Total Quality Management

Steps Towards Continuous Improvement

Total Quality Management

- Total Quality Management is a comprehensive ***managerial philosophy*** and a collection of ***approaches*** and ***tools*** for its implementation.
- The term Total Quality Management conveys de company-wide effort through ***full involvement*** of the entire workforce and focus on ***continuous improvement*** that companies use to achieve ***customer satisfaction***.

Goals of TQM

- Satisfy the ***requirements*** and ***needs*** of customers.
- ***Prevent*** poor quality rather than correcting problems after fact.
- Develop an attitude of ***continuous improvement*** in operations.
- Understand the value of ***measuring performance*** in identifying opportunities and maintaining improvements.
- Identify and eliminate ***chronic sources*** of inefficiencies and costs.

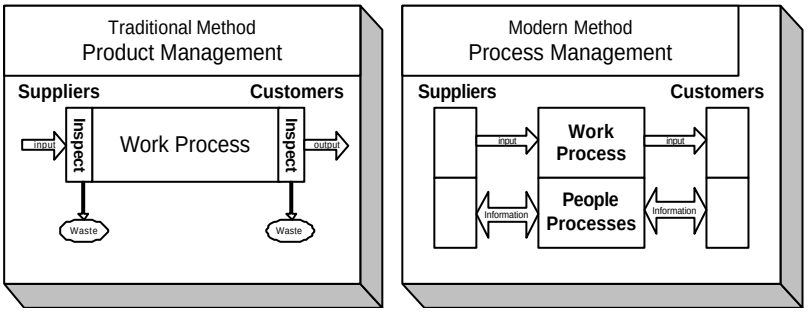
Foundations of TQM, the Principles

- ***Customer Focus***:
  - Involves collection and analysis of customer needs, and once understood and accepted these must be met.
- ***Continuous Improvement***:
  - Involves work on the process to reduce the variability of output and improve the reliability of the process.
- ***Total Involvement*** (Participation & Teamwork):
  - Begins with leadership of senior management, then employees empowerment, and includes suppliers.

Foundations of TQM, Infrastructures, Practices, and Tools

- An integrated organizational infrastructure,
- A set of management practices,
- A wide variety of tools and techniques:
  - Leadership,
  - Strategic Planning,
  - Data and Information Management,
  - Process Management,
  - Supplier Management,
  - Human Resources Management,

Towards an Integrated Production System



Quality assured through inspection:

- Inspect incoming materials,
- Inspect outgoing products,
- Quality is the responsibility of QA department,

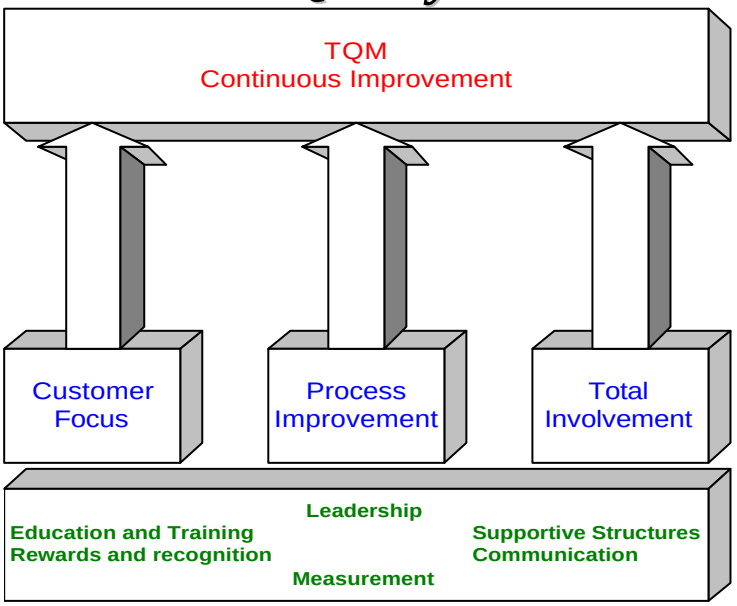
Quality designed through prevention:

- Integrated customer-supplier chain,
- Improve quality through the system,
- Quality is responsibility of everyone,

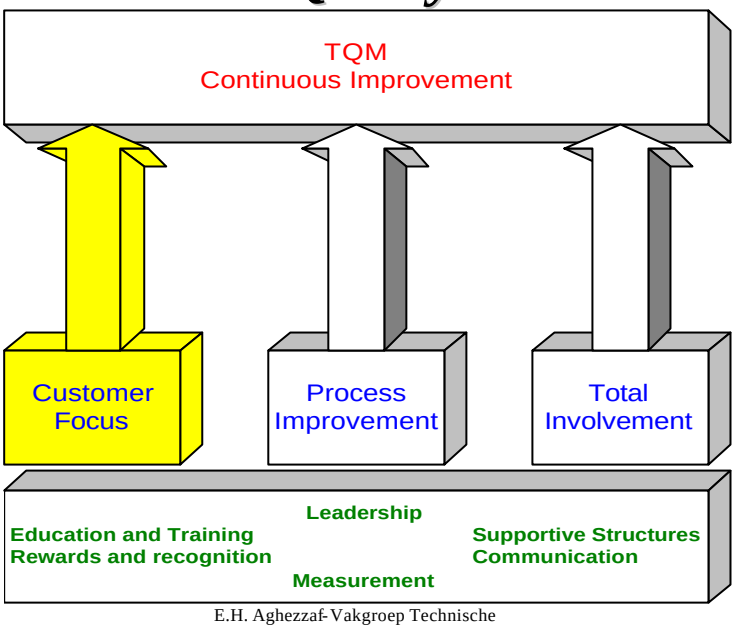
Measurement Dimensions

If this is your focus...	... then this who you need to please	... and these are key Measures
• Customer	Customers	• Customer satisfaction, • Output characteristics defined by customers,
• Shareholder	Bosses Owners Financial Analysts	• Financial indicators, – Cost, sales, and profits – Cost of quality • Goals and objectives defined by management,
• Employee	Employees	• Employee satisfaction, • Factors contributing to job satisfaction,
• Community	Government agents Social services	• Regulatory compliance, • Factors impacting on society,

The TQM System



The TQM System



Customer Focus -*Leading Practices*-

- Define, identify, and segment key customer groups and markets,
- Understand customer needs and expectations (the voice of the customer),
- Understand linkages between the voice of the customer and design, production, and delivery,
- Build relationships through commitments, provide accessibility and information, set service standards, and follow-up on transactions,
- Develop and implement effective complaint management processes,
- Measure customer satisfaction for improvement,

Identifying Customers

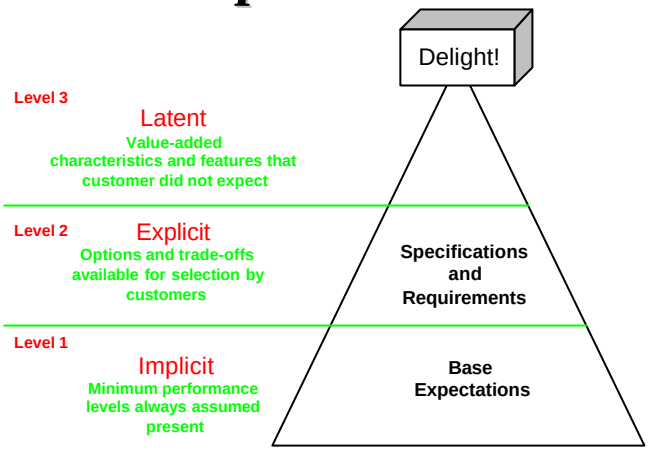
Key customer groups:

- Organization level:
  - Consumers,
  - External customers,
  - Employees,
  - Society
- Process level:
  - Internal customer units or groups,
- Performer level:
  - Individual internal customers,

Understanding Customer Expectations

- Guidelines:
  - What are the product and service characteristics do customers want?
  - What level of performance is required to satisfy customers expectations?
  - What is the relative importance of these characteristics?
  - How satisfied are customers with performance at the current level?

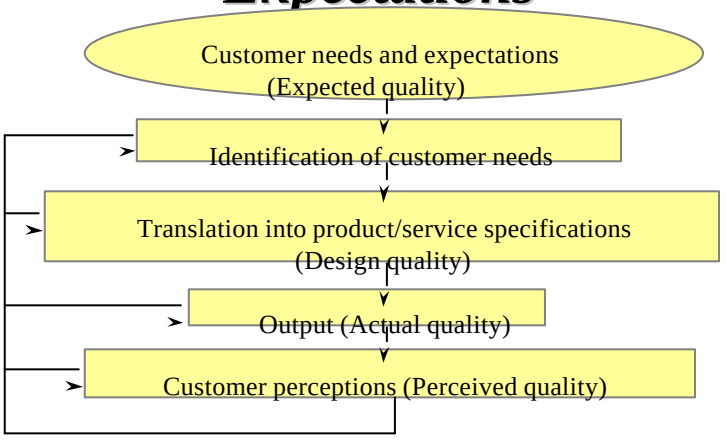
Understanding Customer Expectations



Implicit, Explicit, and Latent Customer Requirements

Ref- TQM, A.R.Tenner & I.J.DeToro

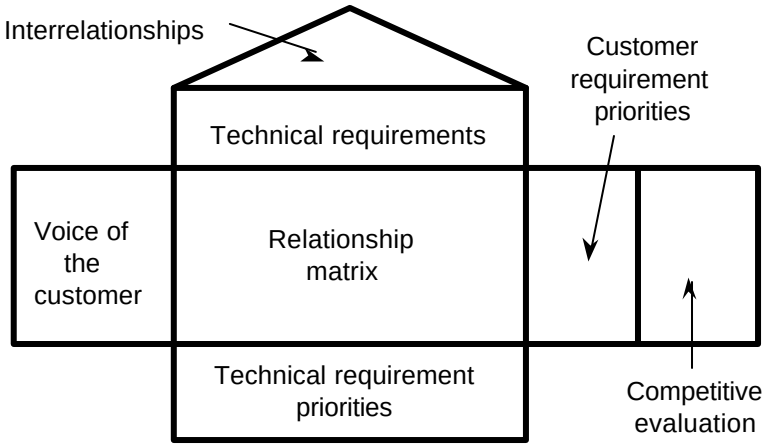
Understanding Customer Expectations



measurement and feedback

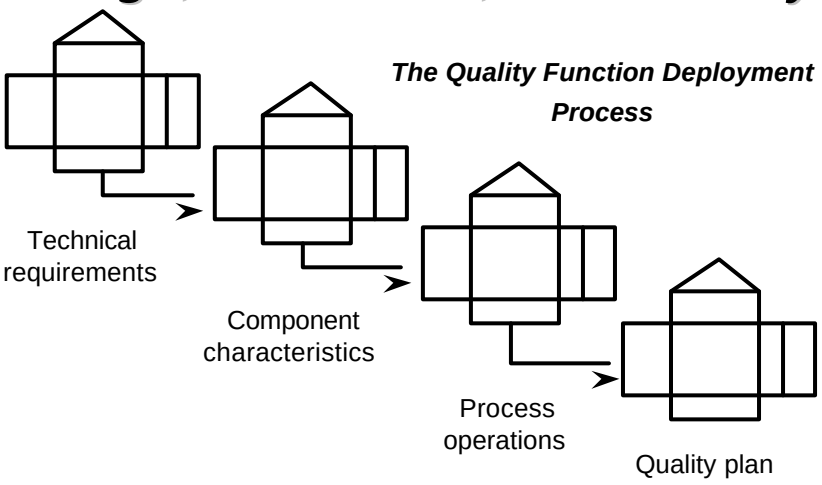
PERCEIVED QUALITY = ACTUAL - EXPECTED

Linking Voice of Customer to Design, Production, and Delivery



Quality Function Deployment HOQ

Linking Voice of Customer to Design, Production, and Delivery



The Quality Function Deployment Process

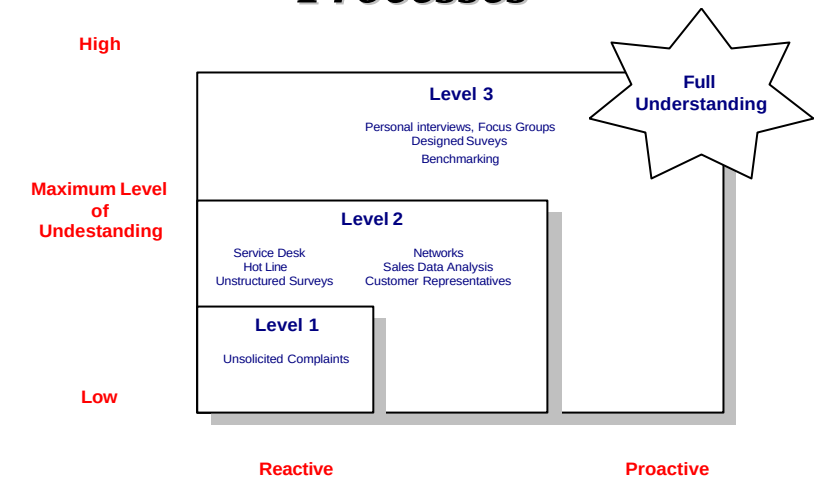
Build Customer Relationships: Gathering Information

- Comment cards and formal surveys: These approaches concentrate on measuring customer satisfaction.
- Focus groups: A panel of individuals who answer questions about a company's products and services.
- Direct customer contacts: Hearing complaints directly by top-executives is an eye-opening experience.
- Field intelligence: Conversing with customers and observing their behavior helps in gaining useful information.
- Study complaints: Helps in understanding de gaps between expectations and performance

Customer Relationships Management

- Accessibility and commitments,
- Selecting and developing customer contact employees through empowerment and training,
- Customer focused service based on relevant customer contact requirements,
- Effective complaint management,
- Strategic partnerships and alliances,

Effective Complaint Management Processes



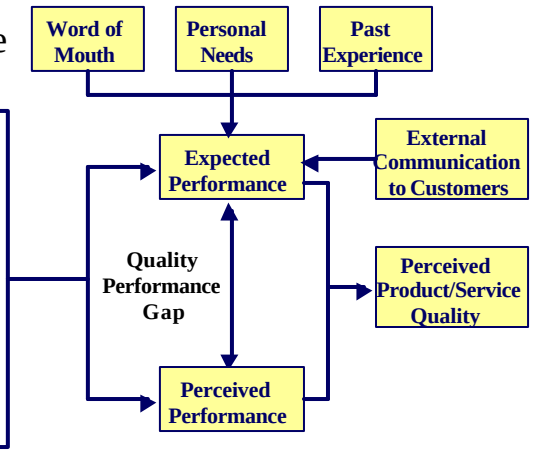
Ref- TQM, A.R. Tenner & I.J.DeToro

Measuring Customer Satisfaction

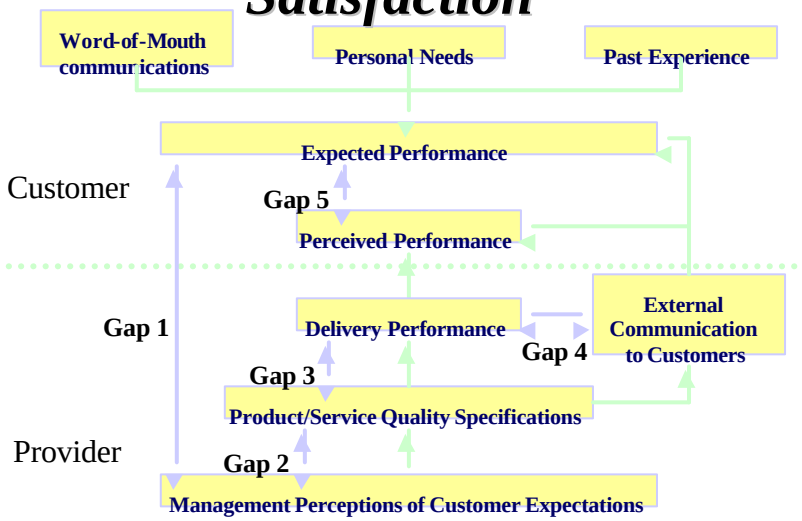
- Discover customer perceptions of company's performance through identification of appropriate quality dimensions and measurement schemes,
- Compare company's performance relative to leading competitors,
- Measure potential and former customers and identify areas for improvement,
- Track trends to determine if changes result in improvements,

Measuring Customer Satisfaction

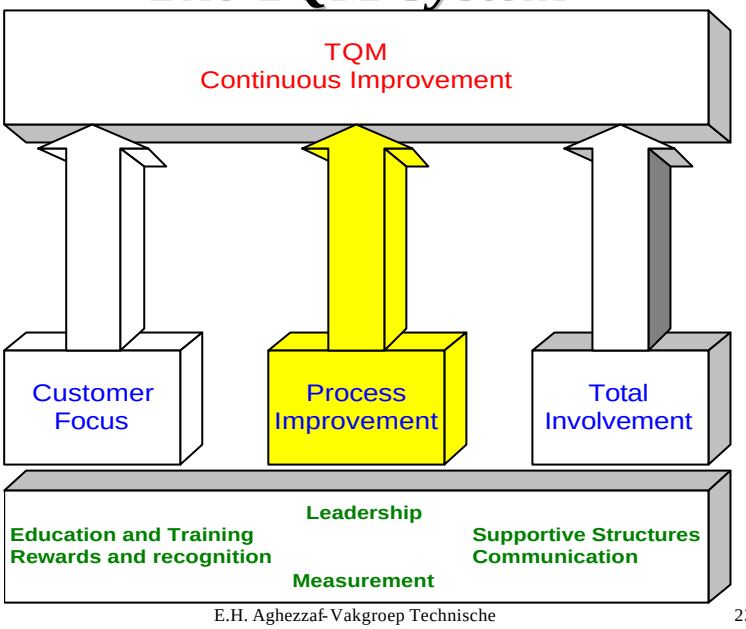
- Product and service quality dimensions
  - Access
  - Communication
  - Competence
  - Courtesy
  - Credibility
  - Reliability
  - Responsiveness



Measuring Customer Satisfaction



The TQM System



Scope of Process Management

- Process Management: involves planning and administering the activities – design, control, and improvement – necessary to achieve a high level of performance,
- There are four types of key processes:
  - Design processes,
  - Production/delivery processes,
  - Support processes,
  - Supplier processes,

Process Management -Leading Practices-

- Translate customer requirements and internal capabilities into product and service design requirements early in the process,
- Ensure that quality is built into products and services and use appropriate tools during development,
- Manage product development process to enhance communication, reduce time, and ensure quality,
- Define, document, and manage important production/delivery and support processes,

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Process Management -Leading Practices-

- Define performance requirements for suppliers and ensure that they are met,
- Control the quality and operational performance of key processes and use systematic methods to identify variations, determine root causes, and make corrections,
- Continuously improve processes to achieve better quality, cycle time, and overall operational performance,
- Innovate to achieve breakthrough performance using benchmarking and reengineering,

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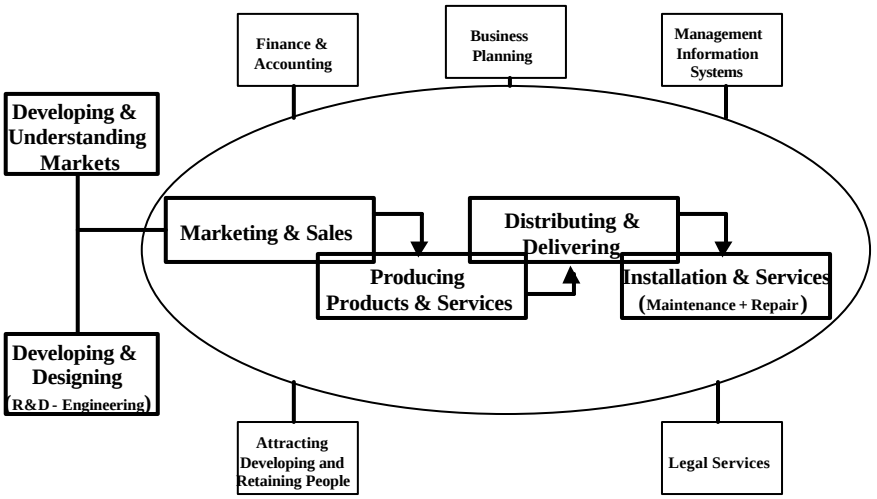
Process Improvement Steps

- **Defining key processes**: Identify the processes that have the greatest impact on customer-driven performance standards.
- **Planning:** Establish a structured and disciplined approach to define and document the major components in the process and to understand their interrelationships.
- **Control:** Assure effectiveness so that the output is predictable and consistent with the customers' expectations.

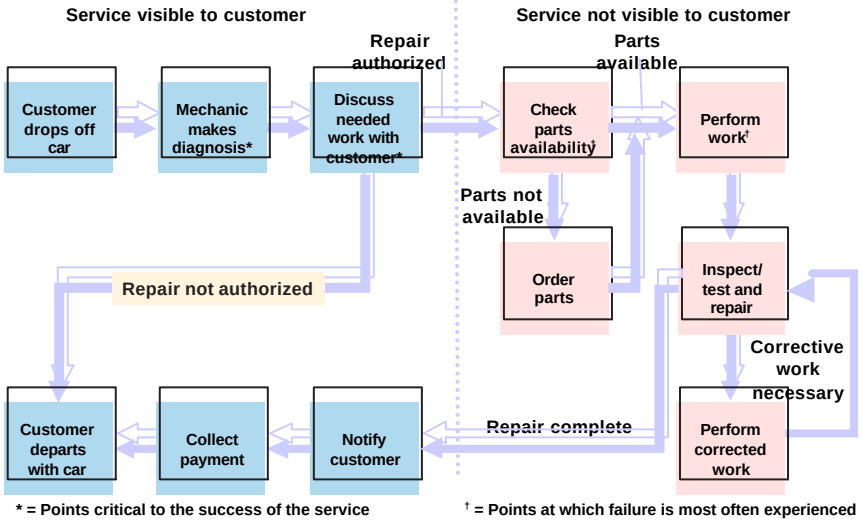
Process Improvement Steps

- **Measurement:** Map performance attributes to customers' requirements and establish criteria for accuracy, precision, and frequency of data acquisition.
- **Improvement:** Increase effectiveness of the process by permanently embedding identified improvements.
- **Optimization:** Increase efficiency and productivity of the key processes by optimizing the resources.

Identifying Key Processes



Planning and Documenting a Process -Flow Diagrams-



Planning and Documenting a Process -Process Charts-

Process: *Emergency room admission*
Subject: *Ankle injury patient*
Beginning: *Enter emergency room*
Ending: *Leave hospital*

Insert Step
Append Step
Remove Step

Summary

Activity	Number of steps	Time (min)	Distance (ft)
Operation	5	23	—
Transport	9	11	815
Inspect	2	8	—
Delay	3	8	—
Store	—	—	—

Step no.	Time (min)	Distance (ft)	○	⇨	□	D	▽	Step description
1	0.50	15		X				Enter emergency room, approach patient window,
2	10.0	-	X					Sit down and fill out patient history,
3	0.75	40		X				Nurse escorts patient to ER triage room,
4	3.00	-			X			Nurse inspects injury,
5	0.75	40		X				Return to waiting room,
6	1.00	-				X		Wait for available bed,
7	1.00	60		X				Go to ER bed,
8	4.00	-				X		Wait for doctor,
9	5.00	-			X			Doctor inspects injury and questions patient,
10	2.00	200		X				Nurse takes patient to radiology,
11	3.00	-	X					Technician x-rays patient,
12	2.00	200		X				Return to bed in ER,
13	3.00	-				X		Wait for doctor to return,
14	2.00	-	X					Doctor provides diagnosis and advice,
15	1.00	60		X				Return to emergency entrance area,
16	4.00	-	X					Check out,
17	2.00	180		X				Walk to pharmacy,
18	4.00	-	X					Pick up prescription,
19	1.00	20		X				Leave the building,

Evaluating a Process -Diagnosis-

- Are steps arranged in a logical sequence?
- Do all steps add value? Can some be eliminated or added? Can some be combined? Should some be reordered?
- Are capacities in balance? What skills, equipment, and tools are required at each step?
- At which points might errors occur and how can they be corrected?
- At which points should quality be measured?
- What procedures should employees follow where customer interaction occurs?

Controlling a Process

- Process control consists in continually evaluating performance and taking corrective action when necessary,
- Components of control systems:
  - Standards and goals,
  - Means of measuring accomplishments,
  - Comparison of the results with the standard as a basis for corrective action,
- A well-controlled system is predictable,

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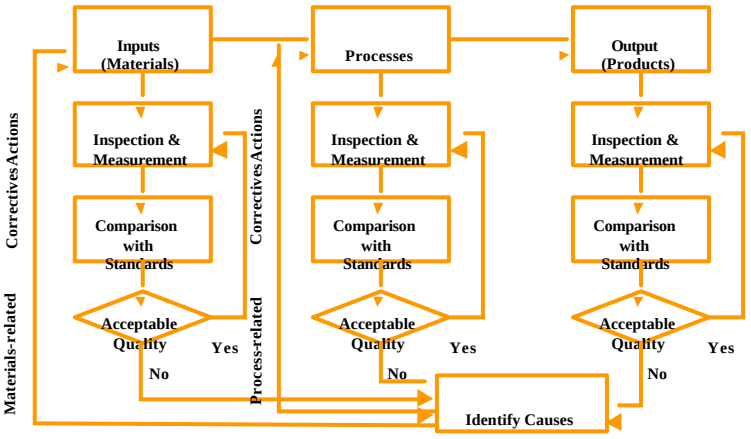
Generic Quality Control System



- What was supposed to happen? What actually happened?
- Why is there a difference? What can we learn?

Process Improvement

- Productivity improvement,
- Work simplification,
- Planned methods change,

Traditional Industrial Engineering

- Kaizen,
- Stretch goals,
- Benchmarking,
- Reengineering,

New approaches from the total quality movement

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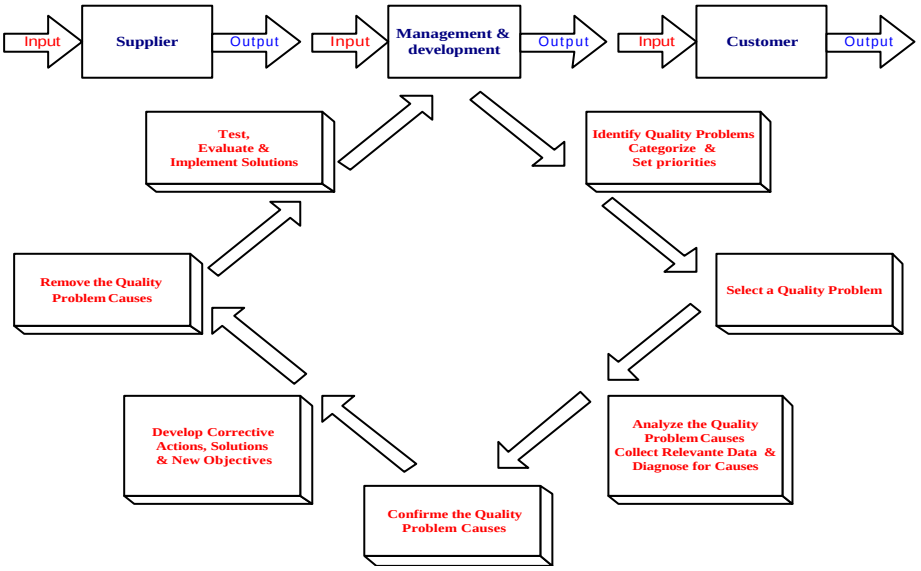
Process Improvement



E.H. Aghezzaf- Vakgroep Technische Bedrijfsvoering (TW18V)

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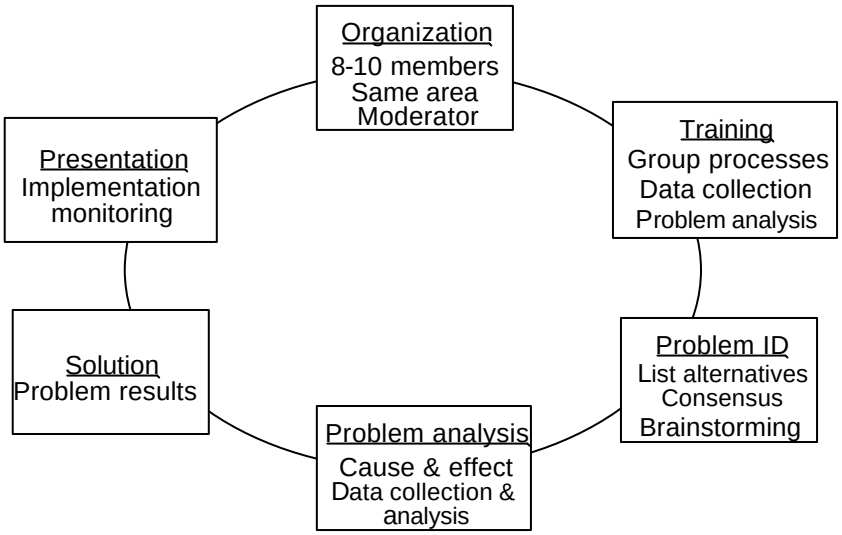
The Quality Circle Process

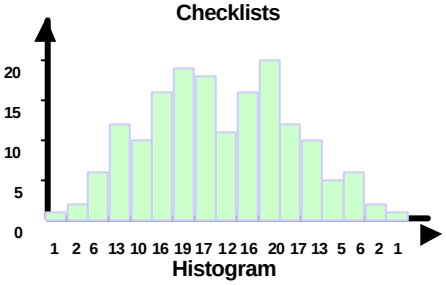


Tools for Process Improvement

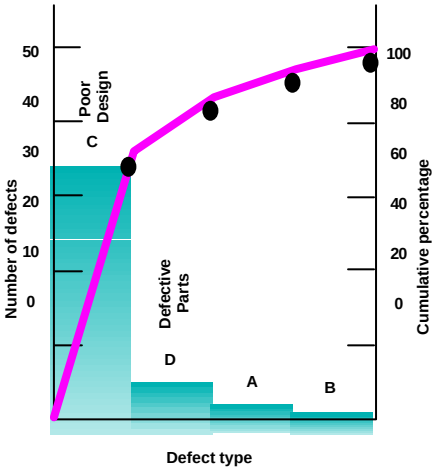
Headliner Defects

Defect type	Tally	Total
A. Tears in fabric	////	4
B. Discolored fabric	///	3
C. Broken fiber board	//// //// //// //// //// //// //// /	36
D. Ragged edges	//// //	7
Total		50

Checklists

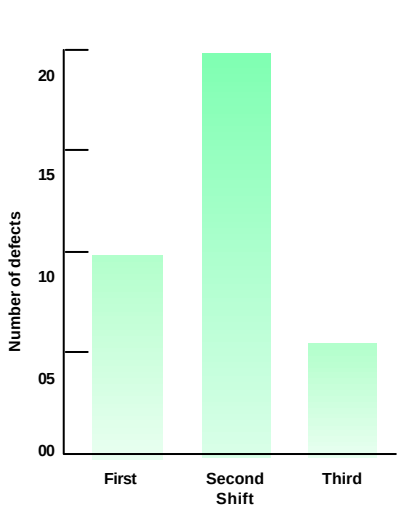


Histogram

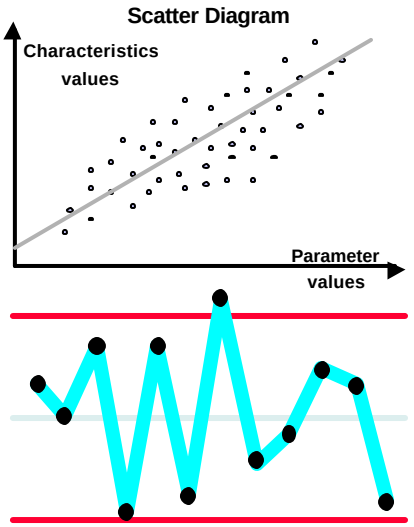


Pareto Chart

Tools for Process Improvement

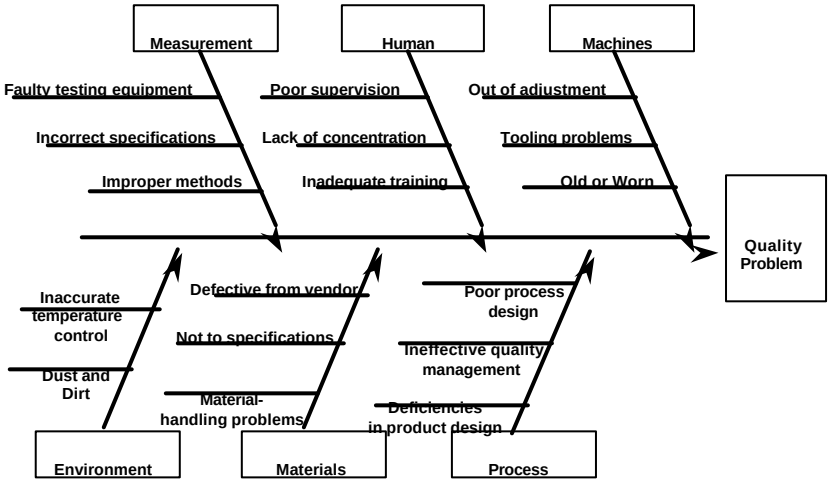


Bar Chart



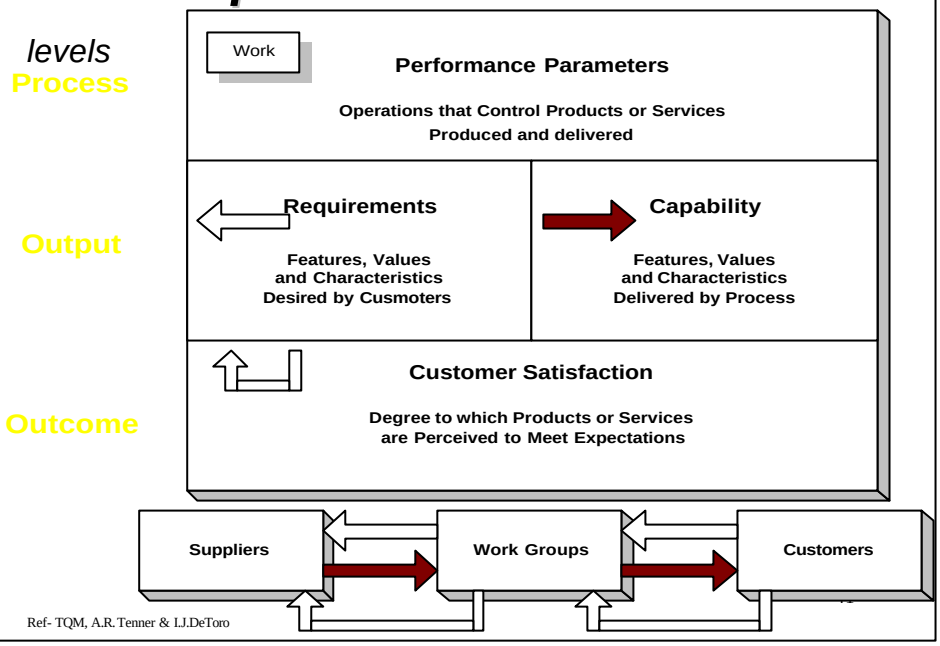
Control Charts

Tools for Improving Quality



Cause-and-Effect Analysis

Performance Measurement



Ref- TQM, A.R. Tenner & I.J.DeToro

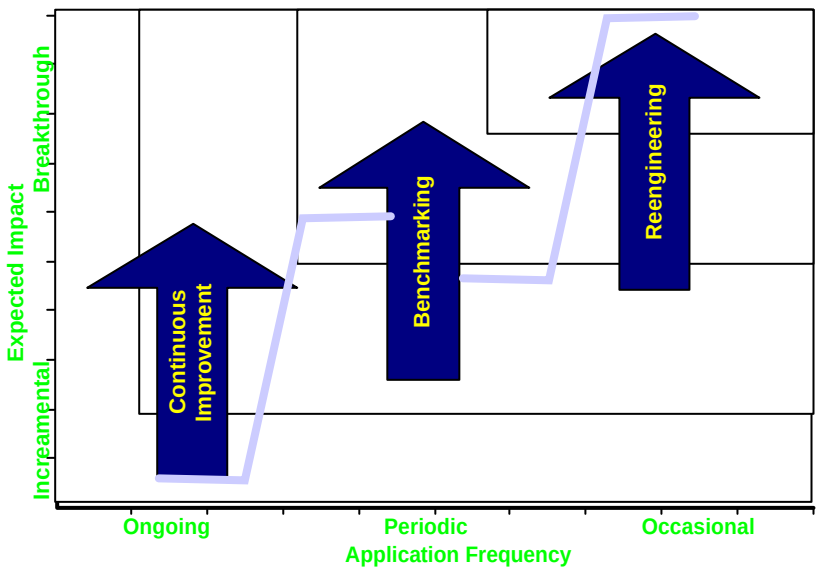
Process Measurement

~~*Efficiency Measures*~~	~~*Effectiveness Measures*~~	~~*Flexibility Measures*~~
Process Cycle Time,	**Product Appearance, Performance,**	**Degree of empowerment,**
Resources used per unit of output,	**Reliability, Timeliness,**	**Percentage of events in which customers expectations are exceeded,**
Value Added cost per unit of output,	**Usability, Serviceability,**	**Degree of difficulty to respond to special requests,**
Ratio of value added to non-value added time,	**Durability, Cost,**	**Degree of authority people have to continuously improve the process,**
Cost of poor quality,	**Responsiveness, Dependability,**	**Amount of time it takes to adjust the process to handle new requirements,**
Wait and delay time per unit of output,	**Accuracy, Adaptability,**	**Number of pre-planned process scenarios,**

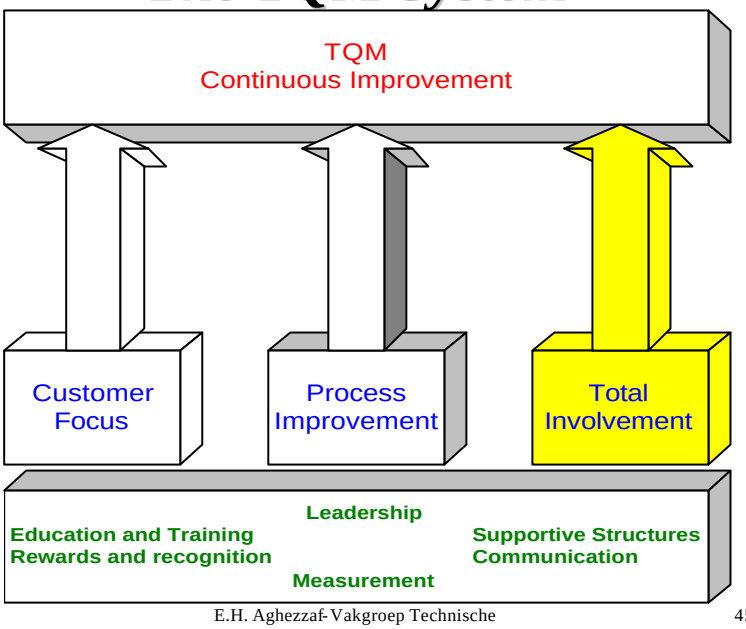
Breakthrough Improvement

- Occasional change resulting from innovative and creative thinking,
- Benchmarking: The search of industry best practices that lead to superior performance,
  - Competitive benchmarking,
  - Process benchmarking,
  - Strategic benchmarking,
- Reengineering: Radical redesign of processes,

Breakthrough Improvement



The TQM System



Total Involvement

- Human Resources,
  - Leadership,
  - Empowerment,
  - Employee Involvement,
  - Teamwork and work systems,
- Suppliers Quality,

Leadership

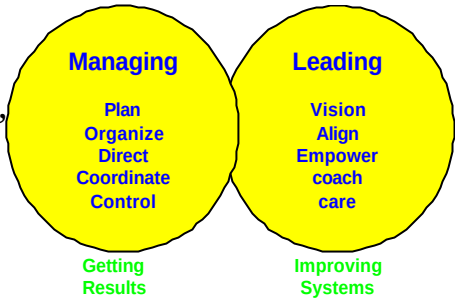
- The ability to ***positively*** influence people and systems to have a meaningful impact and achieve results,
- Leadership System:
  - Refers to how decisions are made, communicated, and carried out at all levels; mechanisms for leadership development, self-examination, and improvement,
  - Effectiveness of leadership system depends in part on its organizational structure,

Leadership – Leading Practices –

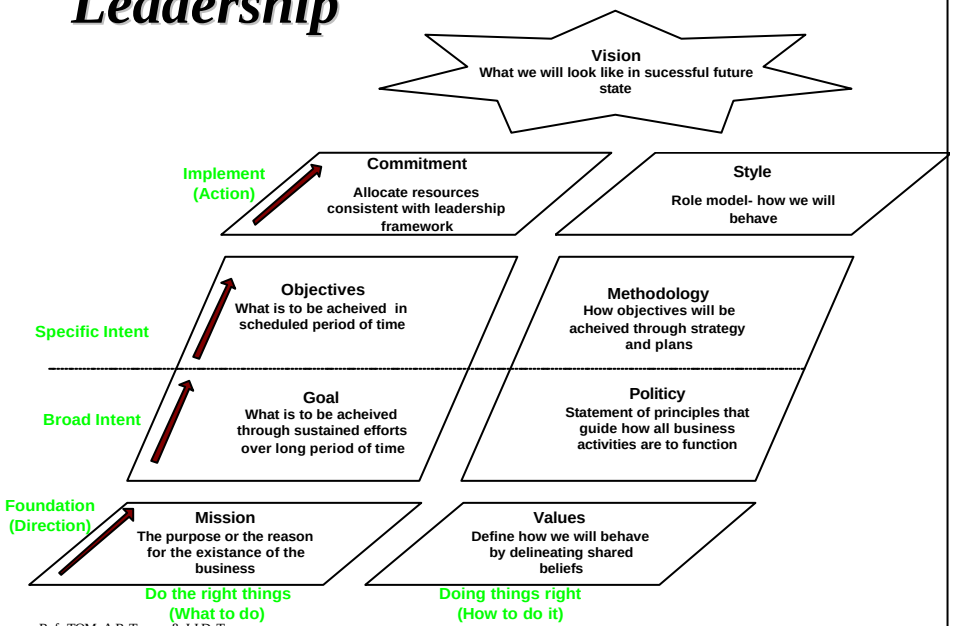
- Create a customer-focused strategic vision and clear quality values,
- Create and sustain leadership system and environment for empowerment, innovation, and organizational learning,
- Set high expectations and demonstrate personal commitment and involvement in quality,
- Integrate quality values into daily leadership and management and communicate extensively,
- Integrate public responsibilities and community support into business practices,

Leadership Theories

- Trait approach,
- Behavioral approach,
- Contingency approach,
- Role approach,
- Emerging theories:
  - Attributional theory,
  - Transactional theory,
  - Transformational leadership theory,
  - Substitutes for leadership theory,
  - Emotional intelligence theory,



Leadership



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Human Resource Paradigms – Empowerment –

- ***Old Thinking:***
  - People are part of the process,
  - Process requires external control,
  - Managers have to control what people do,
- ***New Thinking:***
  - People design and improve processes,
  - Workers who run the process control it,
  - Managers must obtain commitment of workers,

Empowerment

– Leading Practices –

- Promote cooperation and collaboration through teamwork,
- Empower individuals and teams to make decisions that affect quality and customer satisfaction,
- Make extensive investments in training and education,
- Maintain a work environment conducive to the well-being and growth of all employees,
- Monitor extent and effectiveness of HR practices and measure employee satisfaction,

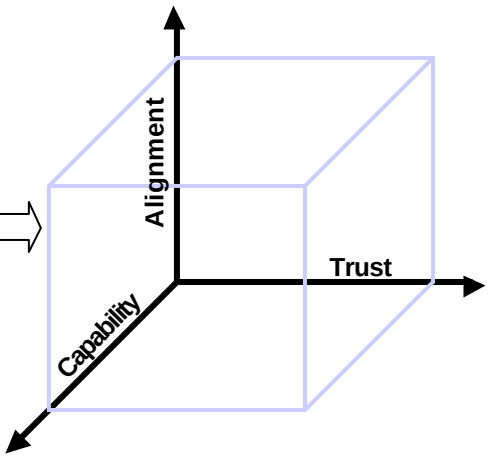
Empowerment

Empowerment in three Dimensions

- Capability
- Alignment
- Trust

Build Capability

Individuals	*System*
- Ability	- Materials
- Skills	- Methods
- Knowledge	- Machines

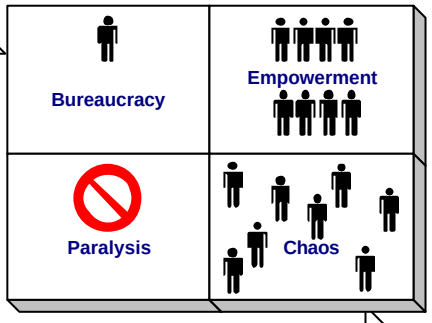


Empowerment

Build Alignment

1. Teach your mission, vision, values, and objectives,
2. Build everyone's commitment to them,

Alignment



Trust

Without alignment and trust the organization will suffer with paralisis, bureaucracy, or chaos.

Build Mutual Trust

Employees feel that:

1. They can trust their managers,
2. Thier managers trust them,

Measuring Employee Satisfaction and Effectiveness

- Satisfaction,
  - Quality of work-life, training, teamwork, leadership, communications, compensation, benefits, internal suppliers and customers,
- Effectiveness,
  - Team and individual behavior, cost, quality, and productivity improvements, employee turnover; suggestions, training effectiveness,

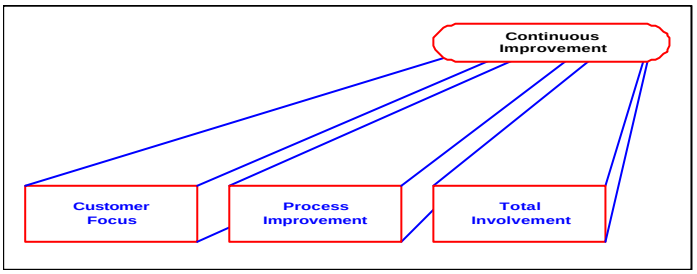
Supplier and Partnering Processes

- Recognize the strategic importance of suppliers,
- Develop win-win relationships through strong partnerships,
- Establish trust through openness and honesty,
- Reduce number of suppliers and integrate the important once and eliminate the others,

Suppliers Quality

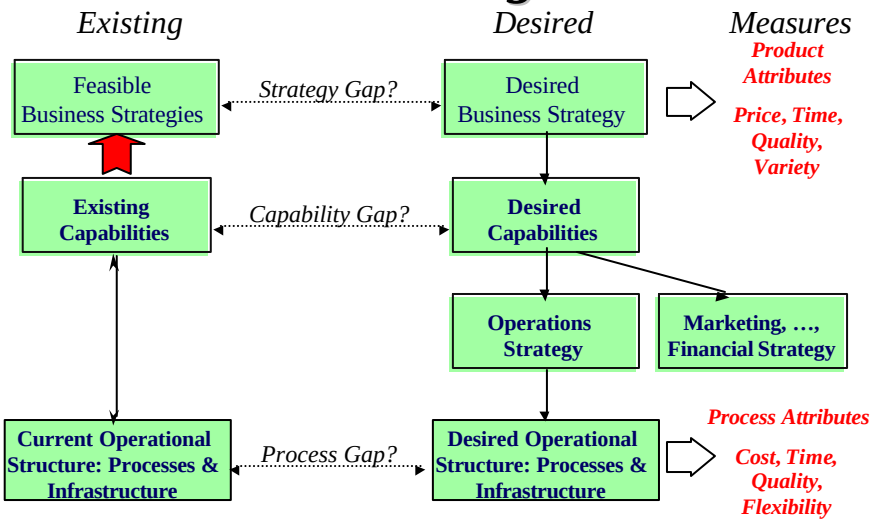
- "Certified supplier" – one that, after extensive investigation, is found to supply material of such quality that routine testing on each lot received is unnecessary,
- Benefits of Effective Supplier Process Management:
  - Reduced costs and faster time to market,
  - Increased access to technology,
  - Reduced supplier risk and improved quality,

Strategies for quality

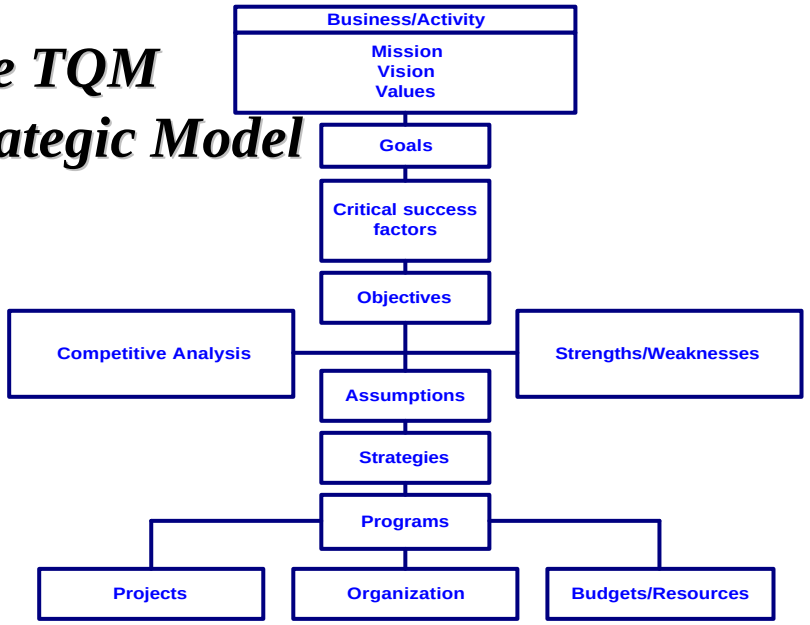


Strategies and Plans

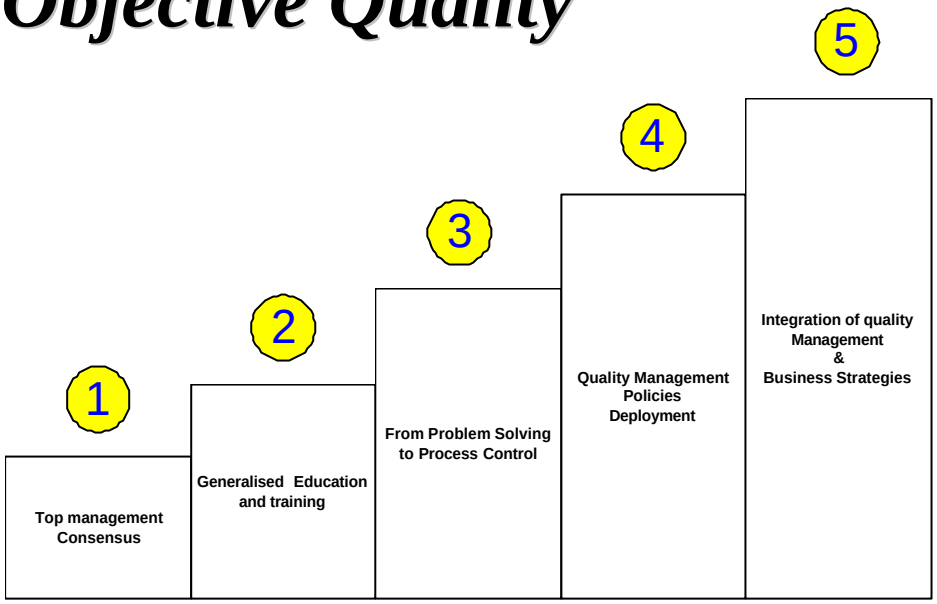
Linking the Strategic Planning To Process Management



The TQM Strategic Model



Objective Quality



Strategic Planning

Guidelines

Strategic Management

- The Strategic Management is a long-term, future oriented process of assessment, goal setting, and decision-making that maps an explicit path between the present and a vision of the future.
- This process relies on careful consideration of an organization's capabilities and the environment.
- This process leads also to priority-based resource allocation for achieving the organization's mission.

Strategic Management

Vision

- A vision is an inspiring picture of a preferred future, not bound by time. It represents global and continuing purposes. It serves as a foundation for strategic planning.
- A vision would depict an ideal future for the organization and the contributions that it can make to that end.

Strategic Management

Goals

- The general ends toward which the organization directs its efforts.
- They address the primary issues facing the organization within broad grouping of interrelated concerns.
- They are founded on the vision and may involve coordination among several department with similar functions.

Strategic Management

Mission

- The reason for an organization's existence. it succinctly identifies what the organization does, why, and for whom it does it.
- A mission reminds everyone in the organization, and also outside, of the unique purposes promoted and served by the organization.

Strategic Management

Objectives

- Objectives are clear targets for specific action.
- They are more detailed than goals, they have shorter time frames, and may state a quantity.
- They are achievable, measurable, and they set the direction for strategies.
- A single goal may be subdivided into multiple objectives.

Strategic Management

Strategy

- Strategies are the methods to achieve goals and objectives.
- The means of transforming inputs into outputs, and ultimately outcomes, with the best use of resources.

Performance Measures

Indicators of the work performed and the results achieved. Can divided into:

- Output measures
- Outcomes measures
- Input measures
- Efficiency measures

Output Measures

- Outputs are the goods and services produced by an organization.
- Output measures are the tools, or indicators, to count the services and goods produced by an organization.
- The number of people receiving a service, or unit produced, or the number of services and customer delivered are often used as measures of output.

Development Guides

- Is the output reliably measurable?
- Is the output measure directly related to the organization's strategies?
- Does the output measure show the quantity of work performed?
- Can the measure be stated in unit cost terms?
- Is the output measure clear?

Outcome Measures

- Outcomes are the quantified results, or impacts, of organization action.
- Outcome measures are tools, or indicators, to assess the actual impact of an organization’s action.
- A means for quantified comparison between the actual results and the intended result.

Development Guides

- Is the outcome measure directly related to the organization's goals.
- Is the outcome reliably measurable?
- Does the outcome measure show what change (difference) the organization's action will have on the target group or problem?
- Can the organization gather data for the outcome measure without incurring excessive costs or undertaking cumbersome procedures?
- Is the outcome measure clear?

Output versus Outcome Measures

- Percentage of high school graduates (output measure) is not the same as the percentage of students with a certain level of mastery of subjects (outcome measure).
- The number of patients treated and discharged from a state mental hospital (output measure) is not the same as the number of discharged patients who are capable of living independently (outcome measure).

Input Measures

- The resources that an organization uses to produce products and services, including human, financial, facility, or material resources.
  - Number of €'s expended
  - Kilograms of material used
- Also includes measures of the scope of an organization's operations:
  - Number of clients eligible for services
  - Number of entities subject to inspection/regulation
  - Number of applications or order received

Efficiency Measures

- Indicators that measure the cost, unit cost or productivity associated with a given outcome or output.
  - Average cost per client served
  - Average cost per inspection
  - Average time to process an order