

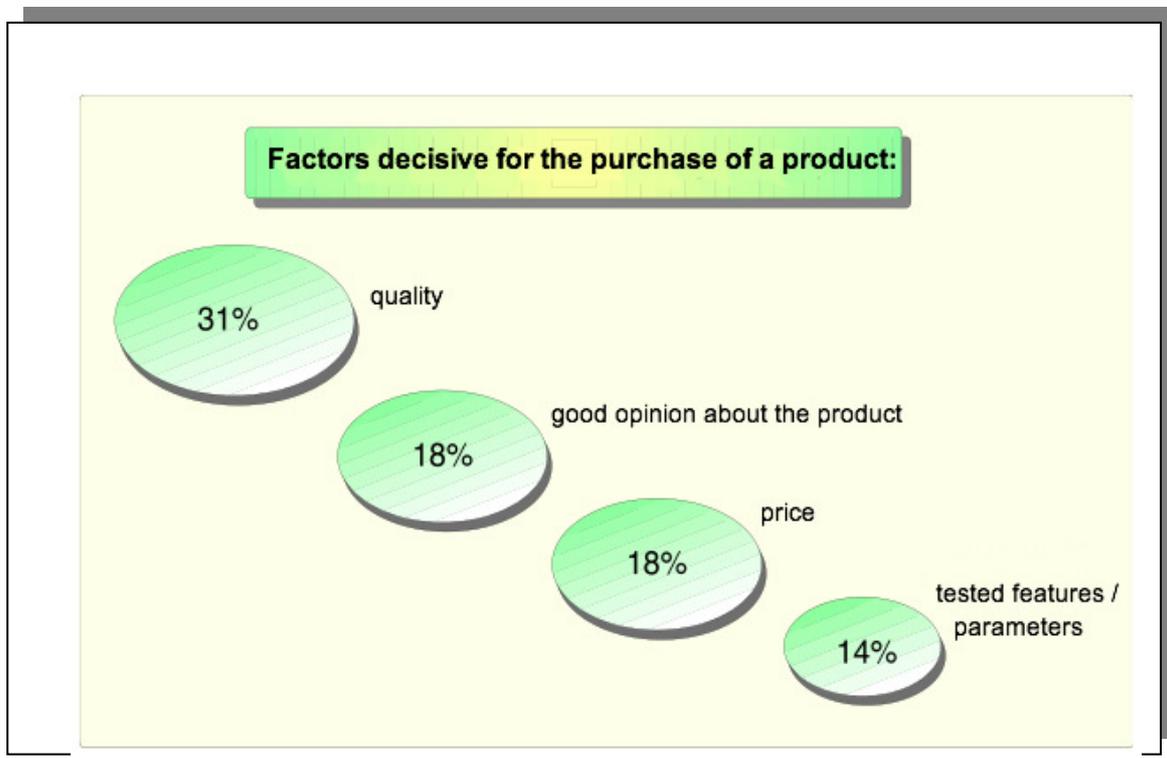
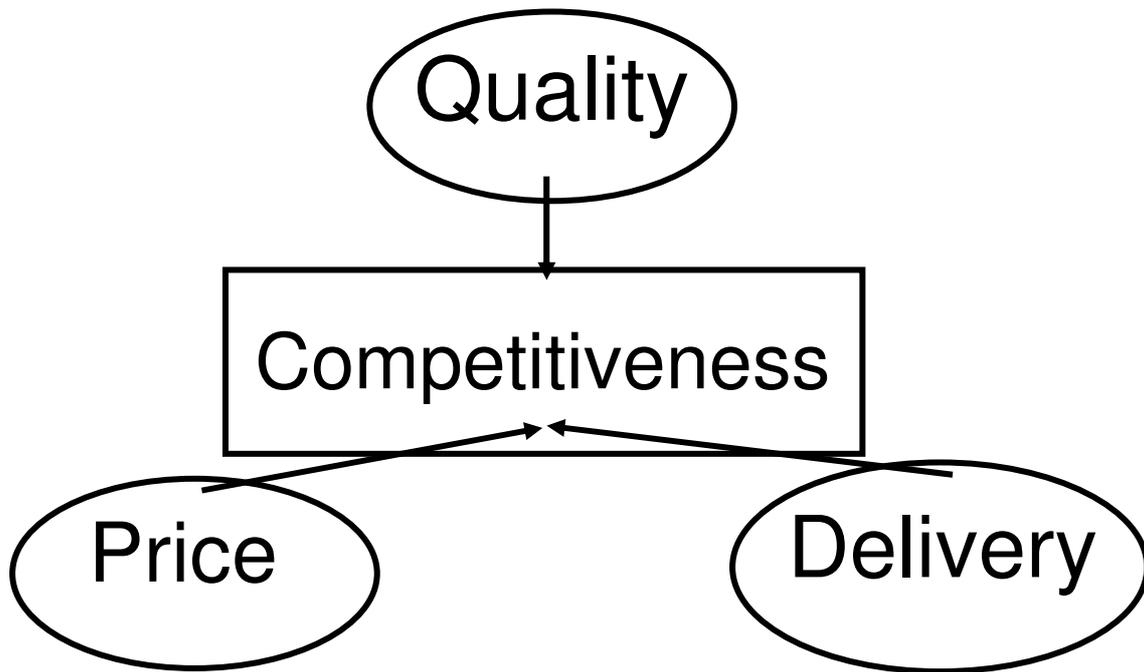
MODULE I

**Basic Concepts. Introduction to the
Quality Issues.**

**Importance of Quality in Modern
Economy.**

**Key Strategies of Management Based
on the Quality Criterion**

1. The role of Quality in the Company Management



COMMON FEATURES OF COMPANIES WHICH SUCCEEDED WITH THE QUALITY OF PRODUCTS

- *Quality is regarded as a strategic objective and appropriately managed*
- *Deep involvement of the directors is regarded as a key element*
- *Training in quality at all levels*
- *Change of the corporate culture to a pro-quality one including all employees*
- *The leading thought of the strategy is constant focusing on the customer*
- *Quality management integrating:*
 - *production and marketing,*
 - *actions requiring the cooperation of different departments,*
 - *technologies and meeting the customer requirements*
- *Quality management regarded as a process requiring constant improvement*

Culture and not the product. Increasingly, in order to defeat their competitors, companies are faced with the necessity to promote their culture or brand and not only their products. Such companies as BMW or Sony sell the image which is called "quality"

A British retail chain, the Body Shop, sells an image of being "environmentally friendly". However, such a message will be convincing to the customers only when an appropriate culture flourishes throughout the company. Japanese managers are taught about it throughout the whole period of their professional career; in Western business schools there are still difficulties in teaching this concept. But they must learn about it.

Robert Haas
Director General of Levi Strauss
(The Economist, 2.03.1991 r.)

**IF YOU DO NOT INVEST
IN QUALITY, YOUR DAYS ON
THE MARKET ARE NUMBERED.**

**Michael Dove
Director Express Lifts
Northampton**

2. Importance of Customers

CUSTOMERS:

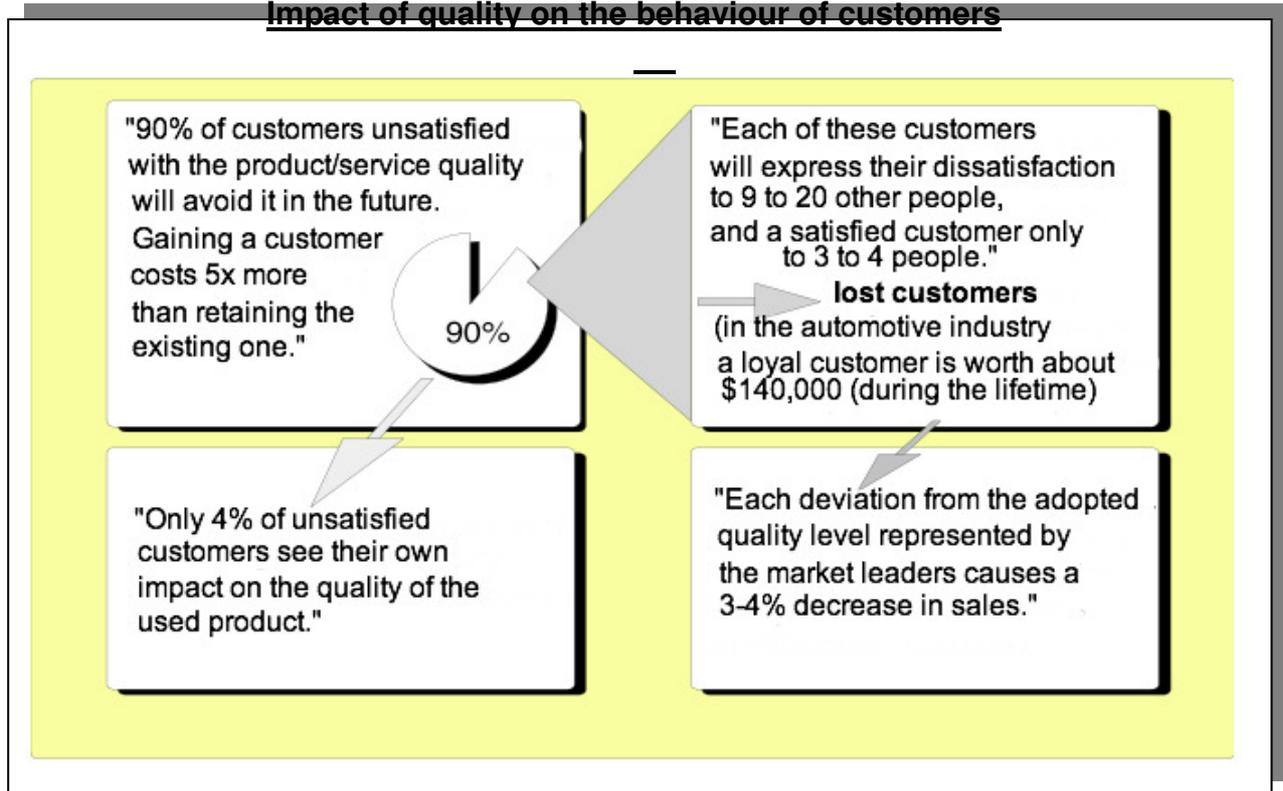
- ♥ *Are the most important persons in each activity.*
- ♥ *Are not dependent on us. It is us who are dependent on them.*
- ♥ *Do not disturb our work. They are its objective.*
- ♥ *They do us a favour when they come.*
We **do not** do them courtesy servicing them.
- ♥ *They are a part of our organisation and not persons from outside.*
- ♥ *They are not only a part of the statistics but true humans who feel and react as we do.*
- ♥ *They come to us with their needs and wishes, and our task is to satisfy them.*
- ♥ *They deserve as much kindness and attention as we can give them.*
- ♥ *They are the essence of each business. We would not exist without them.*

BASIC QUESTIONS OF CUSTOMERS:

- ♥ *What can I expect when I buy a product?*
product or service specification
- ♥ *Is it what I expected?*
compliance with the declared characteristics
- ♥ *Does it meet my expectations at all times?*
reliability of the product
- ♥ *How much do I have to pay?*
value of the product in relation to the price
- ♥ *When will I get this?*
delivery (fast and timely)

Meeting the requirements of the customers means listening to them and reacting to what they request and what has been established.

Impact of quality on the behaviour of customers



A confirmation of an appropriate quality of the product is the fact of its purchase by the customer. And therefore, quality should be related to their requirements and expectations - also not fully conscious ones. In this sense, quality is a relative category. The same product may be accepted by one customer and rejected by another as not meeting the requirements. Hence the necessity and importance of identification of customer requirements. It is obviously within the sphere of marketing activities.

The problem of poor quality is often neglected, which justifies a small percentage of observed deficiencies or mistakes and little "visible" costs connected with that. However, it is necessary to pay attention to the fact that easily noticeable costs of shortcomings are a part of the poor quality. As a rule, such factors as e.g. loss of reputation, non-conclusion of potential contracts or frustration of employees are not measured or difficult to measure. Mistakes made at all positions - also executive ones - bring considerable losses and their sum may constitute 20÷35 % of the company's sales value.

3. Definitions of quality and its aspects

Terminological standard ISO 9000:2005 defines the concept of **quality** in the following way:

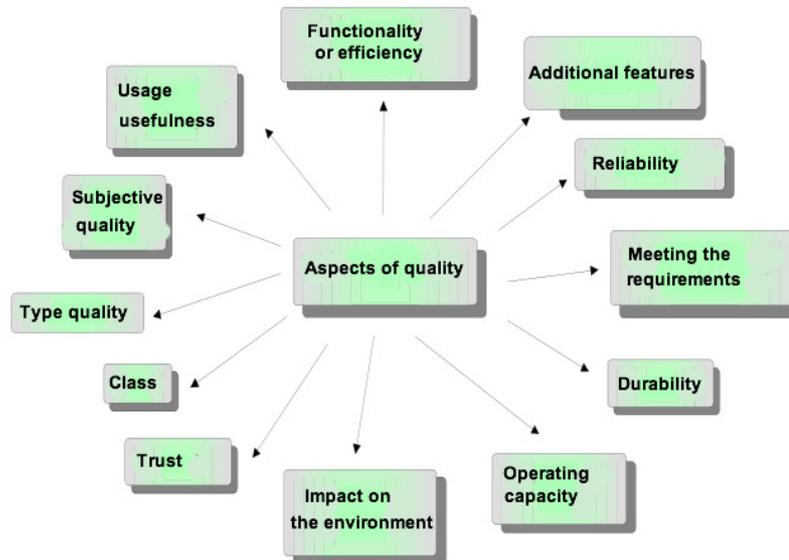
Quality – the degree to which a set of inherent characteristics fulfils the requirements.

Other definitions:

Quality

- **NO ERRORS** (P.B. CROSBY)
- **COMPLIANCE WITH THE REQUIREMENTS** (K. ISHIKAWA)
- **QUALITY IS INVERSELY PROPORTIONAL TO THE VARIATION**
(D. MONTGOMERY)
- **QUALITY IS THE THING, THE LACK OF WHICH MEANS LOSSES FOR EVERYONE**
(G. TAGUCHI)

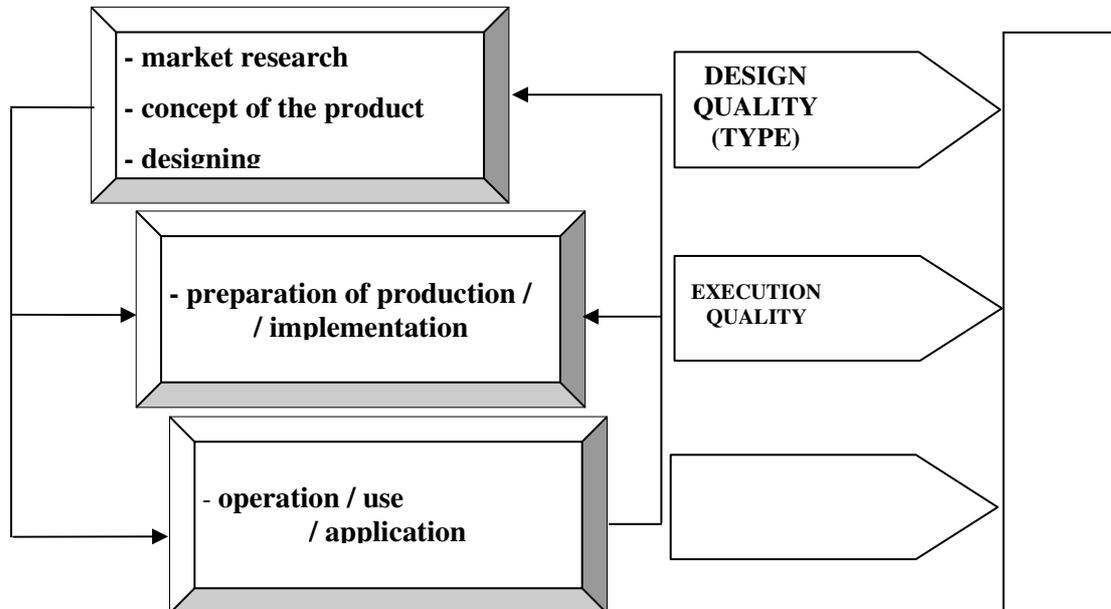
QUALITY is everything what is understood by the customer under this concept.



QUALITY INCLUDES:

- **Knowledge of the customer needs**
- **Design and planning to meet the customer needs**
- **Using optimum equipment and materials in production/implementation**
- **Clear and precise instructions for the implementation**
- **Timely delivery**
- **Production without deficiencies**
- **Efficient support services**
- **Using information from the operational phase (feedback)**

Quality of a product/service is a result of a series of actions constituting the so-called life cycle of the product. What is clear from the figure below, each organisation must take into account the importance of all the stages of building quality, and special attention should be paid to the processes preceding the direct production/implementation of services (i.e. determining the requirements, concluding a contract, planning the implementation) – constituting the so-called type quality. It is during these activities when a decision is made whether all the requirements have been "built in" the product and whether it will have a chance to satisfy the customers.



4. Other concepts connected with quality

<p>Quality management coordinated actions concerning organisation management and its supervision in relation to quality</p> <p>System a set of mutually connected or mutually influencing elements</p> <p>Management system a system for establishing the policy of objectives and achieving them</p> <p>Quality management system a management system for leading the organisation and its supervision in relation to quality</p> <p>Quality policy general intents and focus of the organisation concerning quality, formally expressed by the top management</p>

The concept of **quality management** is a result of many years of gaining knowledge and experience through organisations around the world which had to meet the growing demands of customers and competition. The quality management philosophy puts the customer first, and then all the areas of organisation functioning are subjected to meeting their expectations.

Quality management is based on:

- establishing and continuous updating of the quality policy and quality objectives of the company,
- planning to achieve these objectives,
- current monitoring of the processes influencing quality and
- continuous quality improvement in the company.

Each company is a specific system in which appropriately configured elements - **people, machines, materials, methods and environment** - implement missions and subsequent goals determined by the management.

A system based on setting the policy and quality objectives and focusing on their implementation, in accordance with the management idea is called the **quality management system**.

It is a system, and not a single employee, who is responsible for the effects of the company's activity. A human is only an element of a better or worse configured system.

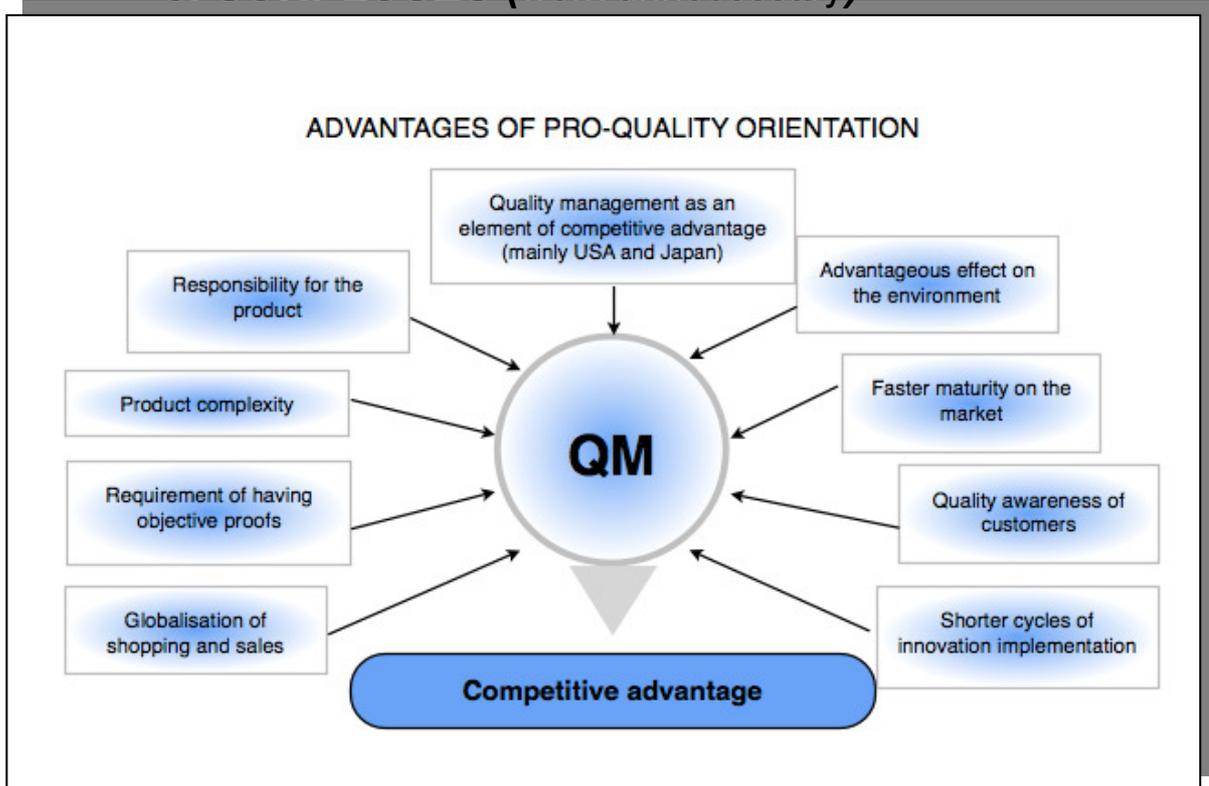
The **management of the company** is responsible for the proper configuration of the aforementioned elements and it bears the main responsibility for the broadly-understood quality by which the organisation is characterised.

5. Measures of quality

PRODUCTION QUALITY CRITERIA

- 1. Quality costs**
- 2. Defects** (work performed not in accordance with the specification)
- 3. Improvement** (work requiring improvement)
- 4. Discards** (wasted work)
- 5. Losses** (work performed again)
- 6. Downtime** (delays in work)
- 7. Delays in deliveries** (work performed after the set deadline)

8. SURPLUSES (work unnecessary)



6. Experts ("gurus") of quality and their views

Expert	Dominating element
P. Crosby	No deficiencies
W.E. Deming	14 points of management System of profound knowledge
A. Feigenblum	Total Quality Control
K. Ishikawa	Quality wheels Cause and effect diagrams Company-Wide Quality Control
J. Juran	Trilogy of quality (planning, steering, improvement)

TQM MODEL according to JURAN

QUALITY PLANNING

- Determine who your customers are
- Determine the needs of the customers
- Develop the product design which would meet the needs
- Develop production processes able to ensure that the product has the required features
- Convert plans into action

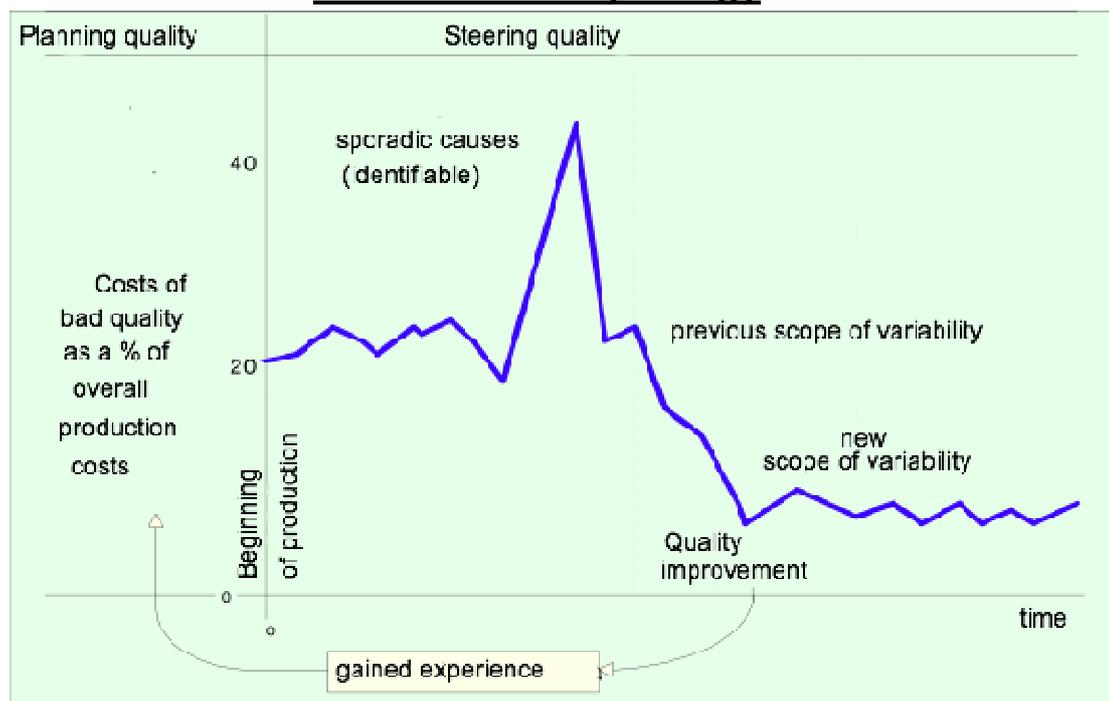
QUALITY CONTROL

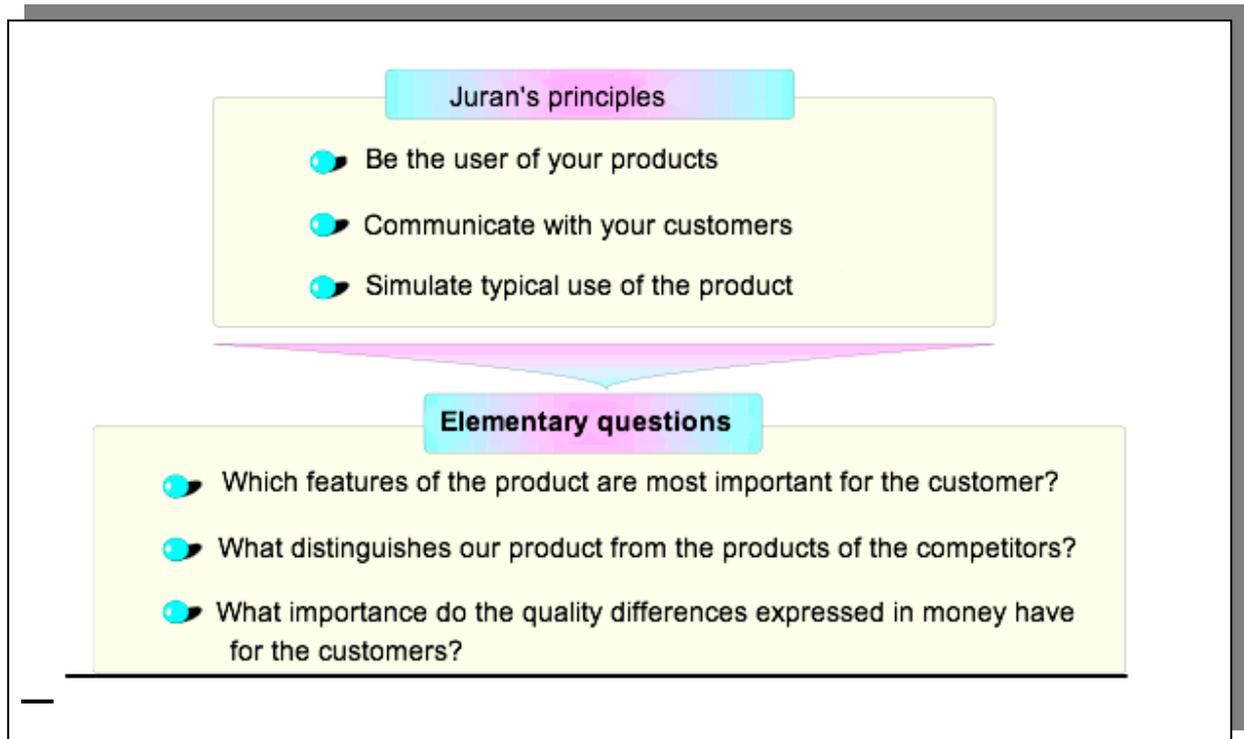
- Examine the actual product characteristics
- Compare the assessment results with the requirements
- Correct discrepancies

QUALITY IMPROVEMENT

- Create an appropriate infrastructure
- Define specific roles in enhancing quality
- Appoint task forces
- Create appropriate opportunities for the work of teams (resources, training, system of incentives)
- Implement the prepared solutions, distribute and strengthen them

J. Juran's Quality Trilogy





JURAN: 10 steps of quality improvement

- 1. Realising the need and opportunity to improve quality***
- 2. Determining the continuous improvement aims***
- 3. Creating an organisation which will help in the implementation of these aims through the establishment of a quality council, identifying the problems, selecting the right design, creating teams and selection of coordinators***
- 4. Training of all employees***
- 5. Assignment of problem tasks***
- 6. Informing about the progress of works***
- 7. Expression of recognition***
- 8. Announcement of results***
- 9. Record of success***
- 10. Inclusion of improvements to the normal activity of the company, which ensures the enthusiasm of employees***

7. Deming's philosophy

System of Profound Knowledge

- 1) *System approach*
- 2) *Variation theory*
- 3) *Forecasting theory*
- 4) *Selected topics in psychology*

Fourteen conditions of effective management

Condition 1 - Consistency in reaching the purpose

The purpose, mission of the management in relation to the enterprise should be articulated and disseminated not only among the employees of the company but it also should be known to its suppliers and customers. The existence of a company mission is necessary for both the management and the employees to plan their future tasks.

Condition 2 - Adoption of the "New Philosophy"

The essence of this "New Philosophy" is the rejection of past practices of uncritical acceptance of the quality level achieved in the past. The philosophy of quality improvement is the cheapest method of productivity improvement as the relation of the derived factors to the input factors. Deming provides in this place the so-called chain reaction:

Condition 3 - Finish with the dependence on mass control

Although the existence of control activities in the company is necessary, we have to remember that quality cannot be "fully controlled" - it is necessary to build it in the process or product. By giving an employee the opportunity to get to know the surrounding system thoroughly and equipping them with appropriate methods, it is possible to significantly reduce the need to apply the inspection control.

It is also necessary to remember that even the most advanced inspection systems never give 100% of certainty of capturing irregularities.

Below there is a simple criterion which allows for making a decision when it is necessary to apply full control, 100% and when it is enough to apply random, statistical control.

If $w^* = \frac{K_1}{K_2} \leq \bar{w}$ - do not apply 100% control, decide for random control
(control costs more than the possible loss)

If $w^* = \frac{K_1}{K_2} \geq \bar{w}$ - apply 100% control

where: K_1 - the cost of control of one element,

K_2 - costs (losses) caused by the occurrence of a defect at further stages of the production process or at the customer's,

\bar{w} - average defectiveness found in a batch of products (e.g. on the basis of the control cards).

A contemporary alternative for the product control is the active process control as a result of which this product is created, using statistical devices such as control cards and enabling active shaping of quality.

Condition 4 - End with the practice of making decisions exclusively on the basis of the price, reduce costs reducing changeability in the processes

Always remember about the regularity:

$$\text{Price} + \text{Cost of Use} = \text{Total Cost}$$

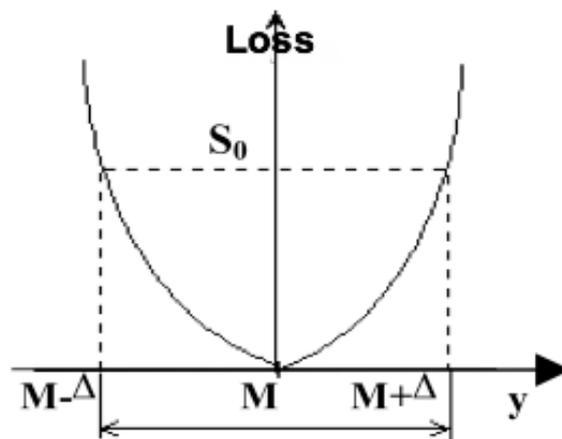
The purpose of the contemporary purchasing department is often a difficult work of searching for the answer to the question - In what case (i.e. for which supplier, product, service) the total cost will be the lowest from the point of view of our company?

If e.g. buying a car tyre are we interested only in the price or e.g. the lowest cost for the mileage guaranteed by the manufacturer?

A useful thing at this point is a new perspective on the issue of quality presented by G. Taguchi in the form of the so-called quality loss function.

Taguchi defines quality in a controversial way (at the same time setting its measure) as a social loss caused by the product after it is submitted to the recipient.

It is therefore necessary to calculate or estimate this loss, hereinafter referred to as the quality loss.



$$S(y) = k(y - M)^2$$

where: $k = \frac{S}{\Delta^2}$ - ratio of qualitative losses,
M - desired value of the parameter y,

$M \pm \Delta$ - the so-called functional limits for the parameter y, i.e. the value of the feature at which the product will not function or will be perceived as defective, in 50% of cases,

S_0 - cost of replacement or repair of product

As it can be seen, this approach is completely different from the traditional Taylor's approach on quality taking the tolerance on the performance of a product (everything that is in the range of tolerance is equally good, regardless of whether the value of one characteristic is close to the desired value or close to one of the tolerance limits) as a basis for its assessment.

Deming compares the two views on the cooperation with sub-suppliers:

Traditional way (bad)	New way (good)
- short contracts	- long-term contracts and relationships
- selection on the basis of the lowest price	- seeking to determine total costs
- treating each other as enemies	- constant quality improvement
- mutual distrust	- partnership, constant exchange of information
	- mutual adaption to the needs

Deming believes that you should strive for lowering the number of suppliers, maintaining contacts with those who want good cooperation and understand that they are an element of the manufacturer's system. The greater the number of suppliers e.g. of a given semi-finished product, the better the overall variability of the final quality.

Condition 5 - Constant improvement of the system

The task of the management is to create a climate in which each employee will be willing and able to introduce innovations and improvement of processes, products and services. The management must remember that the experience shows that 90% of the responsibility for the system is on the part of the leadership.

According to Deming, the desire of employees to self-realisation through the action for the sake of the company was destroyed by such rating systems as MBO, where the employee promotion in the company hierarchy usually takes place at the expense of the career of another employee (the loose/win philosophy instead of win/win).

At this point it is known recalling the well-known cycle of continuous improvement PDC(S)A - Plan (plan a change or an improvement) - Do (try the planned solution) - Check(Study) (check, analyse the results) - Act (introduce the change, make it a new standard for improvement).

Condition 6 - Adopt modern methods of increasing qualifications of all employees

The task of the management is to recognise the training needs of the employees. Deming suggest the use of control cards in order to recognise whether a given employee requires training (the employee's results indicate the existence of the special reasons, about statistical instability of the process implemented by this employee) or it is necessary to do the so-called "breakthrough" in the system which is within the competence of the management.

Condition 7 - Adopt modern leadership methods

A contemporary manager should be a leader. According to Deming, a good leader should have the following characteristics:

- recruits employees fairly and with great caution,
- strives to have subordinated who draw satisfaction from their work,
- is an advisor and a consultant but not a judge,
- uses objective data to understand the results of their subordinates,
- understands the impact of the work of their group on the company objectives,
- cooperated with the representatives of the preceding and subsequent phases after the one implemented by their own team,
- strives for the improvement of the processes implemented by their team,
- creates an atmosphere of trust in the team,
- does not expect perfection but learning from mistakes,
- acts in such a way that the subordinated implement what is expected without a feeling of coercion or humiliation,

Deming often emphasised that it is not enough to try to do our best - unfortunately, often it would be better to do nothing, it would not lead to the system destabilisation. Good intentions must always be accompanied by appropriate knowledge and understanding of the relevant processes.

Condition 8 - Eliminate fear

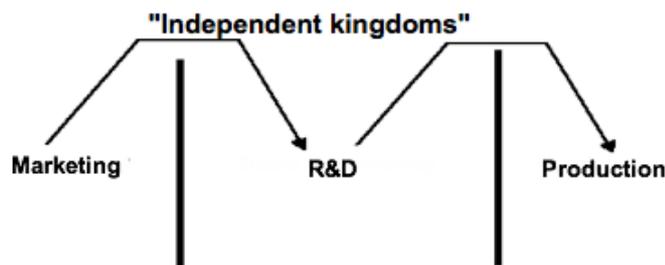
At this point Deming quotes his friend who said that " if you cannot oppose your boss, he is not worthy of you working for him." Communication by the subordinates of their different opinions is extremely important, of course, with the assumption of mutual respect.

Management by Objectives (MBO) is called by Deming the Management by Fear. Within the framework of this method, decisions are made on the basis of various indicators, usually ad hoc, without the mode understanding, as a result of which they were defined (without the so-called operational definition of a given size) and without the understanding the essence of variability of the system.

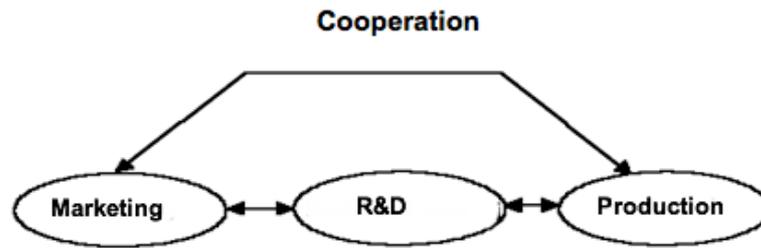
Deming contradicts the concept of the MBO with Management By Planning, in which the subject of interest is the process, the method of implementation and not the result itself. It should be remembered that the numerical objectives usually become the object of "the game" between the management and the employees for whom these objectives were determined. An employee, realising that further objectives are set at a higher level than the present ones, even if they achieve results better than the assumed ones, try to hide this fact at all cost. There is also the mentioned fact of system sub-optimisation for your own needs. Obviously, it is all happening at a loss for the entire company.

Condition 9 - Eliminate barriers between particular activities of the company

Faulty management at most companies has led to the formation of the so-called "independent kingdoms," sharing information on the basis of "flipping it over the wall."



Such an approach where individual departments compete with each other, optimising only their own subsystem should be replaced with a model based on mutual cooperation, constant exchange of information aiming at the optimisation of the entire system of the enterprise. Such techniques as e.g. Simultaneous Engineering, QFD, FMECA or even various forms of brainstorming, all conducted in interdisciplinary teams may be of assistance here.



Condition 10 - Eliminate slogans, appeals and arbitrary objectives

Deming promotes a view that while employees must be communicated the different aspects resulting from the mission and objectives of the company, it should be remembered that if they are not adequately familiar with these objectives and trained in the way of achieving them, any slogans and appeals have a counterproductive effect. Employees are well-informed about the situation of the enterprise, seeking the confirmation of different declarations in the actual activities of the management. If they see that apart from slogans the management does not contribute anything substantial to improve the system - they become distrustful, frustrated and embittered.

At this point it is necessary to remind that if the actual condition of the enterprise system indicates its stability, action from the part of the management is necessary to introduce substantial improvements. The supervisors often require from their subordinates something that is impossible to achieve in these conditions (the system is not qualitatively fit). A highly helpful tool in this respect are control cards which allow for distinguishing a stable and unstable system (process).

Condition 11 - Eliminate thoughtless standards of work and quantitative objectives for employees

It is another reference to the ruinous practices of the MBO. Determining the quantitative objectives to employees or departments of the company and basing the system of rewards and punishment on it is a practice which dates back to the so-called scientific management proposed by F. Taylor in the early twentieth century. Taylor based his theories on the assumption that employees are inherently lazy, thoughtless and hostile to the management whose role is to introduce discipline and drill as the main methods of motivation. An employee or a department which operates in a system based on numerical objectives, having achieved these objectives, strives to keep the ways of achieving them secret (sub-optimises the system). Whereas, if the objectives cannot be achieved and it is known that an adequate gratification will not be obtained, there is no point in thinking about the possibilities of improving their own processes (the losses of the company are then very big).

The environment in which quantitative targets are applied without the use of the principles of the Comprehensive Knowledge System is an environment in which the employee will not help the management for fear of continuous "raising the bar." The management should assume the role of the leader who helps, explains, trains, asks his subordinates for opinion and can admit not knowing something, and not of a controller who seeks "a gap where the hedge is whole."

Condition 12 - Create conditions so that the employees would not be ashamed of what they do

Deming cites here numerous examples (known to us all) when the company system takes the pride of the employees from the performed work. For example, an

employee whose employment is interrupted due to tools of low quality (ordered by the purchasing department because of the low price) asked by Deming sarcastically why he is worried about this situation, if he is paid for the downtime, he answered that money would not compensate for his nerves and a gradual loss of enthusiasm. At this point, Deming criticises also annual employee assessments. Usually neither the superiors nor the subordinates like to do that. Deming asks - why do we wait the whole year to realise that the employee needs help?

Condition 13 - Create conditions for versatile development of employees

This condition is about creating opportunities for willing employees not only to increase strictly professional skills (see condition 6), but also a broadly understood development of their personality, e.g. by allowing for the continuation of the scientific career, learning foreign languages, sports, music, etc. A well educated employee who has a rich personality is the best investment of a company and its most valuable asset.

Condition 14 - Create an efficient structure within the framework of the top management, which will enable the company transformation - systematic, consistent implementation of the above 13 conditions

The transformation of a company must be a process initiated and actively supported by the top management!!!

Part-financed by the European Union (European Development Fund and European Neighborhood and Partnership Instrument)
within the BSR QUICK Project

