

Total Quality Management

Methods Event Chain Methodology

Critical Path Method

Six Sigma

SCRUM

SPIRAL

Waterfall

• **PRINCE 2**

AGILE

LEAN

Rational Unified Process

Mc Gregor Theory x Theory Y

- Douglas Mc Gregor 1960
- The manager's assumptions and employee motivation
- Your management style is strongly influenced by your beliefs and assumptions about what motivates members of your team: If you believe that team members dislike work, you will tend towards an authoritarian style of management; On the other hand, if you assume that employees take pride in doing a good job, you will tend to adopt a more participative style.

Theory X

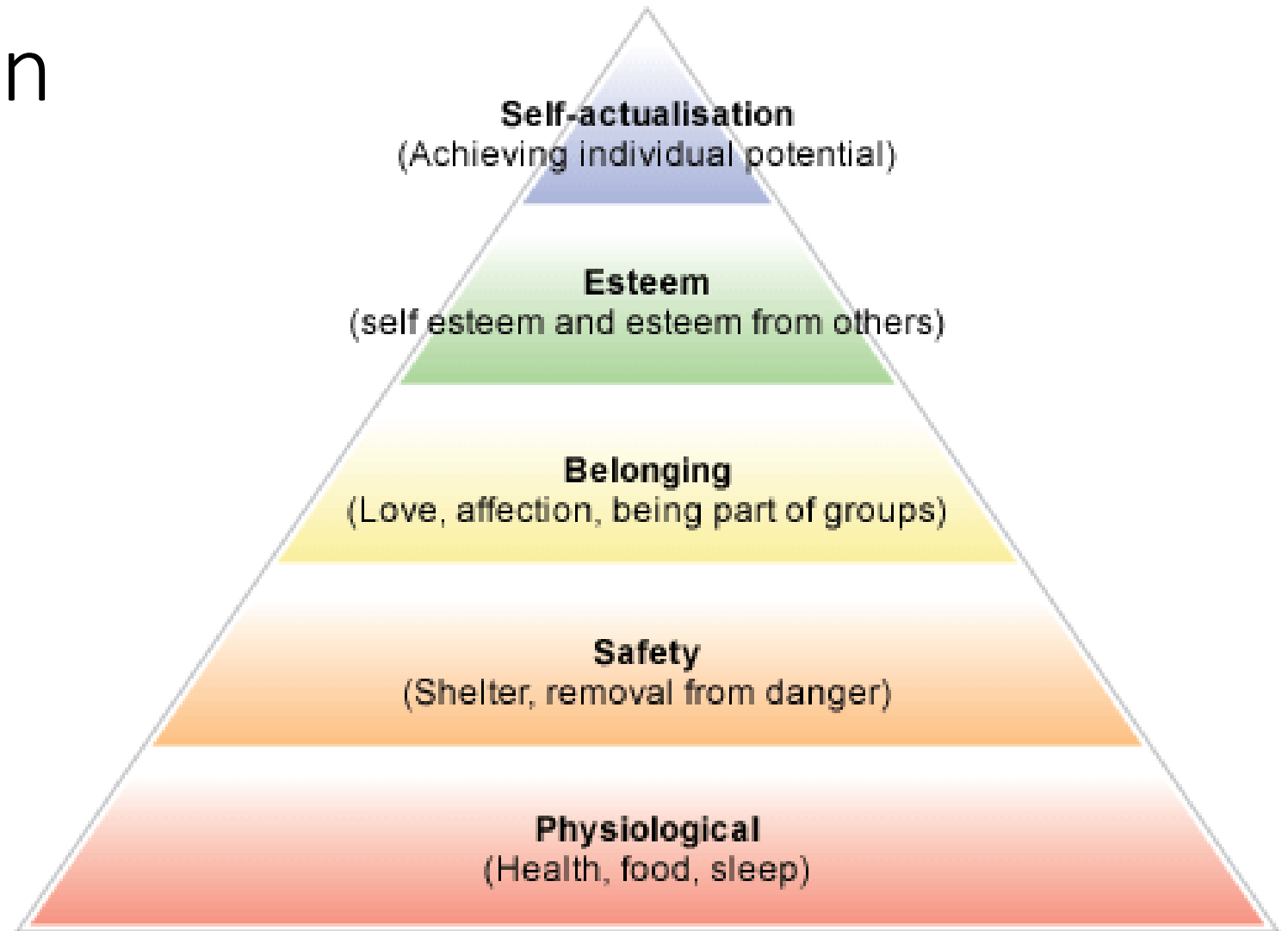
- This assumes that employees are naturally unmotivated and dislike working, and this encourages an authoritarian style of management. According to this view, management must actively intervene to get things done. This style of management assumes that workers:
 - Dislike working.
 - Avoid responsibility and need to be directed.
 - Have to be controlled, forced, and threatened to deliver what's needed.
 - Need to be supervised at every step, with controls put in place.
 - Need to be enticed to produce results; otherwise they have no ambition or incentive to work.
- X-Type organizations tend to be top heavy, with managers and supervisors required at every step to control workers. There is little delegation of authority and control remains firmly centralized. McGregor recognized that X-Type workers are in fact usually the minority, and yet in mass organizations, such as large scale production environment, X Theory management may be required and can be unavoidable.

Theory Y

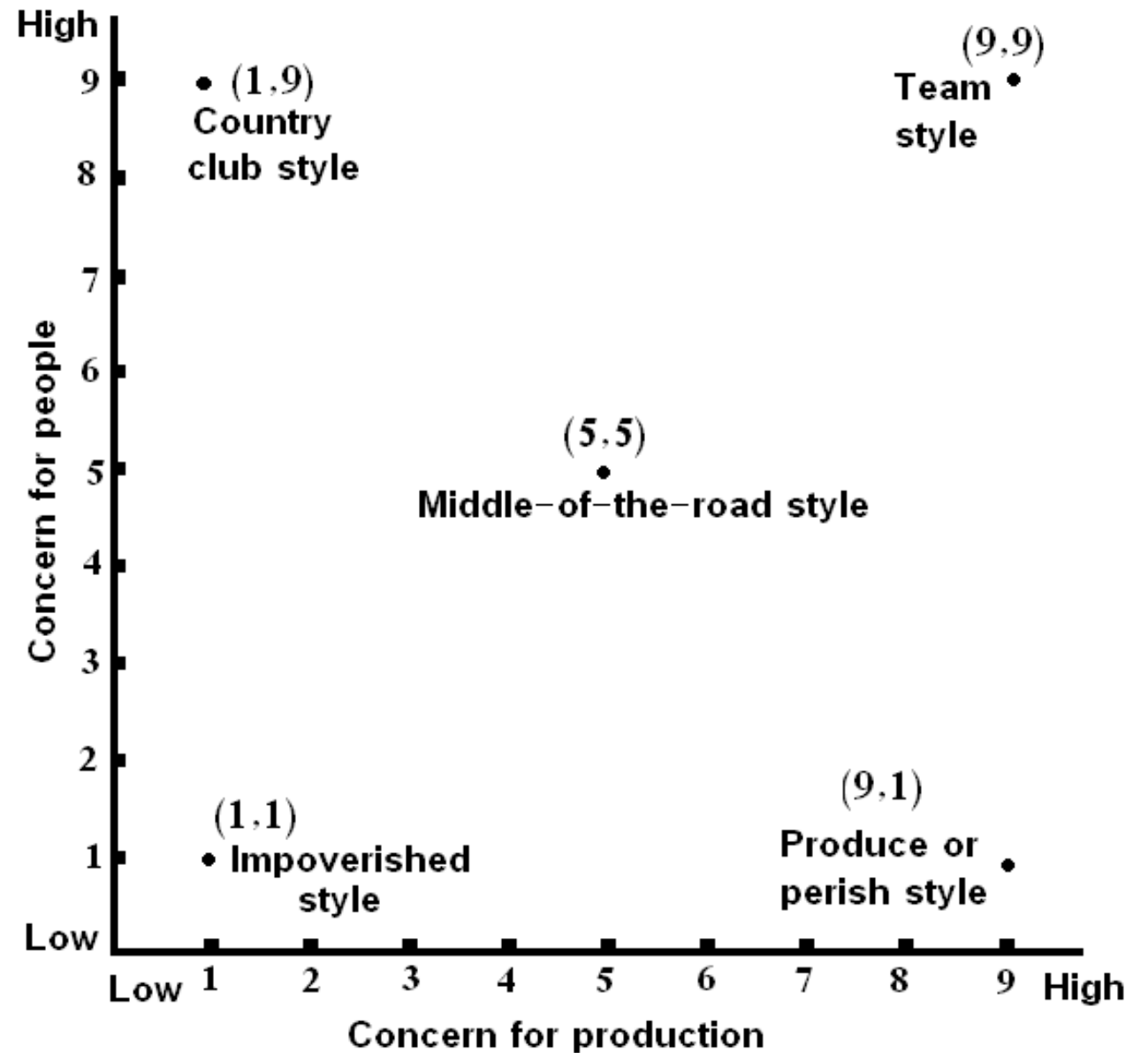
- This expounds a participative style of management that is decentralized. It assumes that employees are happy to work, are self-motivated and creative, and enjoy working with greater responsibility. It assumes that workers:
 - Take responsibility and are motivated to fulfill the goals they are given.
 - Seek and accept responsibility and do not need much direction.
 - Consider work as a natural part of life and solve work problems imaginatively.

Maslow - motivation

Maslow's Hierarchy of needs (or pyramid of needs)



Managerial Grid Model



Managerial Grid Model

Element	Description
<i>Initiative</i>	Taking action, driving and supporting
<i>Inquiry</i>	Questioning, researching and verifying understanding
<i>Advocacy</i>	Expressing convictions and championing ideas
<i>Decision making</i>	Evaluating resources, choices and consequences
<i>Conflict resolution</i>	Confronting and resolving disagreements
<i>Resilience</i>	Dealing with problems, setbacks and failures
<i>Critique</i>	Delivering objective, candid feedback

Key Figures in Management Theory

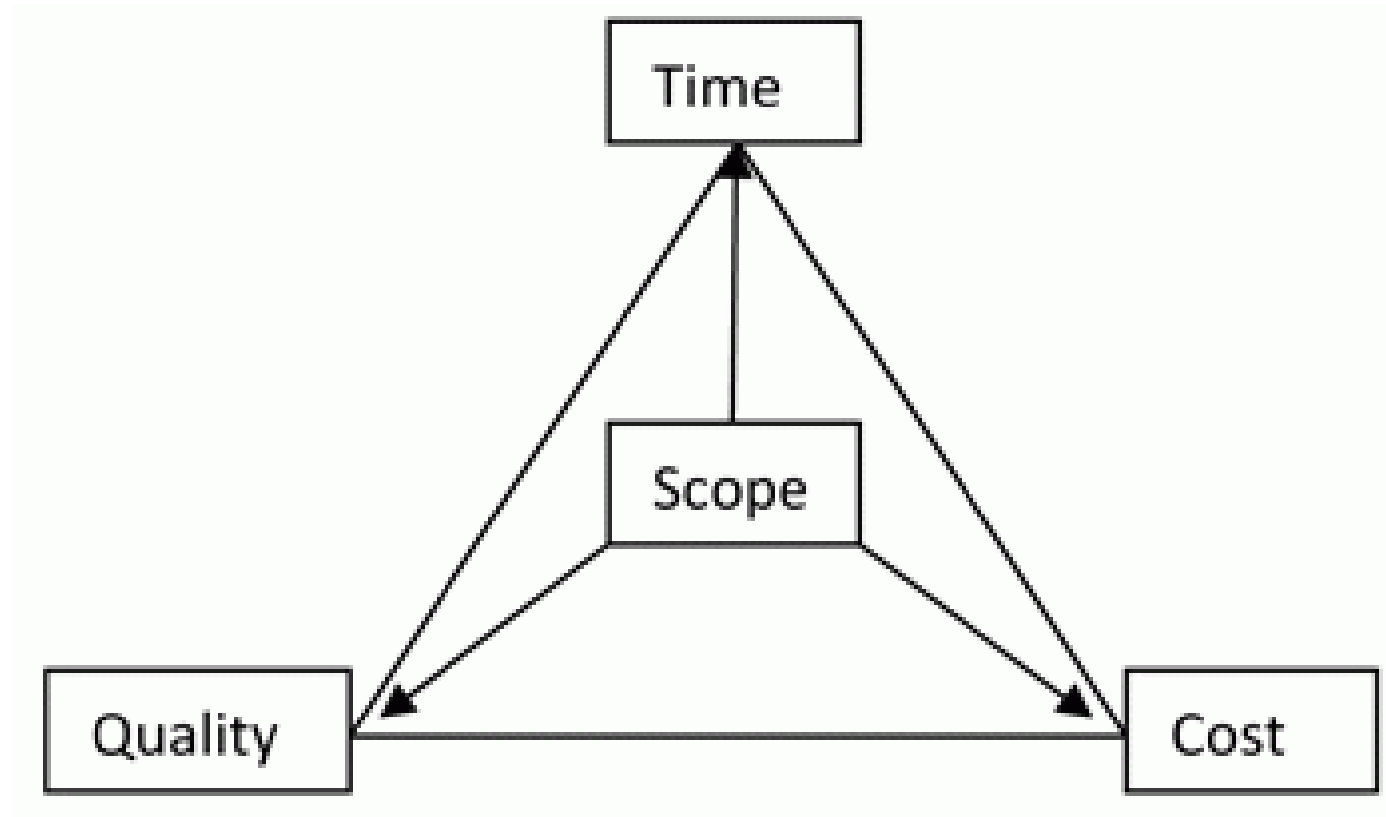
- F.W.Taylor (1856-1915) Time and Motion/ industrialist and contemporaries, Frank and Lilian Gilbreth- Therbligs – science of manual tasks
- Henri Gantt – another contemporary of Taylor who devised piece rate and Gantt charts
- Henri Fayol (1841-1925)– principles of management/ mining engineer and his disciple Lyndall.F. Urwick – 10 principles published 1952
- Weber 1864-1920 – social scientist – theory of organisations
- Mintzberg 1979 The Structuring of Organisations

History

- 1810 – First mechanised production line set up for Royal Navy by Maudslay and Brunel (father of Isambard)
- 1896 Pareto publishes law of economic distribution
- 1898 Taylor does time studies on shovelling iron
- 1904 Cadillac uses interchangeable parts on cars
- 1909 Frank and Lillian Gilbreth do time and motion study on bricklaying
- 1913 Ford establishes Highland Park plant as moving assembly line
- 1922 Gantt produces the Gantt chart
- 1925 Stuart Chase 'The tragedy of Waste'
- 1943 Flow production of bombers at Boeing
- 1948 Deming sent to Japan – lectures on waste as a quality issue
- 1949 Juran goes to Japan – quality control, SPC
- 1961 Quality Circles
- 1978 Just in Time appears in US magazines
- 1981 Motorola uses Six Sigma methodology
- 1984 Goldratt 'The Goal'
- 1986 Kaizen
- 1989 Kanban just in time at Toyota
- 1989 Benchmarking
- 1990 Re-engineering
- 1996 Lean thinking
- 2008 Schonberger Best Practices in Lean Six Sigma Process Improvement

The Time-Quality-Cost Triangle

(The Iron Triangle)



Why is TQM important?

- TQM involves the application of quality techniques to the whole enterprise.
- Tendency for project managers to focus on schedule, budget then quality

Five Principles

- Produce Quality work the first time
- Focus on the customer
- Continuous improvement
- Strategic approach to improvement – involving suppliers, processes tested
- Encourage mutual respect and teamwork

Tools

- Kaizen – Continuous Improvement
- Eliminating Junk Activities
- Quality Circles
- Bottlenecks
- Just in Time
- CPA

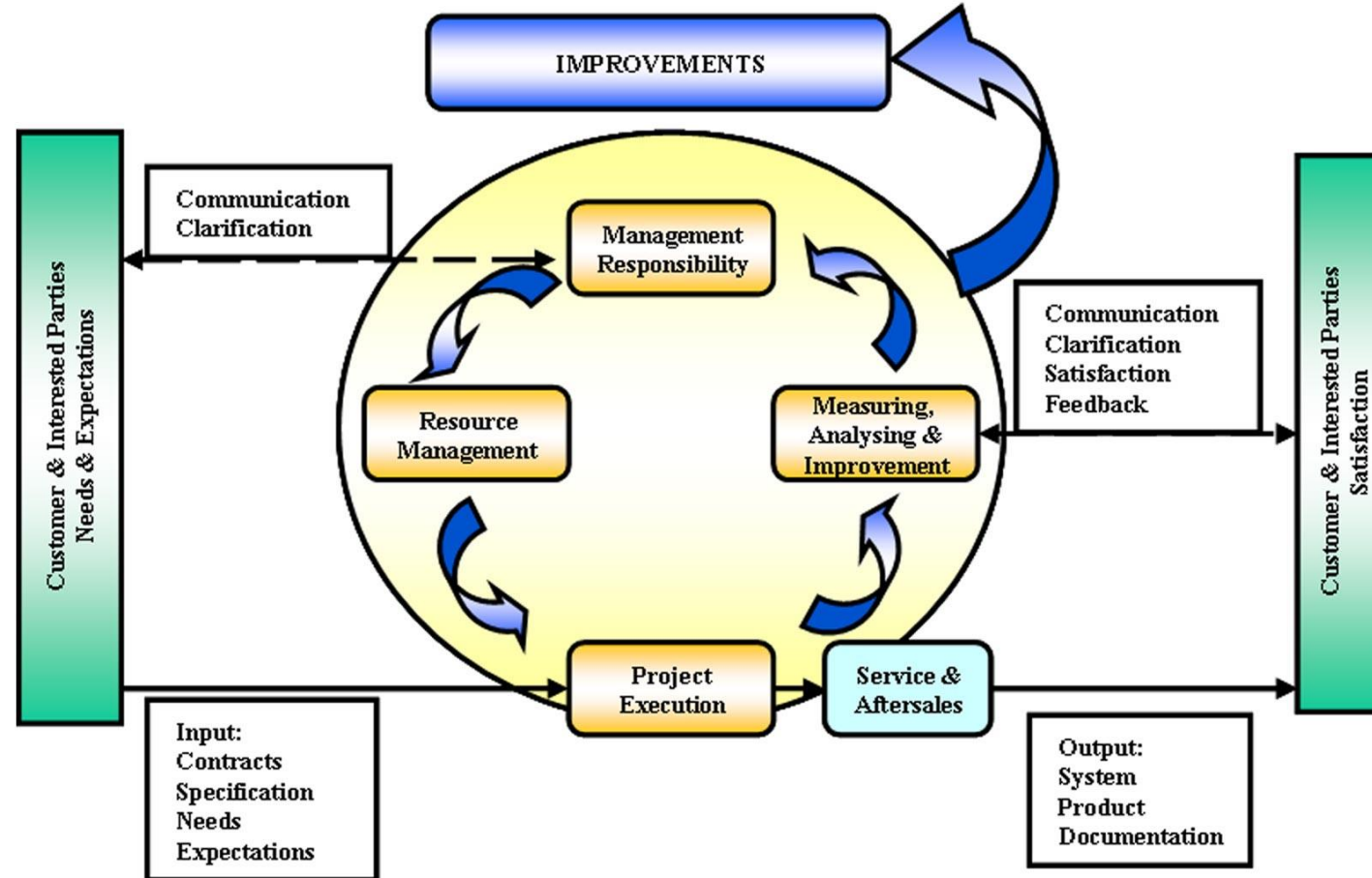
Continuous Improvement

- Joseph Juran 1904-2008 born in Romania emigrated to USA in 1912- took quality control to Japan in 1952 Pareto principle, Management theory, Juran trilogy
- Edwards Deming 1900-1993 born in USA, studied at UCL London under Sir Ronald Fisher (UK)(founder of modern stats) and Jerzy Neyman(Poland)- went to Japan 1950- applied stats to quality- statistical process control and quality concepts
- Japanese manufacturers applied their techniques widely and experienced heretofore unheard-of levels of quality and productivity. The improved quality combined with the lowered cost created new international demand for Japanese products.
- Kaizen and TQM

Eliminating Junk Activities

- Criteria for a junk activity:
- It doesn't improve profitability
- It is in a procedure but seems to have no purpose
- "We always did it this way"
- "The customer wants it this way" – when really it is a customer representative who may not have the authority.
- The standards book recommends an activity that makes no sense (eg doing a test for 'validation' when you've already tested for 'verification')
- Team meetings that last over half an hour

Quality Circles



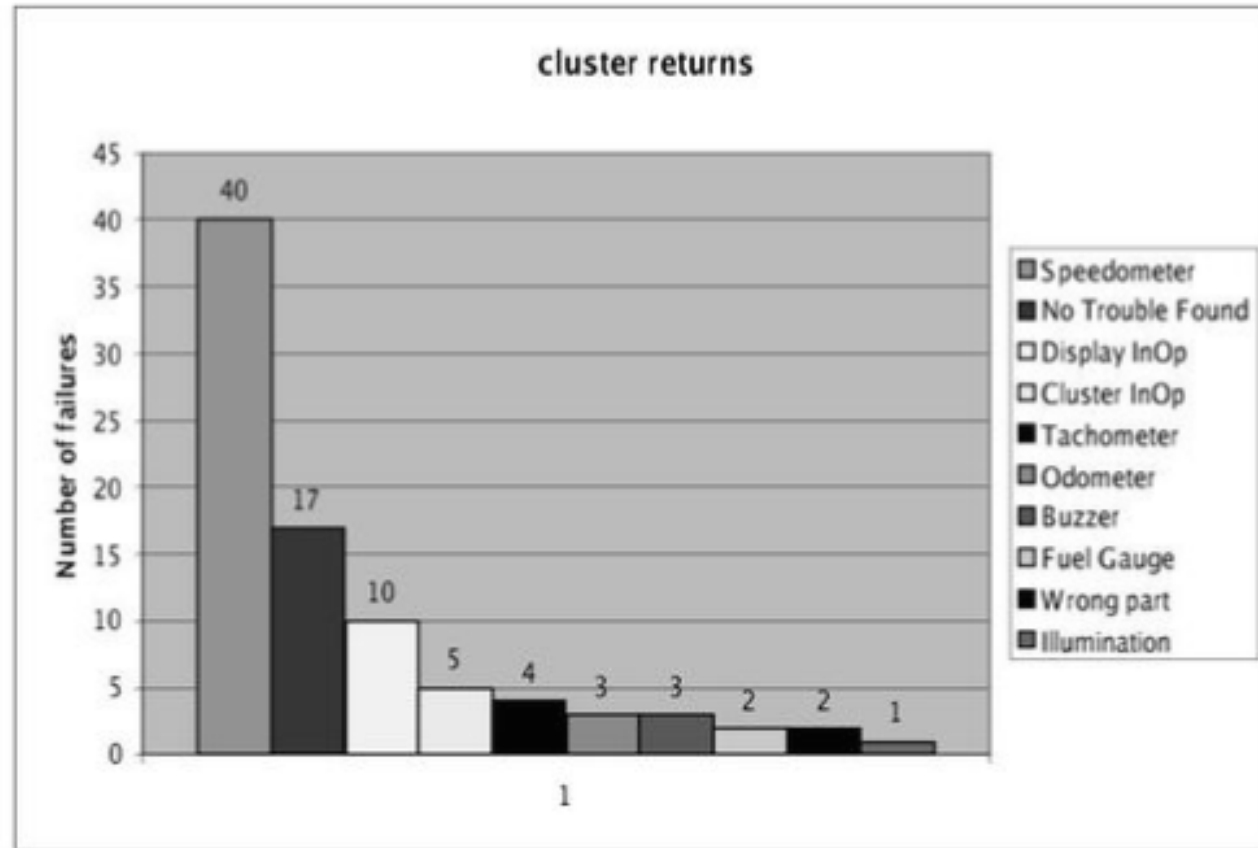
PDCA Shewhart Cycle

- Plan
- Do
- Check
- Act



Pareto Chart

A Pareto chart is a sorted bar chart or histogram. The greatest frequency is on the left and the least on the right hand side of the chart

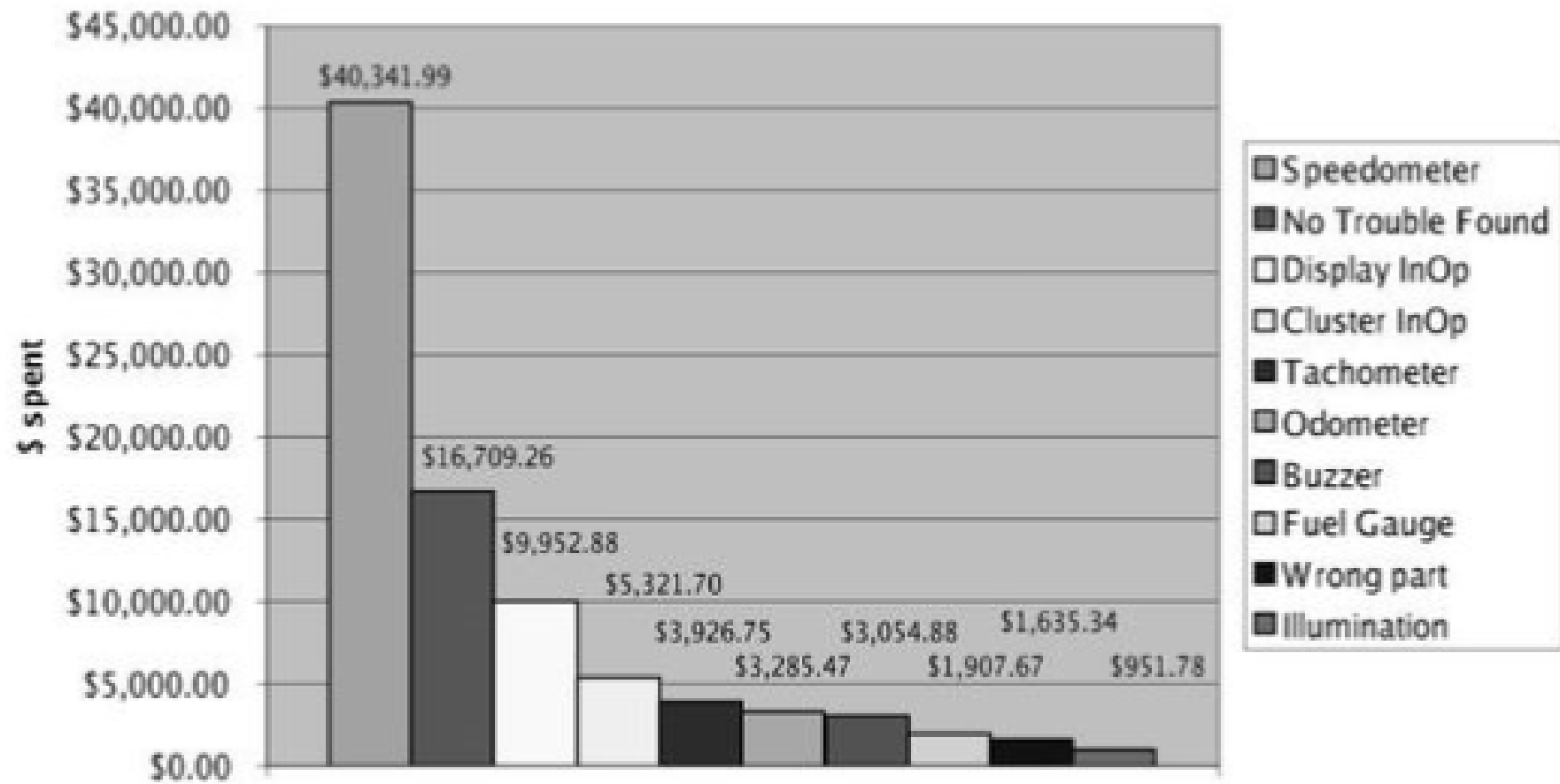


The addition of costs may be useful as it may change the order

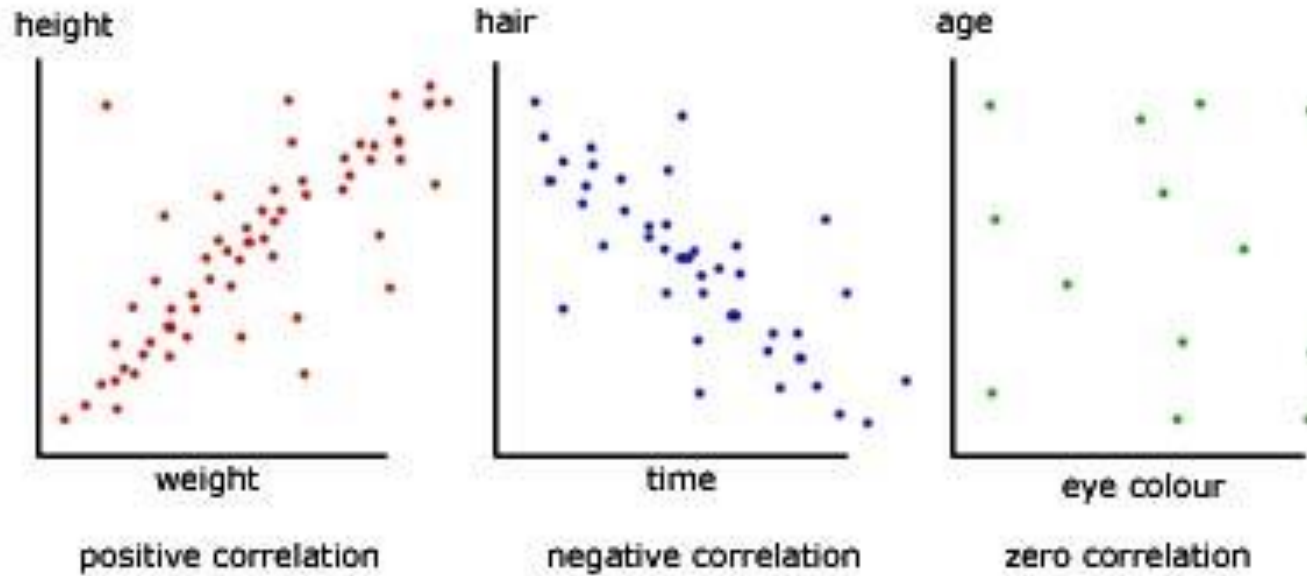
The purpose of a Pareto chart is to identify those items that are significant.

The 80-20 rule comes from this plot; eg 20% of our customers provide 80% of our revenue. It is a simplification of Zipf's Law – the power law observed in many natural phenomena

Failure category \$



Scatter Plots



Scatter diagrams show the relationship between the variables, but they do not prove causation.

True Causation – John Stuart Mill System of Logic (1843)

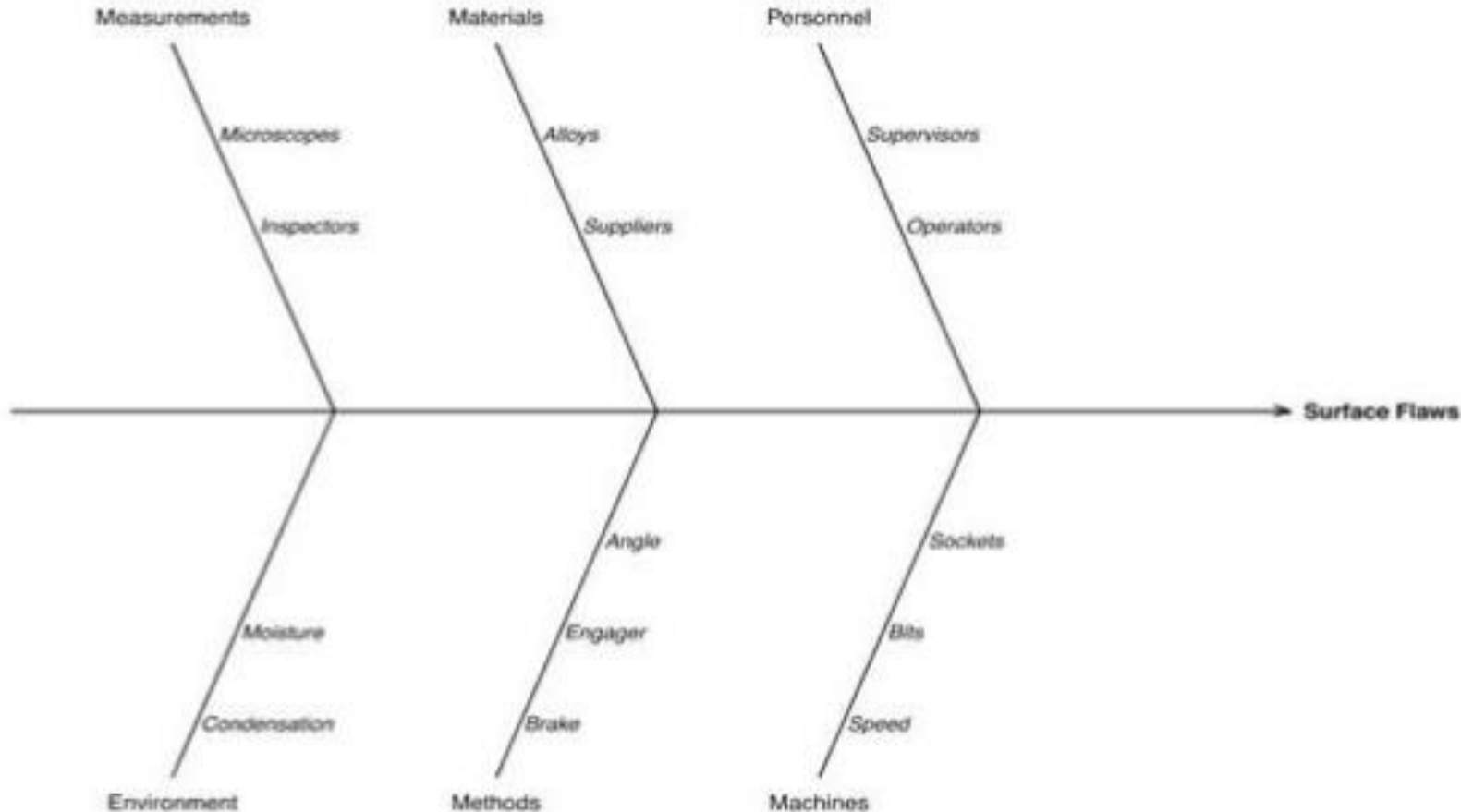
- “If two or more instances of the phenomenon under investigation have only one circumstance in common, the circumstance in which alone all the instances agree, is the cause (or effect) of the given phenomenon.”
- “If an instance in which the phenomenon under investigation occurs, and an instance in which it does not occur, have every circumstance in common save one, that one occurring only in the former; the circumstance in which alone the

two instances differ, is the effect, or the cause, or an indispensable part of the cause, of the phenomenon.”

- “If two or more instances in which the phenomenon occurs have only one circumstance in common, while two or more instances in which it does not occur have nothing in common save the absence of that circumstance: the circumstance in which alone the two sets of instances differ, is the effect, or cause, or a necessary part of the cause, of the phenomenon.”
- “Deduct from any phenomenon such part as is known by previous inductions to be the effect of certain antecedents, and the residue of the phenomenon is the effect of the remaining antecedents.”
- “Whatever phenomenon varies in any manner whenever another phenomenon varies in some particular manner, is either a cause or an effect of that phenomenon, or is connected with it through some fact of causation.”

Ishikawa Diagram (Fishbone diagram, cause and effect diagram)

Cause-and-Effect diagram



Bottlenecks

- Constraint management
- An hour lost at a bottleneck is an hour lost at the whole system
- Non-bottlenecks can be idle with no consequence

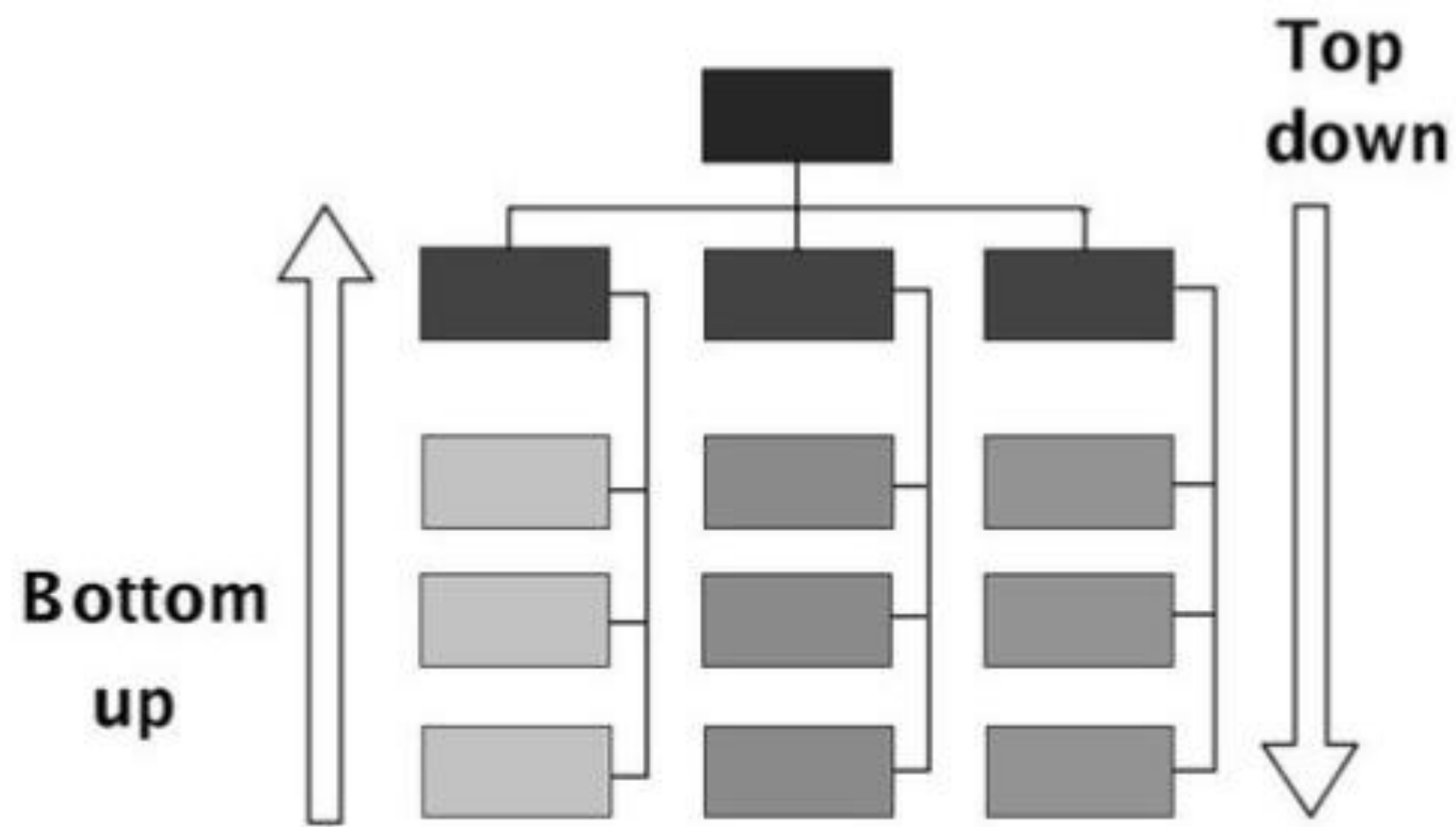
PERT – Program evaluation review technique

- Define Specific tasks and milestones
- Determine the sequence of the tasks
- Build a network diagram
- Estimate the duration for each task
- Determine the critical path

- Development from Juran and Deming and Total Quality Management
- Flow production
- No large stocks
- Concentration on 'Right First Time'
- High Quality
- Low rework

Culture Change

- What's needed for culture change?
- Product of thousands of small changes focussed on a goal or set of goals – easier than a transformational change – less fear
- Top down or Bottom up?
- Hoshin Kanri management method – top down AND bottom up -



- Written Spec
- Invitation to tender
- Requirements spec

Requirements Specification

- Defining the project scope
- Making sure we know what the customer wants
- Achievable
- Verifiable (objectively and quantitatively)
- Complete(all info to understand customers needs)
- Expressed in terms of need, not solution
- All requirements consistent – no conflicts among the requirements
- Appropriate level of detail under definition (systems definition does not contain component detail requirements)

Requirements Specification



Characteristics of good SRS requirements

according to IEEE Standard 830-1998: Recommended Practice for Software Requirements Specifications

- Correct
- Unambiguous
- Complete
- Consistent
- Ranked for Importance
- Verifiable
- Modifiable
- Traceable

Define Specific tasks and Milestones

- Tasks are things required to complete the project
- Milestones are events marking the beginning and end of tasks