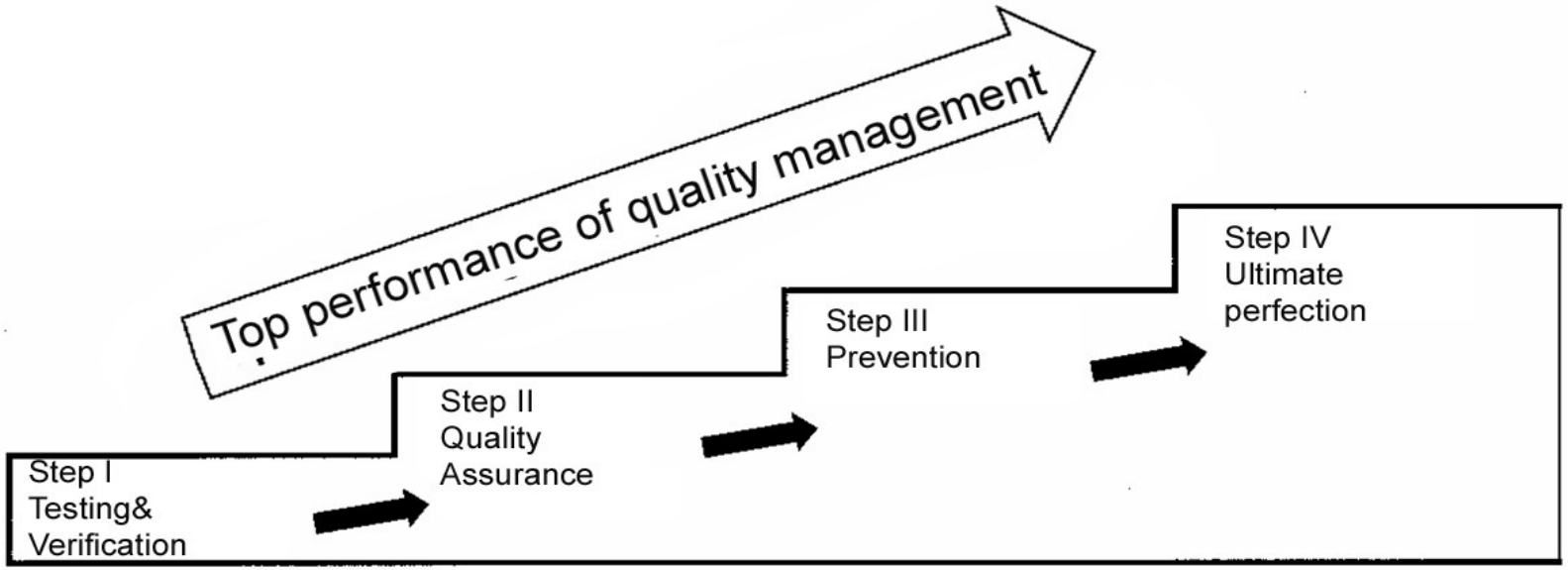

- Quality through testing
- Weak quality awareness
- Establishing of processes
- Involvement of employees
- Checking& improving processes
- Integration of suppliers
- Focusing on customers& predominant products
- Cultural adjustment

Quality wins (McKinsey)/7

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Four steps to top quality

step 1:

operational: Testing & verifying
tactical : reactive
Strategic: weak quality awareness

step 2:

operational : Improving
tactical : steadiness
Strategic: involvement of employees

step 3:

operational : Preventing
tactical : Processes are established
Strategic: Integration of suppliers

step 4:

operational : Satisfy customers
tactical : Benchmarking
Strategic: cultural transformation

Quality wins (McKinsey)/8

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Return on Sales

A widely used ratio that detects operational efficiency. Calculated as:

$$\frac{NetIncomeBeforeTaxes}{Sales}$$

- ROS is also known as a firm's operating profit margin.

Revenue Growth is an important indicator of the market reception of a company's products and services and is related to the revenue of the previous year

Quality wins (McKinsey)/9

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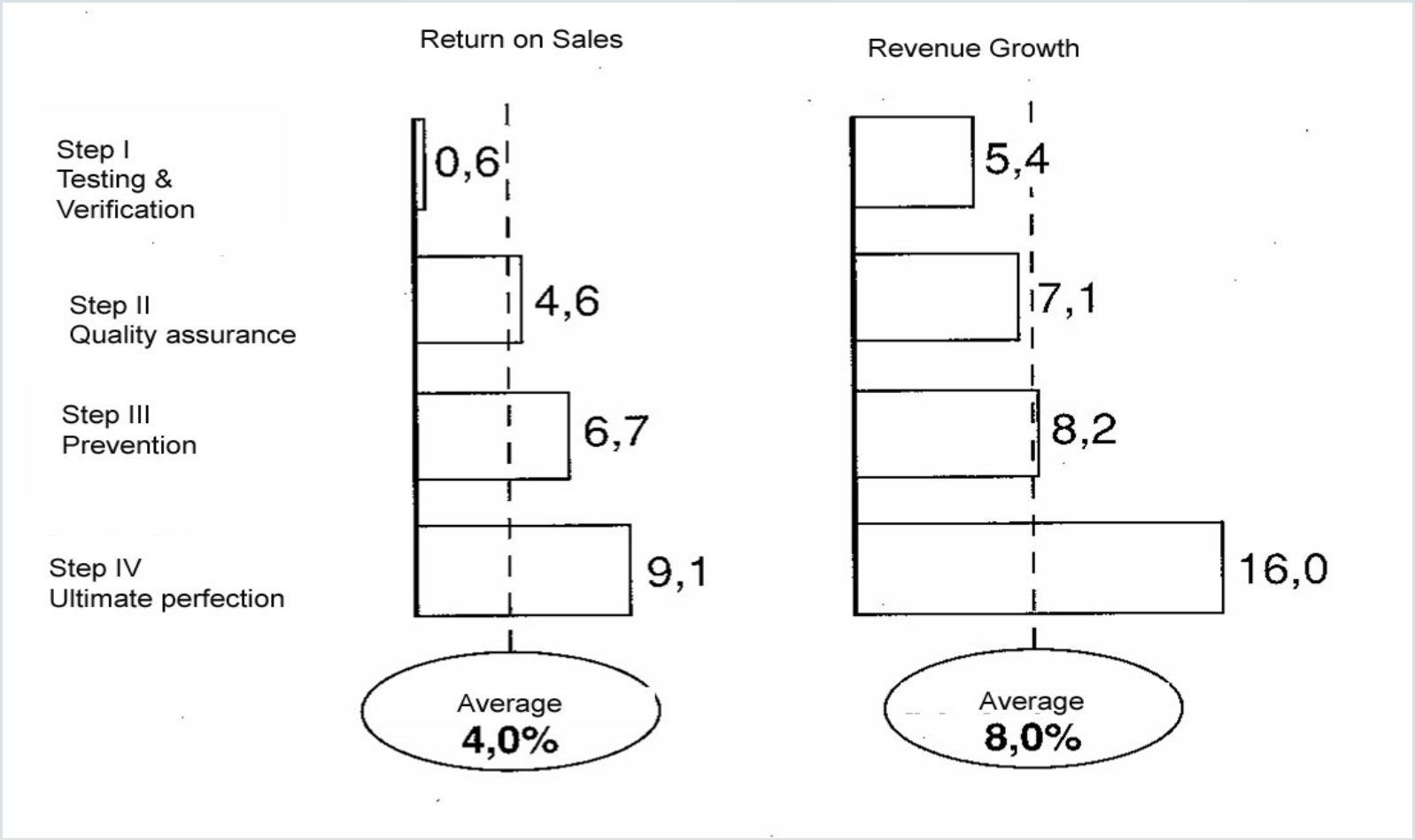

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Average 8,0%

quality - time – cost/1

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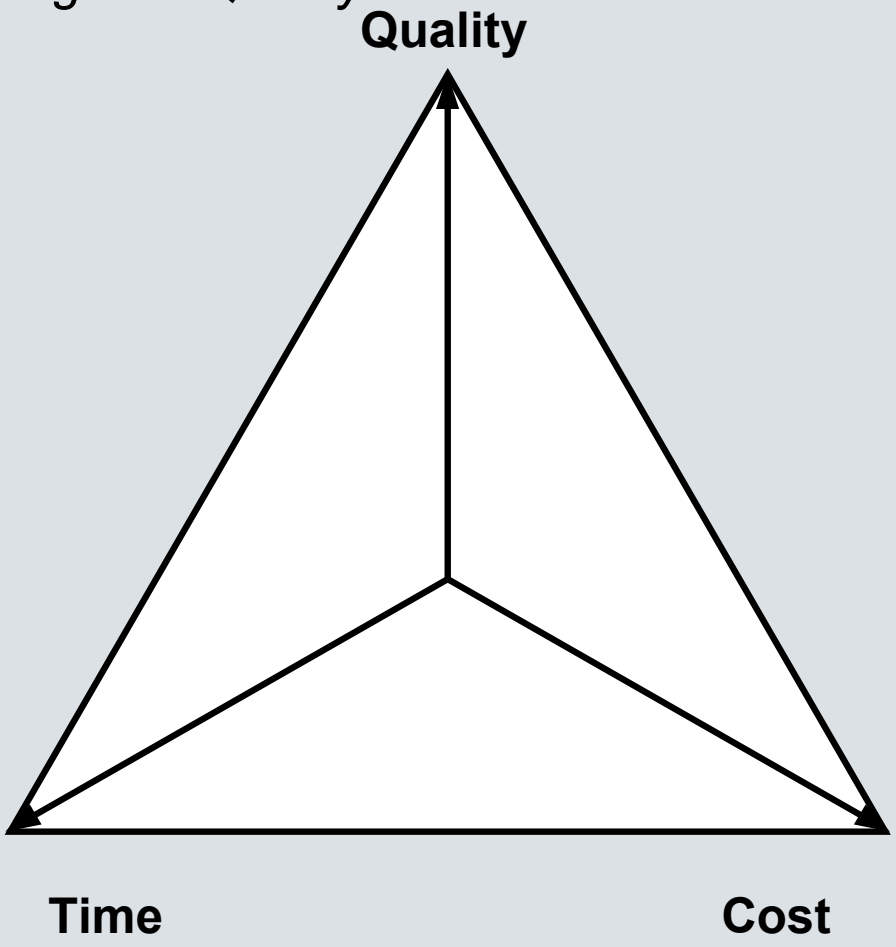
Magical Triangle of Quality Assurance



quality - time – cost/2

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Magical Triangle of Quality Assurance

- **Theoretical three solutions are possible:**

4. **Higher quality entails being later and higher costs**
5. **Time reducing entails reduced quality and higher costs**
6. **Reduced costs entails reduced quality and being late**

- **Practical solution encompasses the following steps**

8. **Never reduce quality**
9. **Time and cost are in general fixed by customer**
10. **Try to adapt requirements together with customer**
11. **Try to establish versioning of shipping the product**

quality - time – cost/3

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- Many companies establish quality improvement programs
- Unfortunately 80% of them failed
- Reasons

1. Management neither believes in nor backs it
2. Inadequate equipment of employees
3. Organizational barriers

-

quality - time – cost/4

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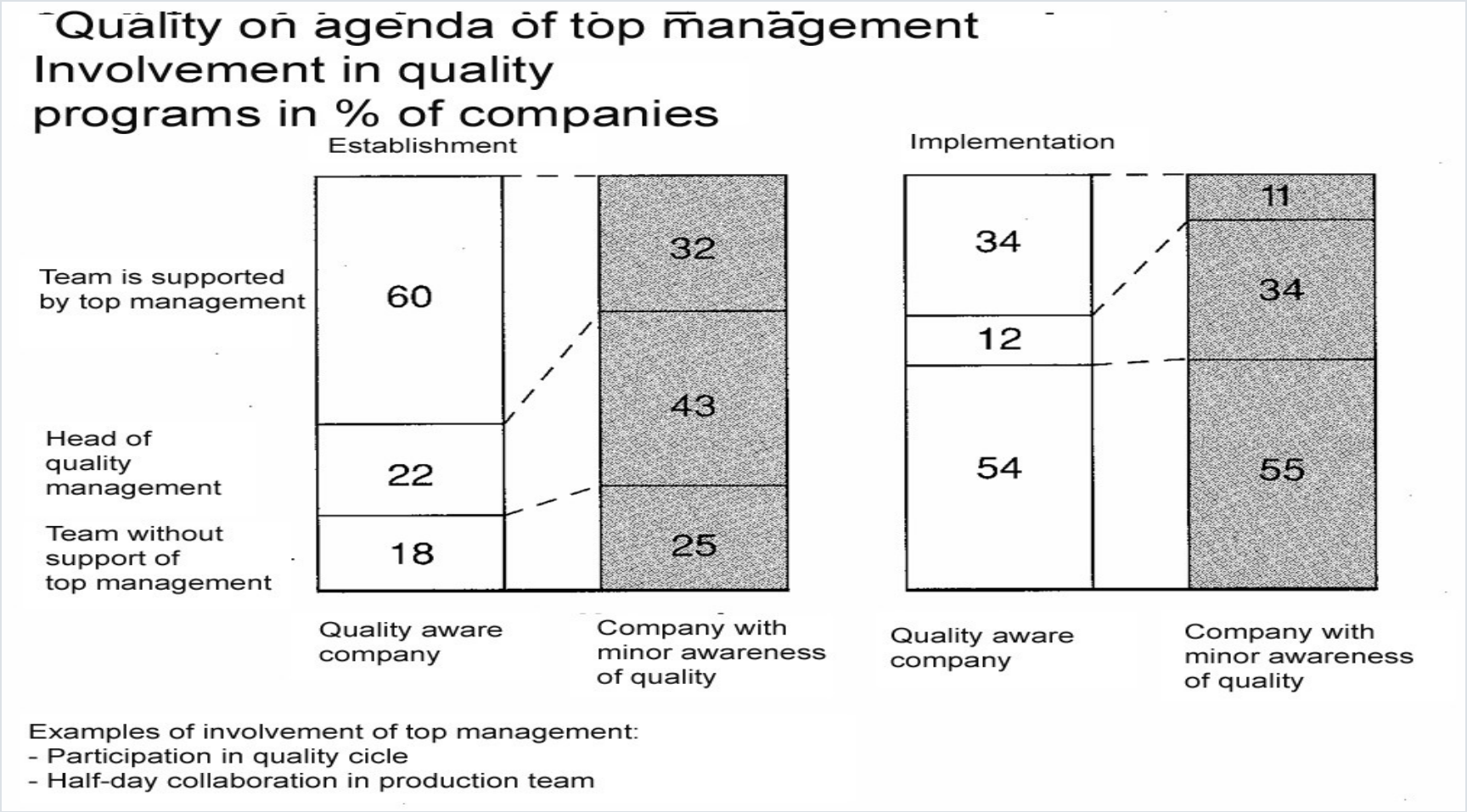

Examples of involvement of top management:
- Participation in quality cicle
- Half-day collaboration in production team

quality - time – cost/5

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Contribution of top management

significant distinction between quality aware company and company with minor awareness of quality

- **Active co-operation of top management**
  - **Especially in establishing phase**
- **Role in the quality program**
  - **Adviser, coach**
    - **Not delegating**

Impact of quality deficiencies/1

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Emerging technologies afford new opportunities and big potentials

Question:

What are the critical factors for success or failure of transformation programs

Impact of quality deficiencies/2

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The three main reasons why transformation programs failed are according Don Tapscott:

- Nonconformity of top management
- Lack of skill of coordinator
- Unrealistic expectations

Impact of quality deficiencies/3
Job specification for a coordinator

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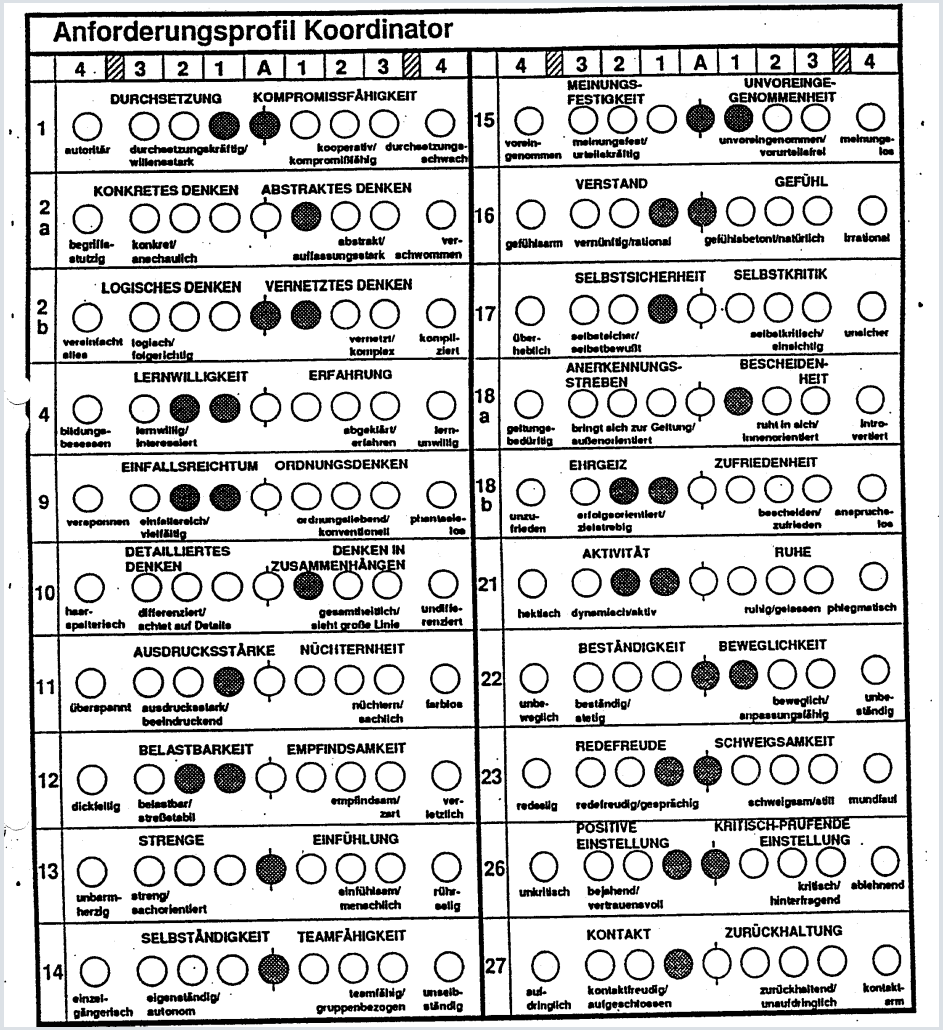

Impact of quality deficiencies/4

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Key factors for success

- Flexibility
- Organizational Learning
- Innovation

Impact of quality deficiencies/5

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„41% of Britons refuse bank transactions via the Internet“

Dieter Claasen, Britons disappointed by On line services, Die Presse, 3.Aug.2000

„British online Bank EGG: virtual bank robbery“

http://www.independent.co.uk/news/Digital/Update/2000-08/first230800.shtml

Impact of quality deficiencies/6

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„cancer clinic Therac-25“

Nanca Leveson, Clark Turner, An Investigation of the Therac-25 Accidents, IEEE Computer, July 1993

„rolling mill“

Peter Neumann, Computer related risks, New York, 1995

Impact of quality deficiencies/7

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How do we classify these critical examples?

Losses on

- Humans
- Material
- Engines
- Environment
- Money
- trust

...

Impact of quality deficiencies/8

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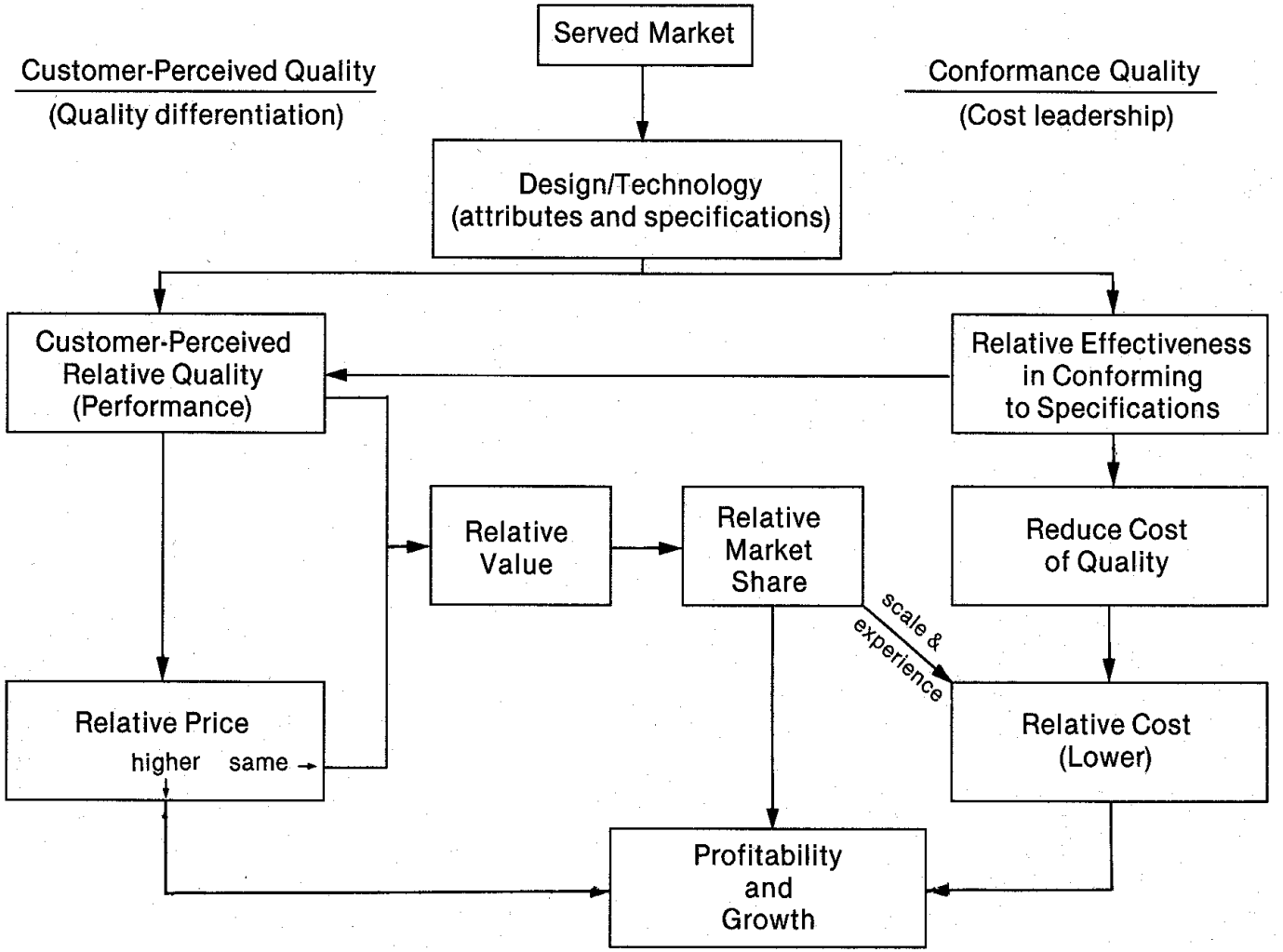

Quality definitions/1

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„Quality: the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs“

(ISO8402).

„Software quality: the totality of features and characteristics of a software product or service that bear on its ability to satisfy stated or implied needs“

(ISO/IEC9126)

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quality means to fulfill requirements

Quality definitions/2

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What does it mean in real life?

- is the quality of a Rolls Royce higher than that of a Mini Cooper
  - Very essential: what are the requirements!!

In work environment ? Don’t go by what I say – go by what I mean!

Quality definitions/3
Software quality characteristics/1

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Functionality: what SW does

Reliability: maintain function under stated conditions

Usability: effort needed to use

Efficiency: performance of SW / amount of resources used

Maintainability: effort for modification

Quality definitions/4
Software quality characteristics/2

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Portability: transfer from one environment to another

Availability: of data

Integrity: of data

Confidentiality: of data

Auditing: of transactions

Quality definitions/5

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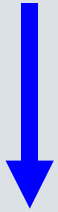
Product oriented testing is according technical requirements not a satisfying approach



Standards should not specify in detail products but the requirements of the management system of a quality organization

- A quality organization with specified roles and tasks

Quality definitions/6

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REVIEW REPORT

ORGANIZATION: DATE: TEAM LEADER:	SCORE (%)	SUBSYSTEMS RATINGS					WEIGHT	WEIGHTED TOTAL
		NO SYSTEM	SIGNIFICANT DEFICIENCY	IMPROVEMENT NEEDED	SATISFACTORY	OUTSTANDING		
		20	40	70	85	100		
SUBSYSTEMS		0	21	41	71	86		
1 Quality System Management							15	
2 New Product/Technology/Service Development and Control							10	
3 Supplier (Internal or External) Control							10	
4 Process Operation and Control							10	
5 Quality Data Programs							5	
6 Problem Solving Techniques							10	
7 Control of Quality Measurement Equipment and Systems							5	
8 Human Resources Involvement							5	
9 Customer Satisfaction Assessment							20	
10 Software Quality Assurance							10	
							SYSTEM RATING	
							PREVIOUS SYSTEM RATING (DATE:)	

Quality definitions/7
Standards-Overview

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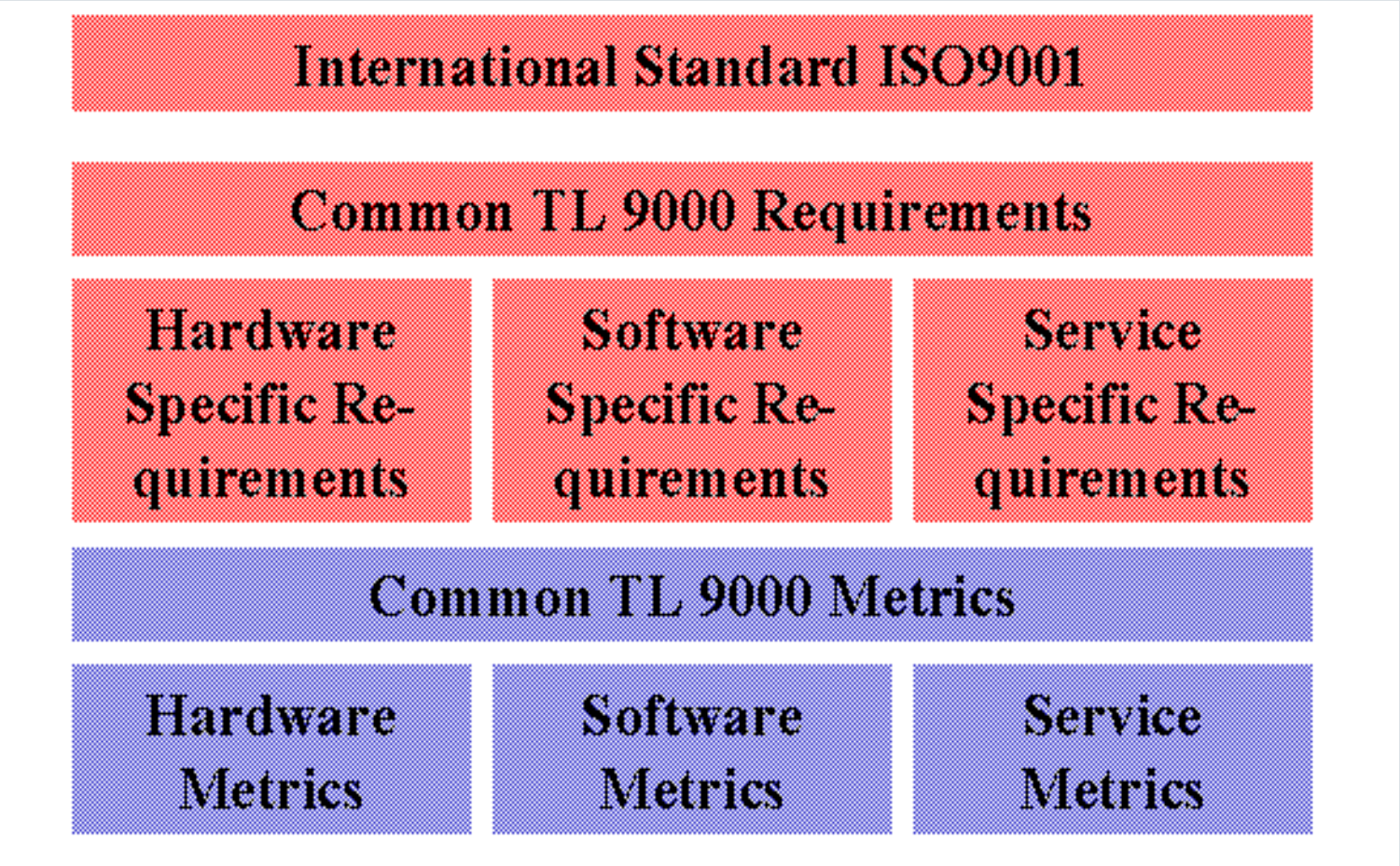

Standards/1

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Important standards:

AQAP 1,4,9 **Allied Quality Assurance Procedures**	NATO Requirements on an industrial QA system
AQAP 13	NATO Requirements on Software
CAN 3-Z 299 1 bis 4	Quality Assurance Program
QSF A,B,C,D	QA requirements (aircraft and space industry)
GMP	Good Manufacturing of the world health organization for pharmaceutical and food manufacturer

Standards/2

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ISO 9000 is composed of the following sections:

- **ISO 9000:2000**, Quality management systems — Fundamentals and vocabulary. covers the basics of what quality management systems are and also contains the core language of the ISO 9000 series of standards. The latest version is ISO 9000:2004.
- **ISO 9001** Quality management systems - Requirements is intended for use in any organization which designs, develops, manufactures, installs and/or services any product or provides any form of service. It provides a number of requirements which an organization needs to fulfill if it is to achieve customer satisfaction through consistent products and services which meet customer expectations. This is the only implementation for which third-party auditors may grant certifications. The latest version is :2000.
- **ISO 9004** Quality management systems — Guidelines for performance improvements. covers continual improvement. This gives you advice on what you or could do to enhance a mature system. This standard very specifically states that it is not intended as a guide to implementation

Standards/3

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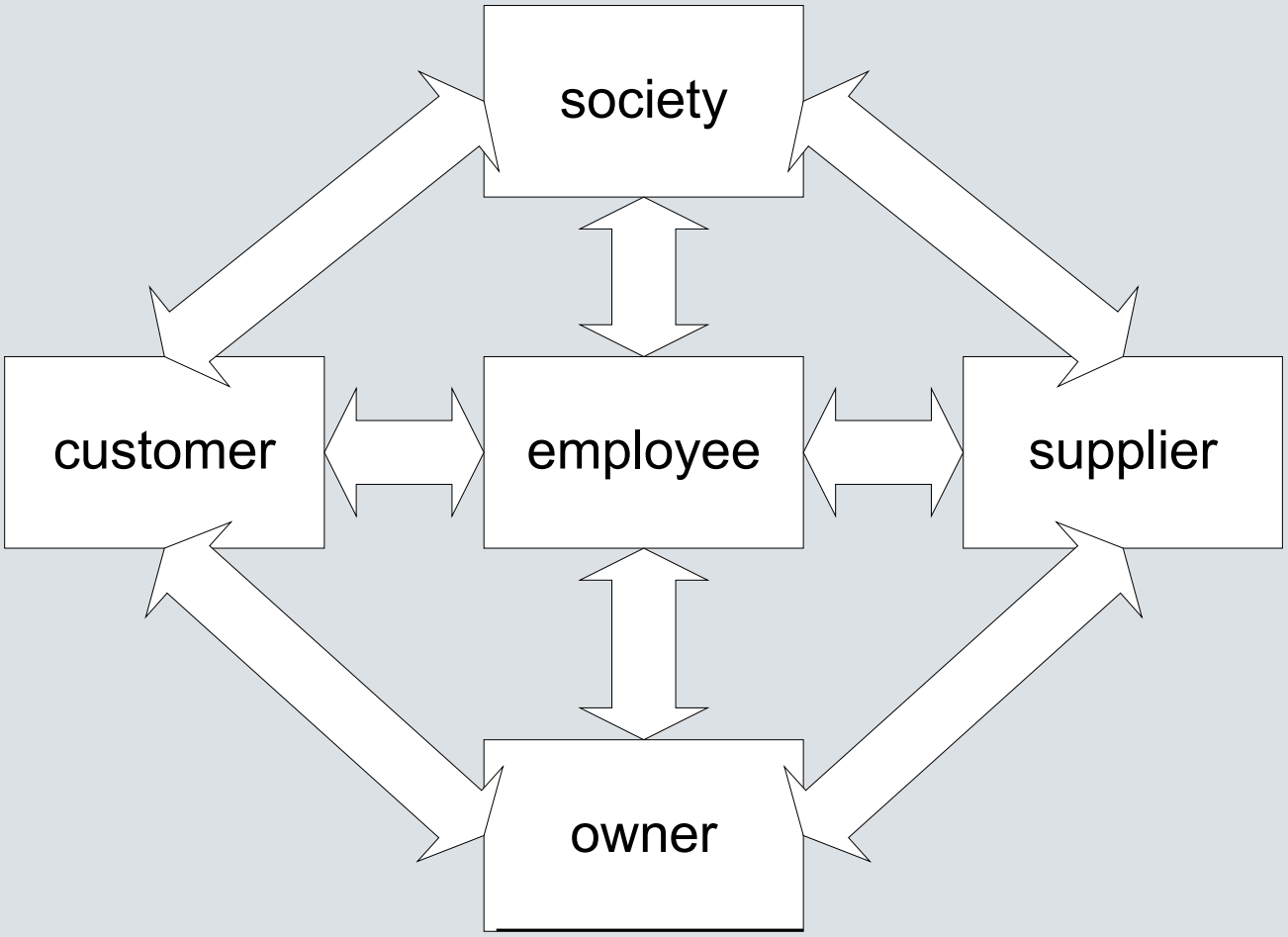
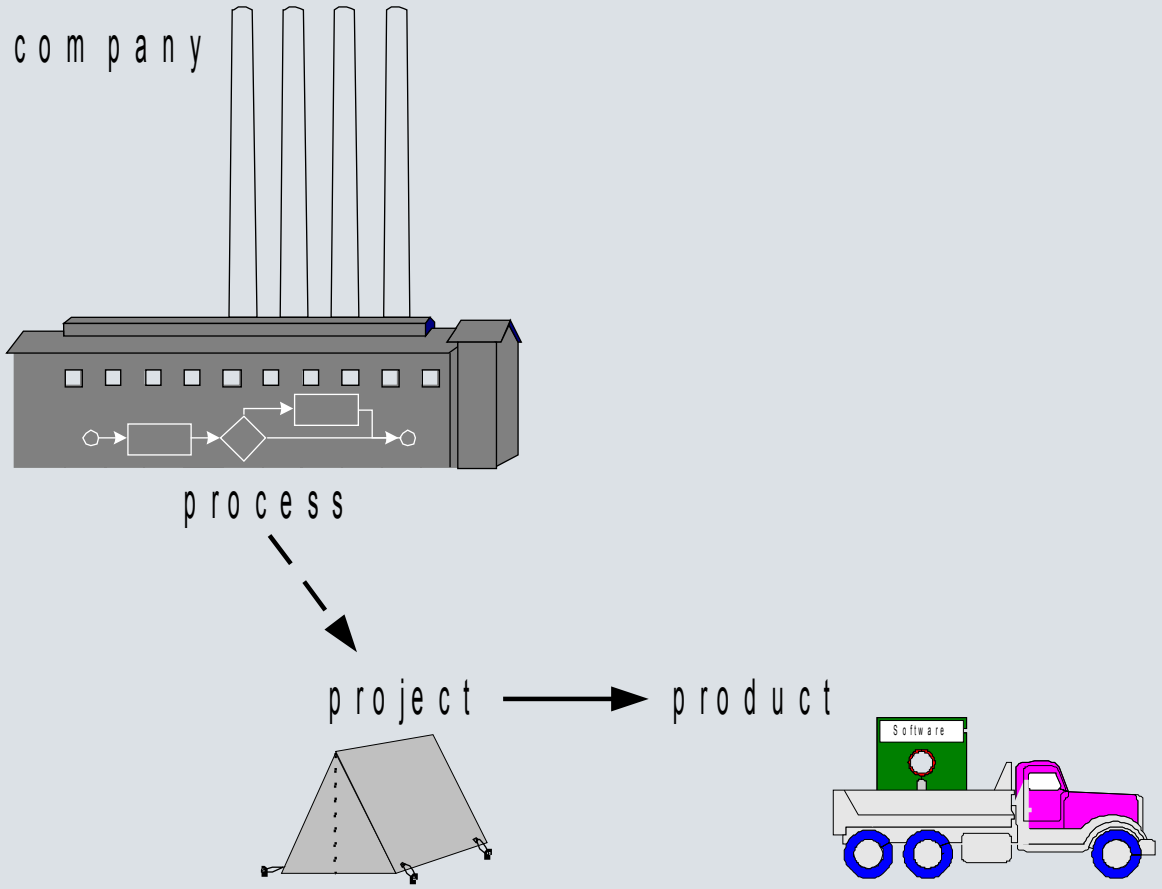


Standards/4



Standards/5

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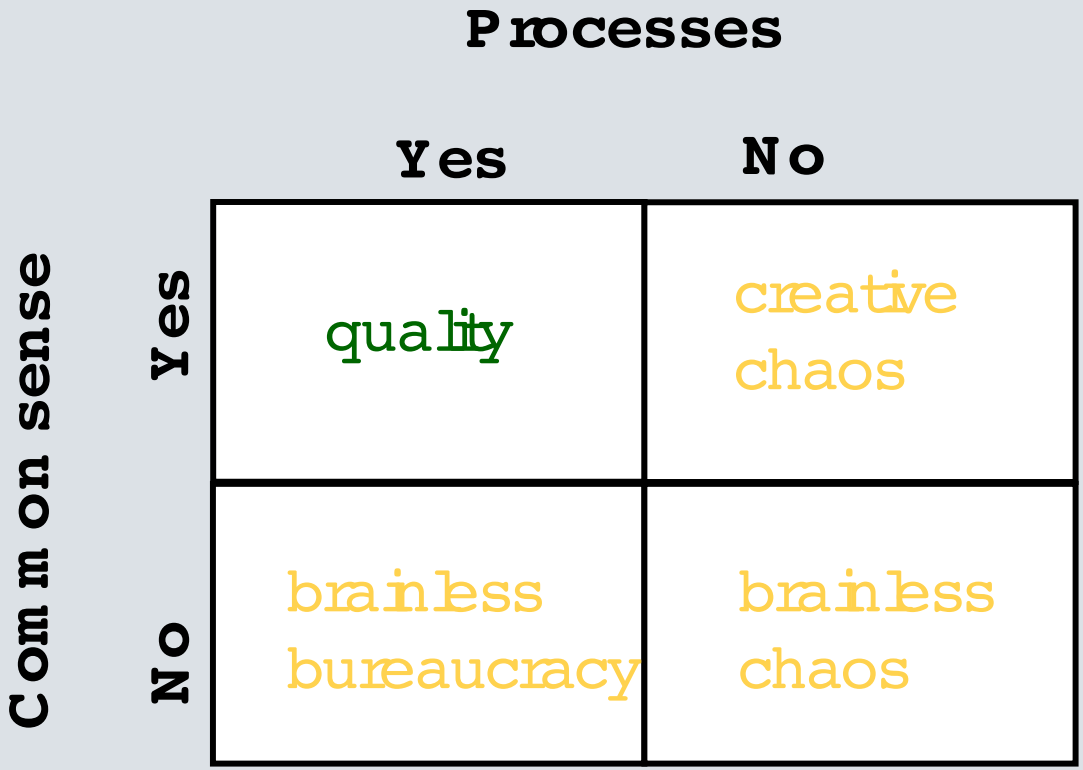
Product A software package, consisting of code and publications, that eventually is delivered to a customer. In a broader sense, the definition of product also includes the product support materials that are related to such activities as marketing and maintenance.

Project The combined resources (people, machines, materials), processes, and activities that are dedicated to building and delivering a product. A project has a defined starting point and defined objectives from which completion is identified. Also, a group of people, typically comprised of two or more organizations, working on the same project.

Process A systematic approach that is designed to achieve a specific purpose.

Documentation dynamic activity of high value enhancement

Standards/5



Quelle: Technologies; SEI

Standards/6

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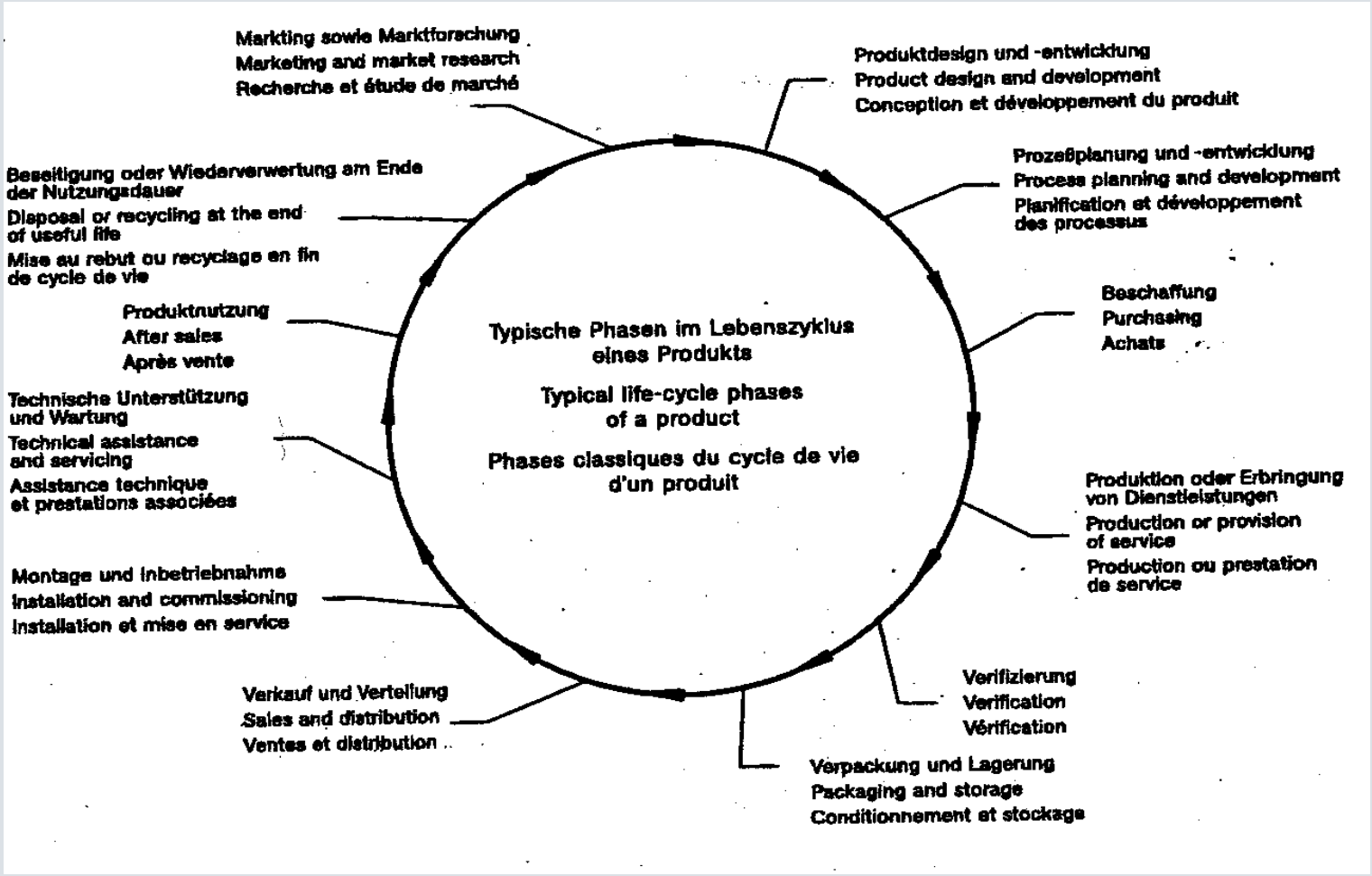

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- Requirements stated in ISO 9001 (2000)

GENERAL REQUIREMENTS

Identify the processes neede for the quality management system
Determine the sequence and interaction of these processes
Ensure the availability of resources and information
Monitor, measure and analyse these processes,
Implement actions necessary to achieve planned results and continual improvement of these processes

DOCUMENTATION REQUIREMENTS

General	Quality manual	Control of documents	Control of records

Standards/8

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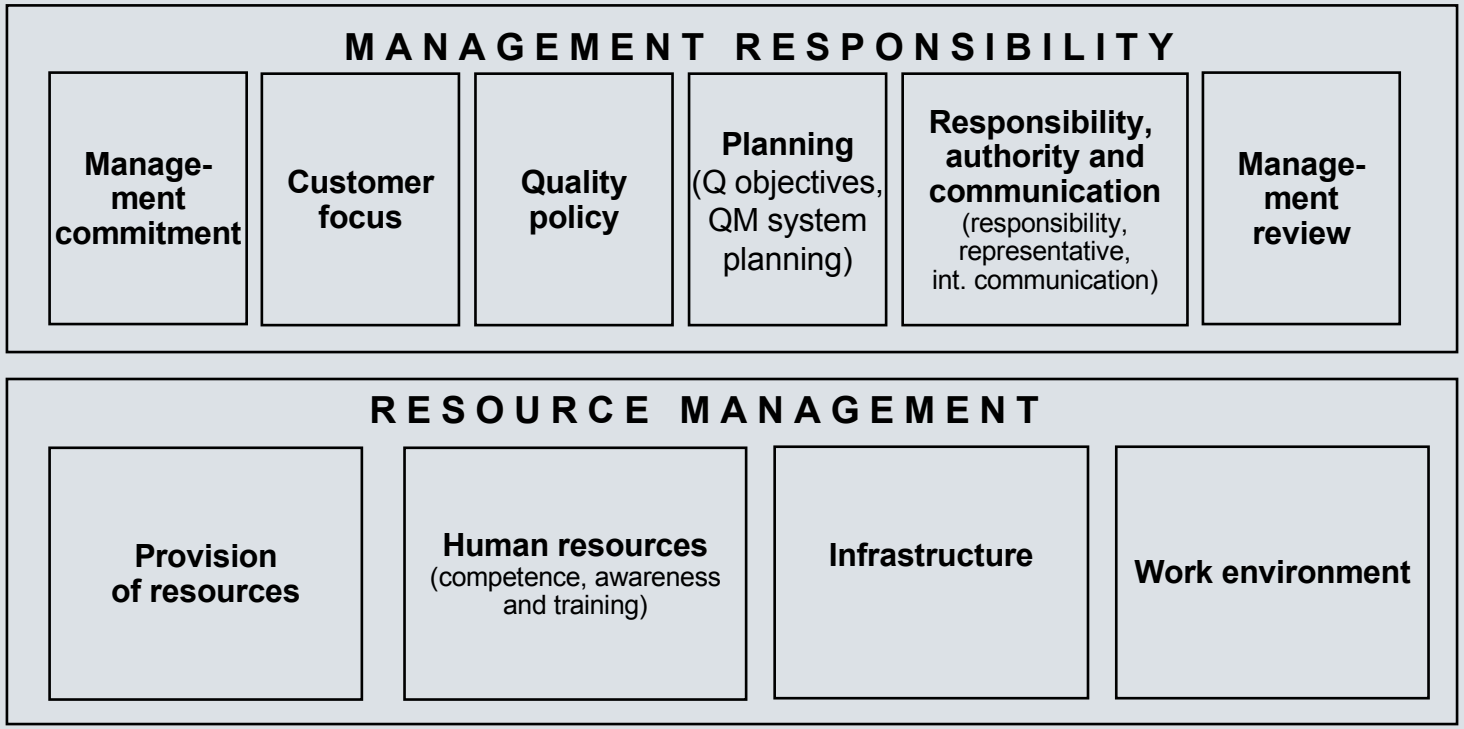
- Requirements stated in ISO 9001 (2000)



Standards/9

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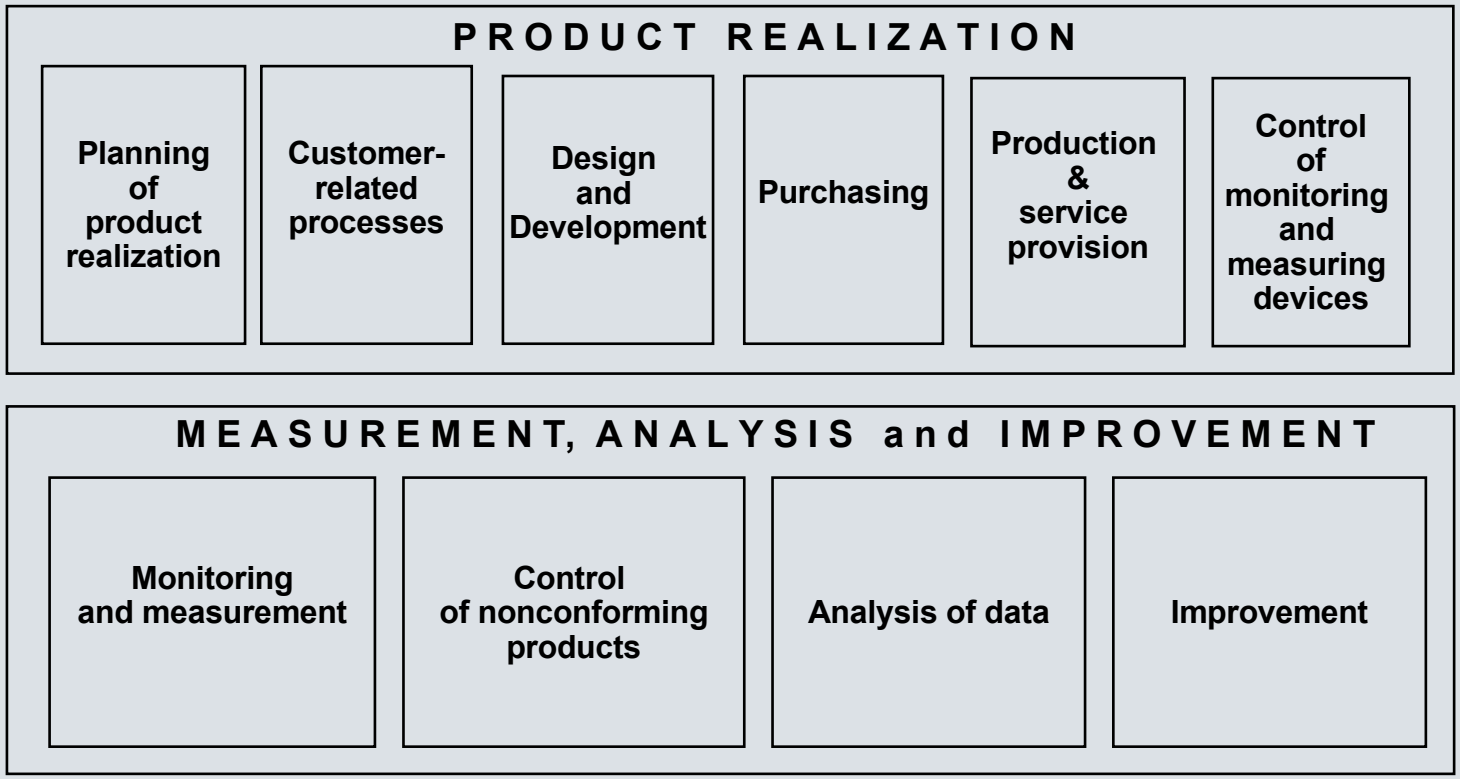
- Requirements stated in ISO 9001 (2000)



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definitions:

- documents/data are given values
- accounting records are actual values

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example:

1) A checklist epitomizes a document in the beginning.

2) If the actual values are rendered the checklist becomes an accounting record.

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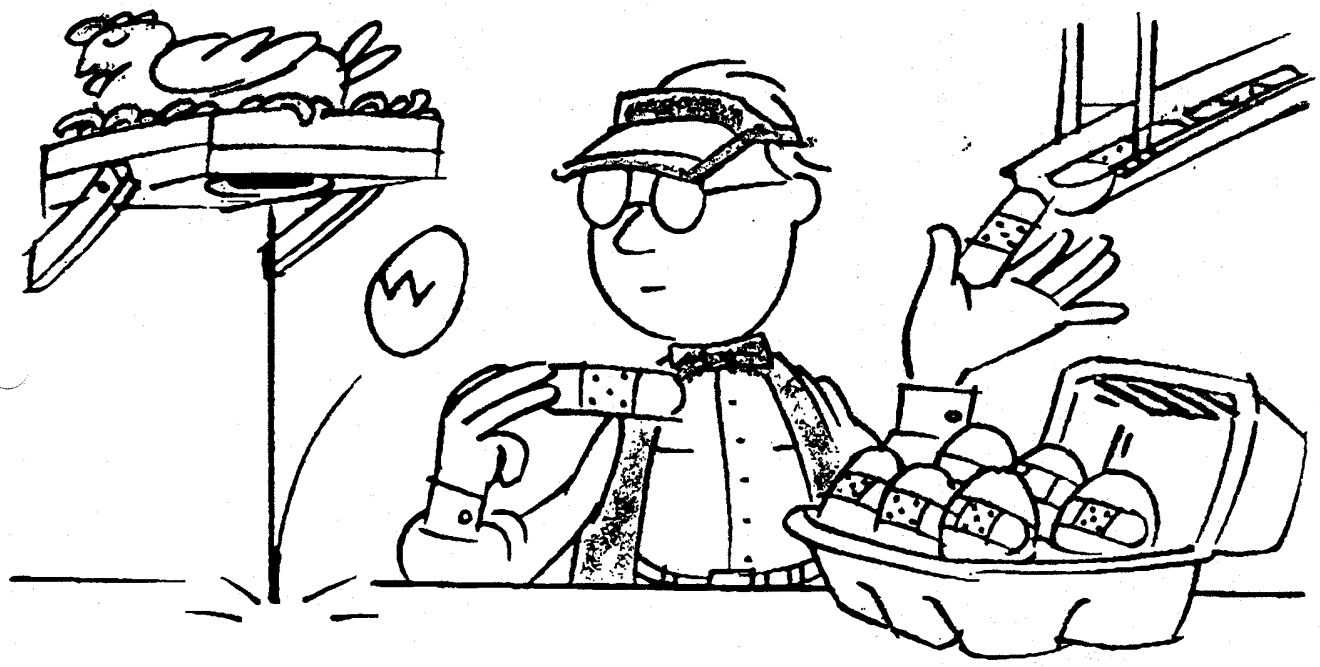
What‘s the difference between repair/fix and correct?



Many organizations concentrate their efforts on fixing mistakes instead of preventing them.

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What‘s the difference between repair/fix and correct?

Repair: is fixing any sort of mechanical or electrical device should it get out of order or broken.
Corrective measures: make sure that errors not arise repeatedly
Preventive measures: prevent potential errors before they occur.

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Steps of a corrective measure

Fixing the error

Description of error

Cause analysis

Definition and implementation of measure

Observation of current occurrence

Evaluation of the efficiency of the measures

Process will be adapted according these measures

Standards/14

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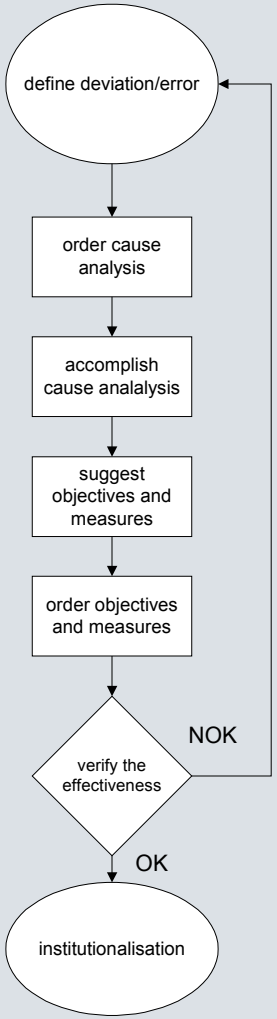

activity	responsibility	document/ recording
define deviation/error	discoverer	appendix A
order cause analysis	department/ group manager	appendix A
accomplish cause analalysis		appendix A
suggest objectives and measures		appendix A
order objectives and measures	department/ group manager	appendix A
verify the effectiveness	department/ group manager	appendix A
institutionalisation		appendix A

Standards/15

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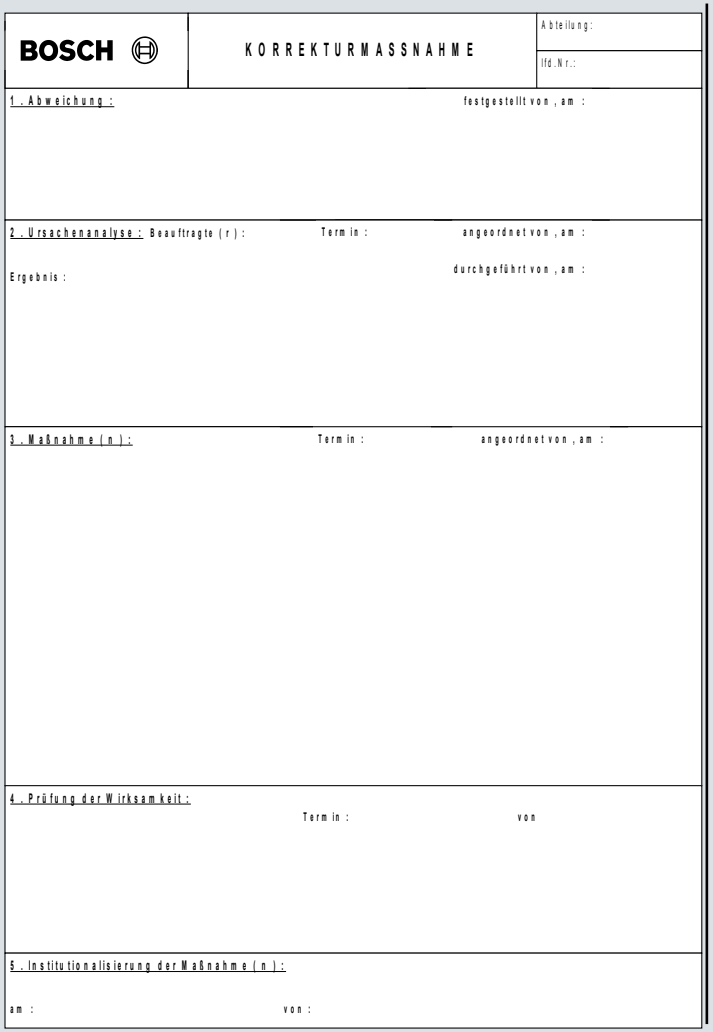

BOSCH

KORREKTURMASSNAHME

Abteilung:

lfd.Nr.:

1. Abweichung:

festgestellt von, am:

2. Ursachenanalyse: Beauftragte(r):

Termin:

angeordnet von, am:

durchgeführt von, am:

Ergebnis:

3. Maßnahme(n):

Termin:

angeordnet von, am:

4. Prüfung der Wirksamkeit:

Termin:

von

5. Institutionalisierung der Maßnahme(n):

am:

von:

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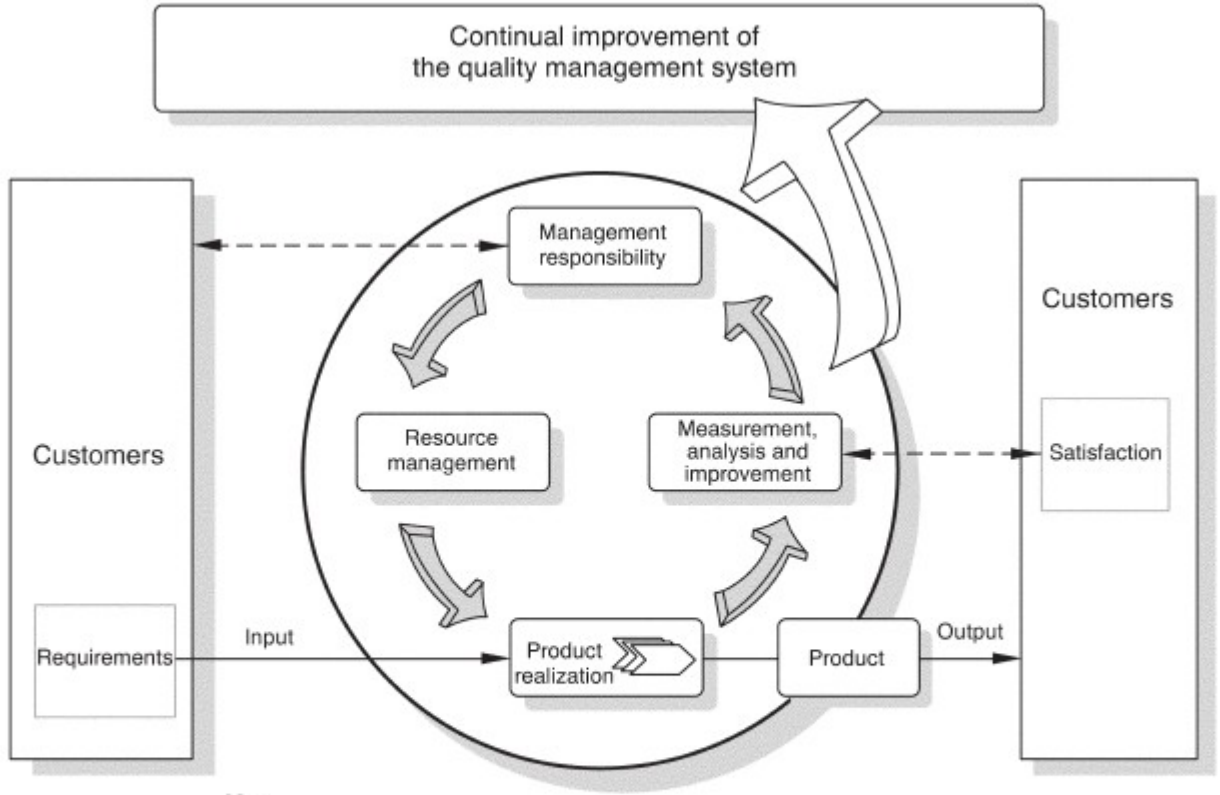

Figure 1 — Model of a process-based quality management system

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Essential improvement compared to the original version of 1992

- Engagement and commitment of top management
- Customer focused
- Management processes are essential parts of the quality management system
- Quality targets are the linking between politics and their realization in the process management
- Management review is a very efficient means to measure
  - Effectiveness of management system
  - Customer satisfaction.

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Essential improvement compared to the original version of 1992

- Information is a very important resource
- Much higher requirements on process management
- Enforce communication with customers to reach more effective relations
- Part of processes are focused to permanently check and improve the process itself
    - Methods and measures should be defined and introduced.

Standards/19

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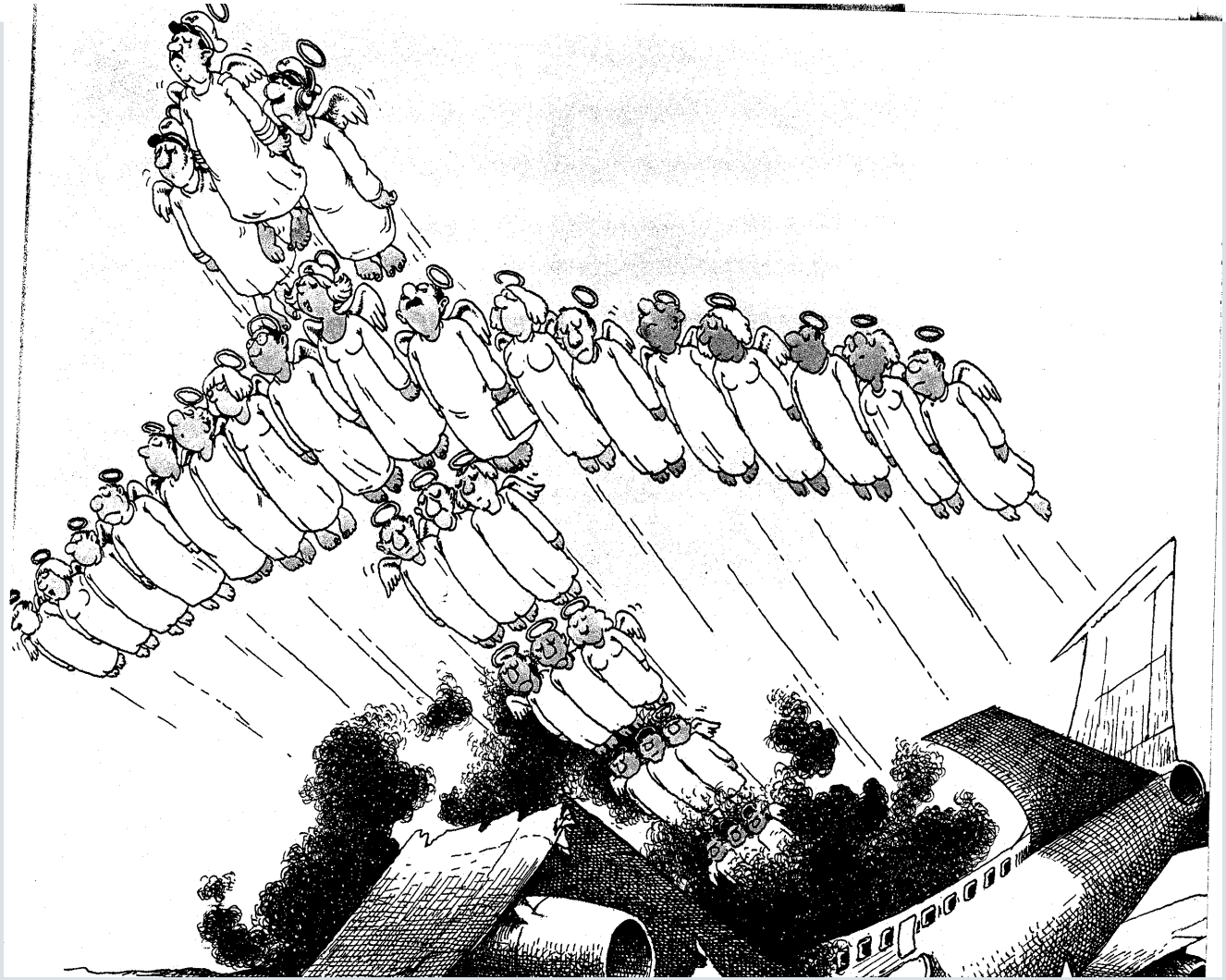

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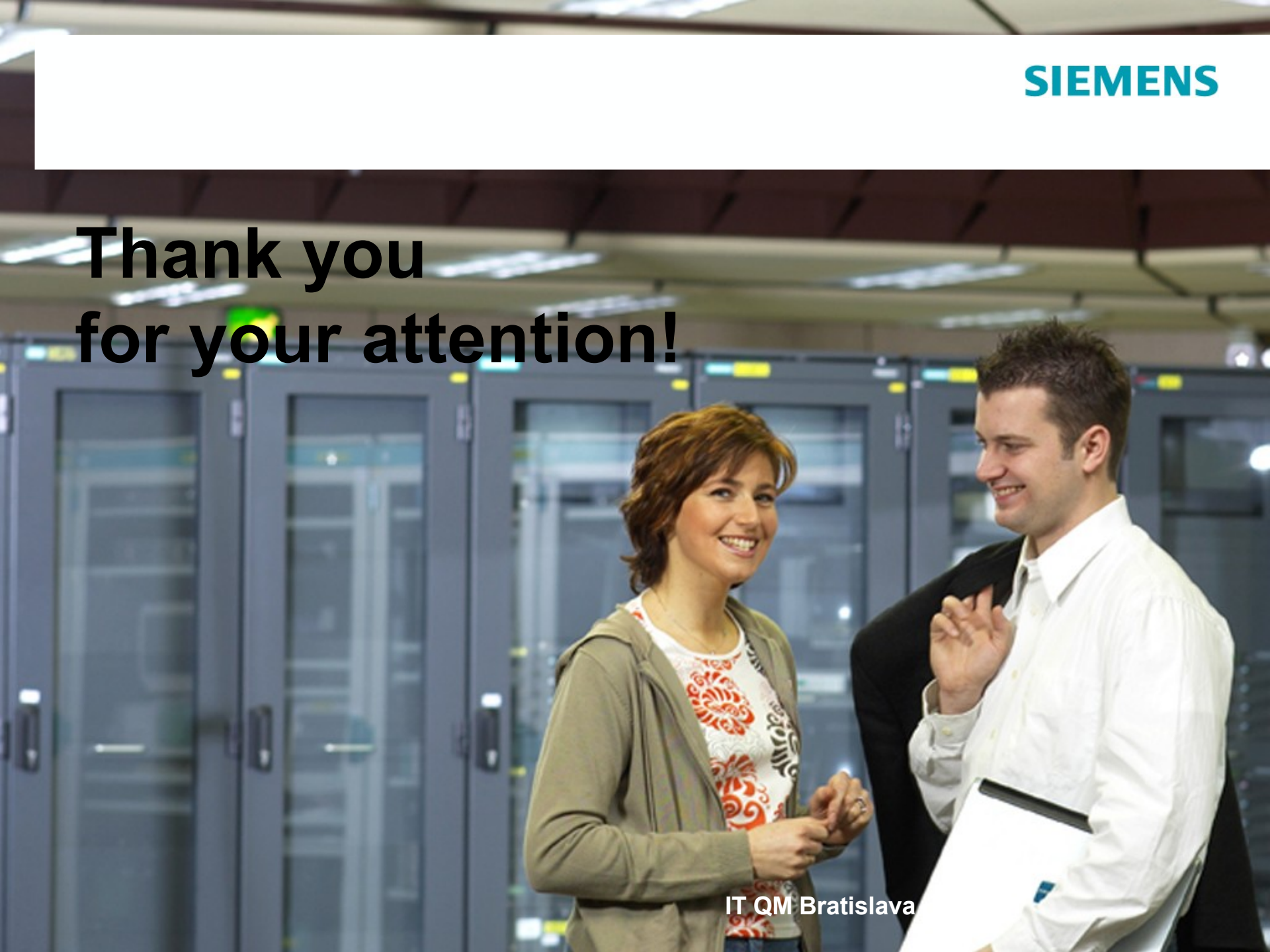
Thank you for your attention!



Headline

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- Text

Farbpalette mit Farbcodes

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Primäre Flächenfarbe:

R 255 G 255 B 255

Sekundäre Flächenfarben:

R 215 G 225 B 225	R 170 G 190 B 195	R 130 G 160 B 165
R 220 G 225 B 230	R 185 G 195 B 205	R 145 G 155 B 165

Akzentfarben:

R 255 G 210 B 078	R 245 G 128 B 039	R 229 G 025 B 055	R 000 G 133 B 062	R 000 G 084 B 159	R 000 G 000 B 000
R 255 G 221 B 122	R 248 G 160 B 093	R 236 G 083 B 105	R 064 G 164 B 110	R 064 G 127 B 183	R 064 G 064 B 064
R 255 G 232 B 166	R 250 G 191 B 147	R 242 G 140 B 155	R 127 G 194 B 158	R 127 G 169 B 207	R 127 G 127 B 127
R 255 G 244 B 211	R 252 G 223 B 201	R 248 G 197 B 205	R 191 G 224 B 207	R 191 G 212 B 231	R 191 G 191 B 191
R 255 G 250 B 237	R 254 G 242 B 233	R 252 G 232 B 235	R 229 G 243 B 235	R 229 G 238 B 245	R 229 G 229 B 229