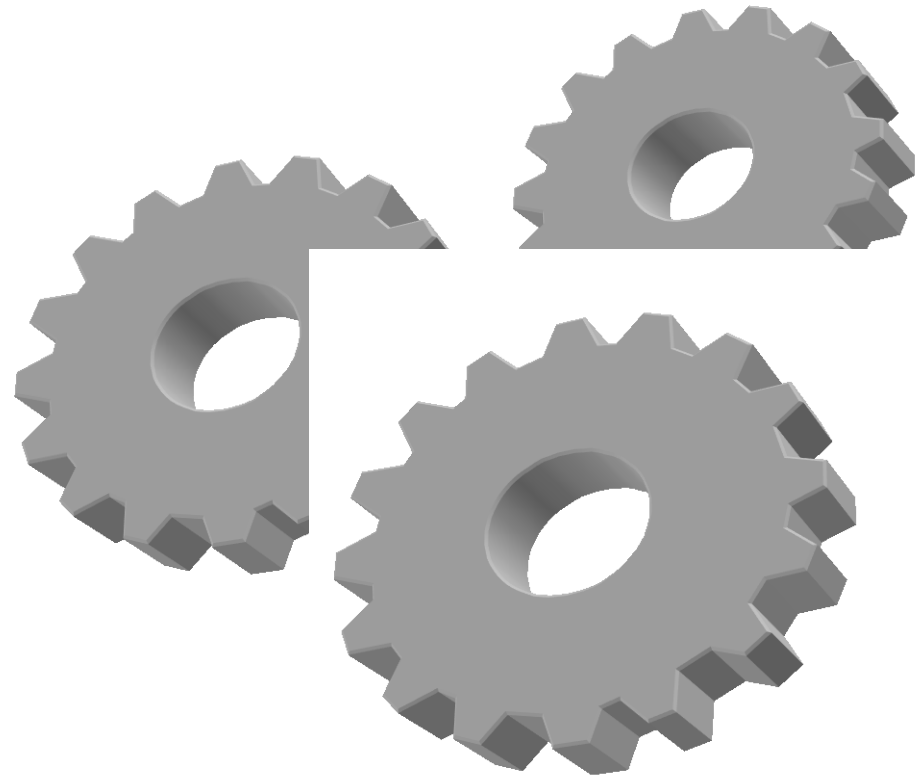
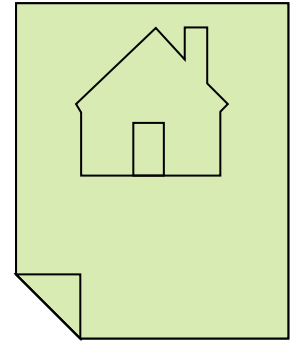


TOTAL QUALITY MANAGEMENT

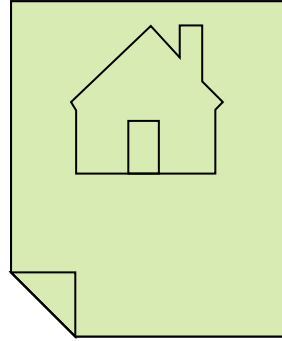


EVOLUTION of TQM



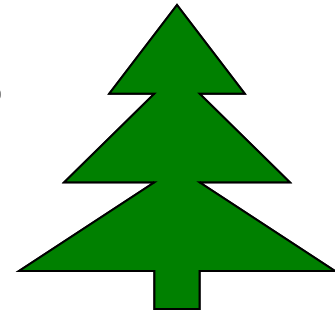
- **CRAFTSMEN & ARTISANS**(eg. Artists, Sculptors, working with metals & other materials who were very Quality-conscious.)
- **TRADESMEN** (eg.Masons,Carpenters etc.)
- **ENGINEERING TRADES & PRACTICES**
(eg.Foundry,Smithy, Die-making,Mould-making,Stamping,Forging,Turning,Milling, Drilling etc.)

TQM Evolution



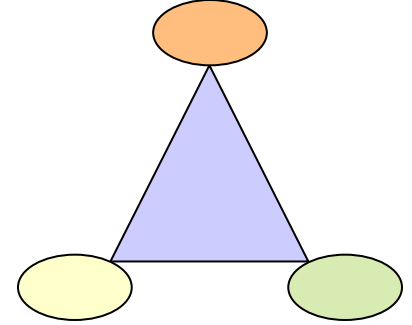
- **Custom-built** Articles/Products having considerable control over Quality.
↓
- **Mass- Produced** Products with less control over Quality
↓
- **Quality control** Department in Factories.
↓
- **TQM-based Production** facility – enhancing the Organization through Quality techniques to better achieve organization’s goals-eg. Productivity and Profitability with min.wastage.
↓
- **ISO** Quality Management Systems.
↓

QUALITY IS ...the QUALIFIER!



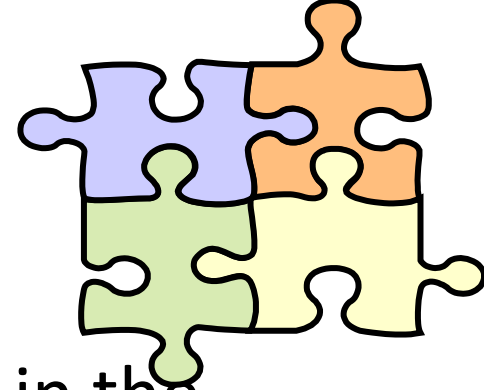
- **Doing it right first time and all the time.**
This boosts Customer satisfaction immensely and increases efficiency of the Business operations.
- **Clearing the bar** (ie. Specification or Standard stipulated) Excellence that is better than a minimum standard.

Quality - Definitions

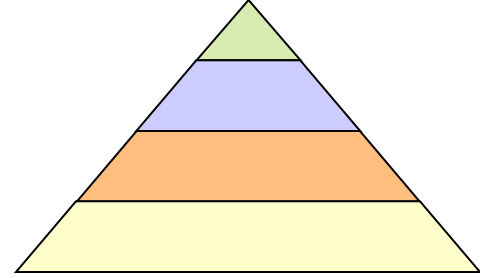


- Quality is *excellence that is better than a minimum standard.*
*It is **conformance to standards and 'fitness of purpose'***
- ISO 9000:2000 definition of quality-
It is the degree to which a set of inherent characteristics fulfills requirements.
- Quality is *'fitness for use'* of the product –
Joseph Juran.

Quality and customer expectations



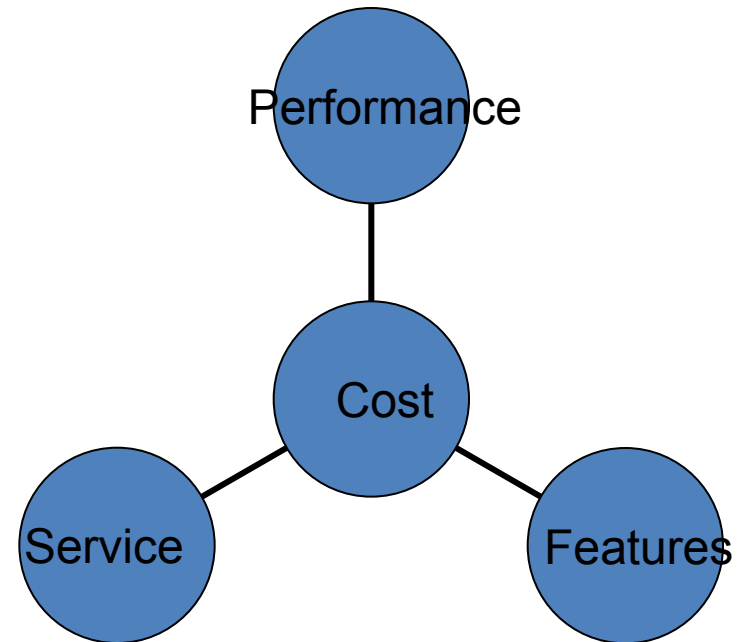
- Quality is also defined as **excellence** in the product or service that **fulfills or exceeds the expectations of the customer.**
- There are **9 dimensions of quality** that may be found in products that produce customer-satisfaction.
- Though quality is an abstract perception, it has a quantitative measure- $Q = (P / E)$, where **Q=quality**, **P= performance**(as measured by the Mfgr.), and **E = expectations**(of the customer).



- Quality is **not fine-tuning your product at the final stage** of manufacturing, before packaging and shipping .
- **Quality is in-built into the product at every stage** from conceiving –specification & design stages to prototyping –testing and manufacturing stages.
- **TQM philosophy and guiding principles** continuously improve the Organisation processes and result in customer satisfaction.

The 9 Dimensions of Quality

- Performance
- Features
- Conformance
- -----
- Reliability
- Durability
- Service
- -----
- Response- of Dealer/ Mfgr. to Customer
- Aesthetics – of product
- Reputation- of Mfgr./Dealer

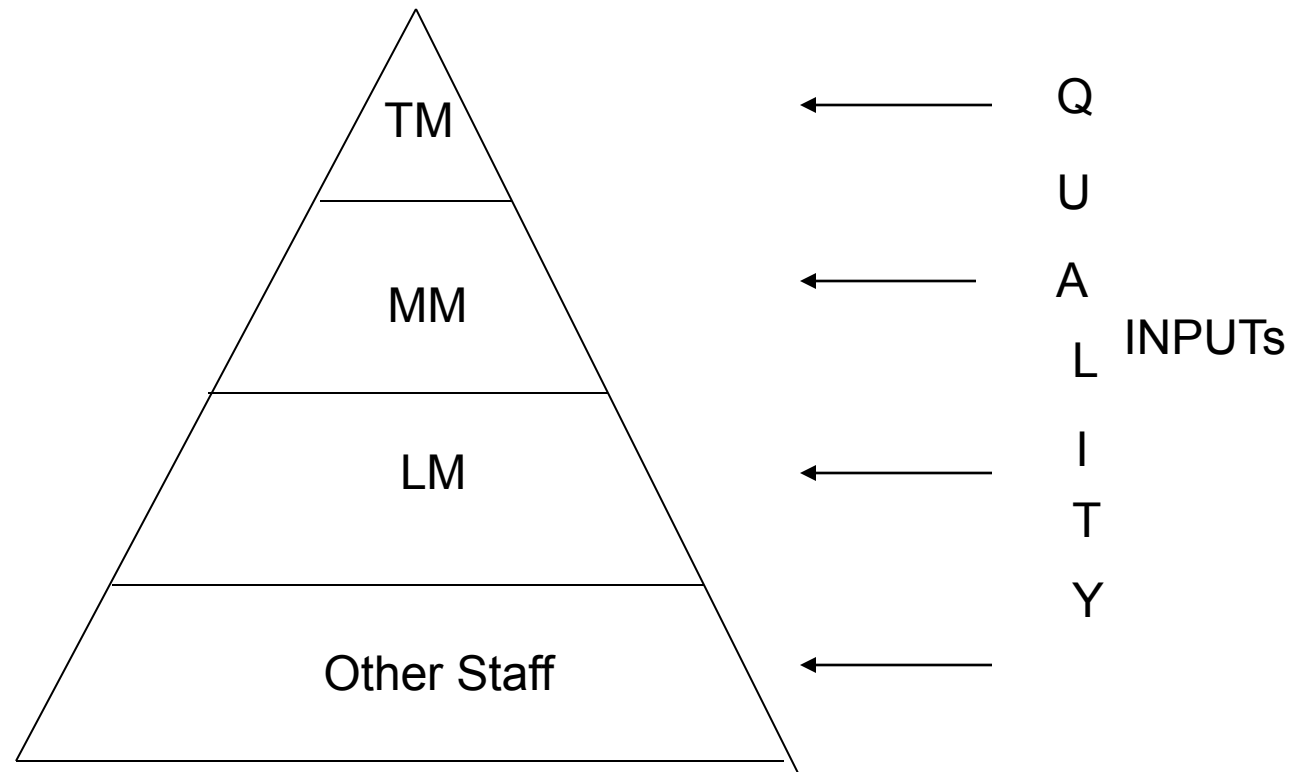


Market Changes

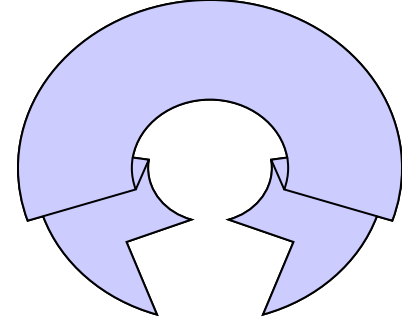
- **MONOPOLIST** markets **Seller's** market
↓ ↓
- **GLOBAL** markets **Buyer's** market
↓ ↓
- Market more competitive **Customer-oriented** market
Demand is defined by Users.
↓
- **Quality management** is a necessity for survival and growth of the organization in a global environment.

The TQM Organization

- Quality infused Personnel and Processes.

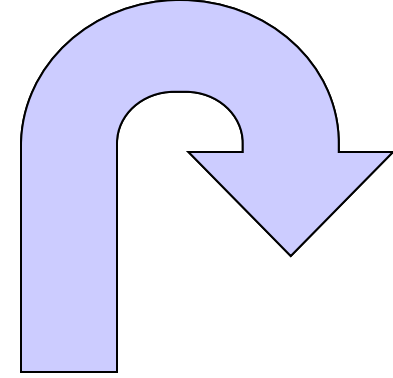


TQM six basic Concepts



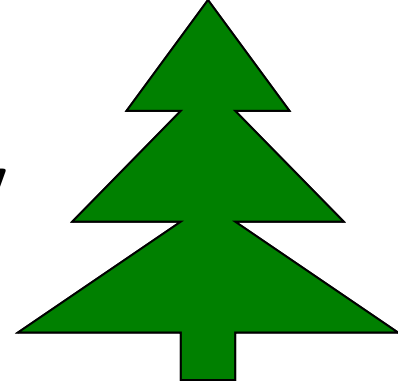
- **Management commitment to TQM principles and methods & long term Quality plans for the Organisation**
- **Focus on customers – internal & external**
- **Quality at all levels of the work force.**
- **Continuous improvement of the production/business process.**
- **Treating suppliers as partners**
- **Establish performance measures for the processes.**

Effects of poor Quality



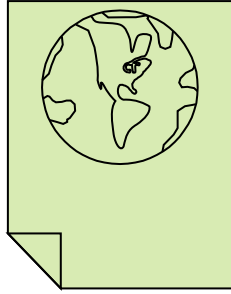
- **Low customer satisfaction**
- **Low productivity, sales & profit**
- **Low morale of workforce**
- **More re-work, material & labour costs**
- **High inspection costs**
- **Delay in shipping**
- **High repair costs**
- **Higher inventory costs**
- **Greater waste of material**

Benefits of Quality



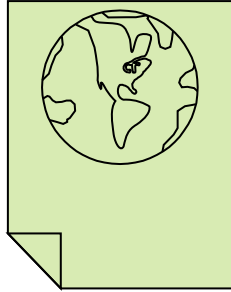
- **Higher customer satisfaction**
- **Reliable products/services**
- **Better efficiency of operations**
- **More productivity & profit**
- **Better morale of work force**
- **Less wastage costs**
- **Less Inspection costs**
- **Improved process**
- **More market share**
- **Spread of happiness & prosperity**
- **Better quality of life for all.**

Historical Review of Quality Control



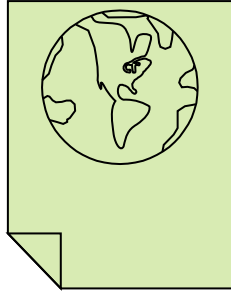
- **Quality in articles and artefacts produced by skilled craftsmen and artisans from the B.C. era eg. goldsmiths, silversmiths, blacksmiths, potters, etc.**
- **Artists & Artisans Guilds in the Middle ages spent years imparting quality skills and the worksmen had pride in making quality products.**
- **Industrial Revolution brought factory manufacturing where articles were mass-produced and each worker made only a part of the product, and did not sense the importance of his contribution to the quality of the product .**

Historical Review of Quality Control



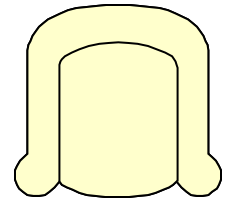
- In 1924, W.A.Shewhart of Bell Telephone Labs developed a statistical chart for the control of product variables – the beginning of SQC and SPC.
- In the same decade, H.F.Dodge and H.G.Romig of Bell Telephone Labs developed statistical acceptance sampling instead of 100% inspection.
- In 1946,the American Society for Quality Control was formed.
- In 1950, W. Edwards Deming,who learnt SQC from Shewhart,taught SPC & SQC to Japanese engineers and CEO's

Historical Review of Quality Control



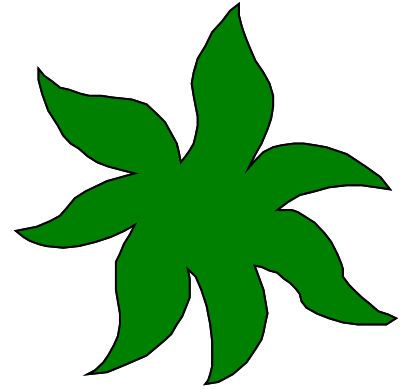
- In 1954, Joseph M. Juran taught Japanese managements their responsibility to achieve quality .
- In 1960, the first quality control circles were formed. SQC techniques were being applied by Japanese workers.
- 1970's US managers were learning from Japan Quality implementation miracles.
- In 1980's TQM principles and methods became popular.(also in auto industry)
- In 1990's ,the ISO 9000 model became the world-wide standard for QMS.

Leadership concepts



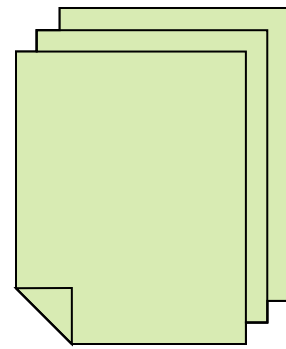
- 12 characteristics of quality leaders (refer pgs 30,31 Besterfield)
- 7 Habits of highly effective people (Pgs. 32-39 Besterfield)
- The Deming philosophy (Pgs. 39-43 Besterfield)

7 Habits of highly effective people (Stephen Covey)



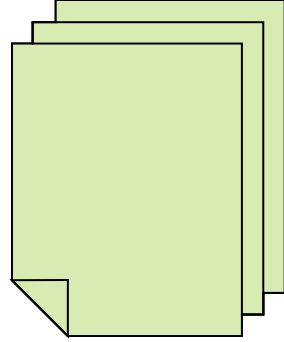
- **Be pro-active**
- **Begin with the end in mind**
- **Put first things first (ref.Covey's Time management matrix pg.35)**
- **Think win-win**
- **Seek first to understand,then to be understood**
- **Synergy**
- **Sharpen the saw**

The Deming Philosophy



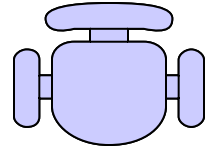
- **Create and publish the aims and purposes of the organization**
- **Learn the new philosophy**
- **Understand the purpose of inspection**
- **Stop awarding business based on price alone.**
- **Improve constantly and forever the System**
- **Institute training**
- **Teach and institute leadership**

The Deming Philosophy



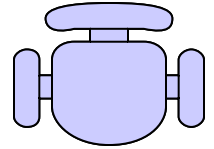
- **Drive out fear, create trust, and create a climate for innovation**
- **Optimize the efforts of teams, groups, and staff areas**
- **Eliminate exhortations for the work force**
- **Eliminate numerical quotas for the work force**
- **Eliminate management by objectives**
- **Remove barriers to pride of workmanship**
- **Encourage education and self-improvement for all**
- **Take action to accomplish the transformation.**

Role of TQM leaders



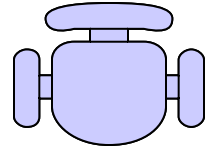
- All are responsible for quality improvement especially the senior management & CEO's
- Senior management must practice MBWA
- Ensure that the team's decision is in harmony with the quality statements of the organisation
- Senior TQM leaders must read TQM literature and attend conferences to be aware of TQM tools and methods
- Senior managers must take part in award and recognition ceremonies for celebrating the quality successes of the organisation
- Coaching others and teaching in TQM seminars
- Senior managers must liaise with internal ,external and suppliers through visits, focus groups, surveys
- They must live and communicate TQM.

TQM implementation



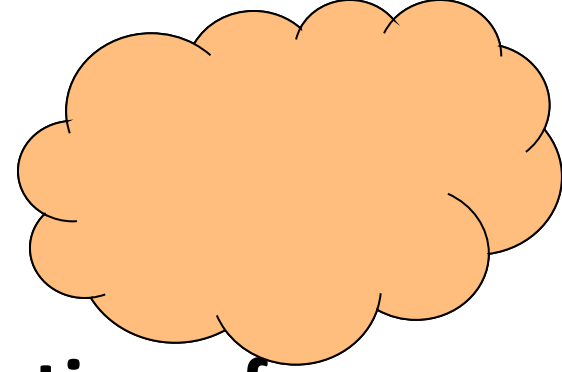
- **Begins with Sr. Managers and CEO's**
- **Timing of the implementation process**
- **Formation of Quality council**
- **Union leaders must be involved with TQM plans implementation**
- **Everyone in the organisation needs to be trained in quality awareness and problem solving**
- **Quality council decides QIP projects.**

Quality Council



- **The quality council includes CEO and Senior managers of the functional areas -research,manufacturing,finance,sales ,marketing etc. and one co-ordinator and a union representative.**
- **Duties- To develop the Quality statements eg. Vision, Mission, Quality policy statements, Core values etc.**
- **To develop strategic long-term plans and annual quality improvement programme.**
- **Make a quality training programme**
- **Monitor the costs of poor quality.**
- **Determine the performance measures for the organisation**
- **Always find projects that improve the processes and produce customer satisfaction.**
- **Establish work-group teams and measure their progress.**
- **Establish and review the recognition and reward system for the TQM system**

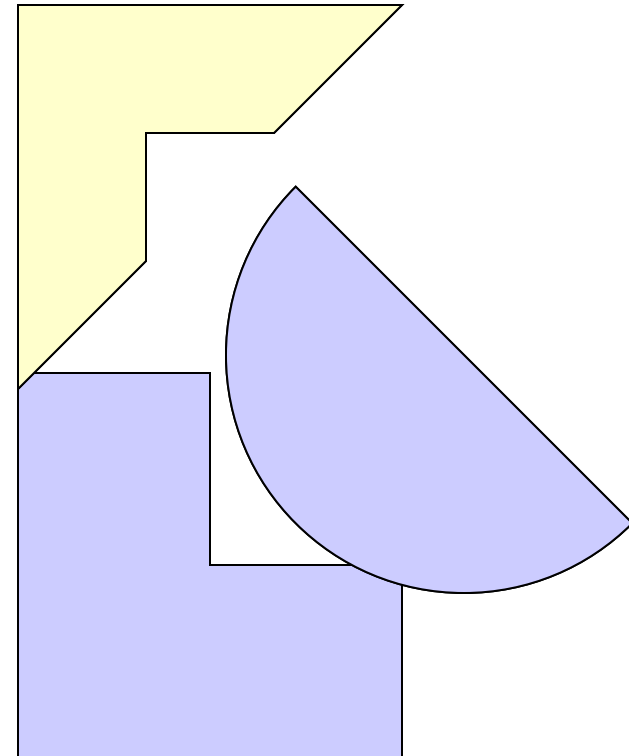
Quality statements



- **Vision statement – a short declaration of what the organization hopes to be tomorrow.**
- **Mission statement – a statement of purpose –who we are,who are our customers,what we do , and how we do it.**
- **Quality policy – is a guide for everyone in the organization ,how they should provide products and services to the customers.**

Strategic Planning

- **Strategic business planning is similar to strategic quality planning.**
- **7 steps to strategic planning**
- **Customer needs**
- **Customer positioning**
- **Predict the future**
- **Gap analysis**
- **Closing the gap**
- **Alignment**
- **Implementation.**



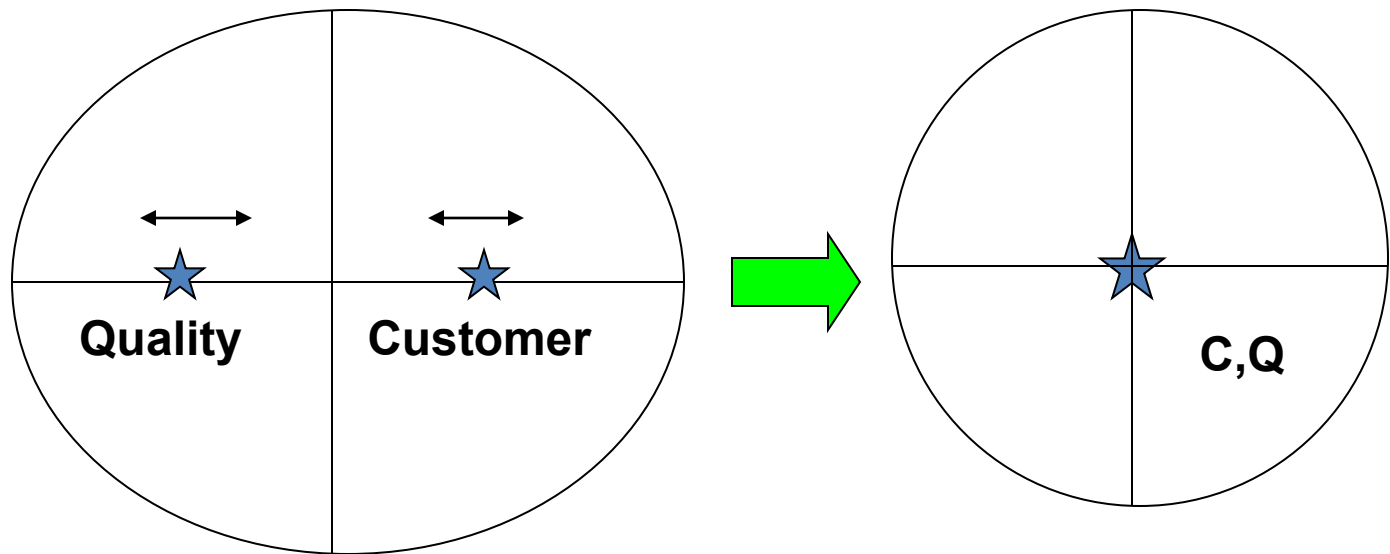
Strategic Quality Goals and Objectives

- Goals must be focused
- Goals must be concrete
- Goals must be based on statistical evidence
- Goals must have plan or method with resources
- Goals must have a time-frame
- Goals must be challenging yet achievable

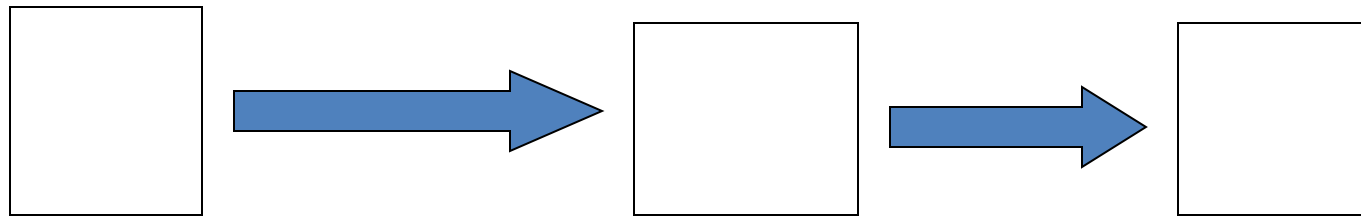
Customer satisfaction

- **Customer is the Boss or 'King'**
- **Customer dictates the market trends and direction**
- **Customer not only has needs to be supplied(basic performance functions)**
- **Also he 'wants what he wants!'(additional features satisfy him and influence his purchase decision)**
- **Hence the Suppliers and Manufacturers have to closely follow at the heel of the customer.**

Norman's Customer satisfaction model



Customer Satisfaction

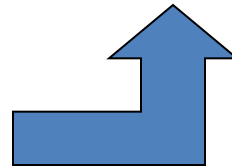


**Quality
System**

**Quality Product/
Service**

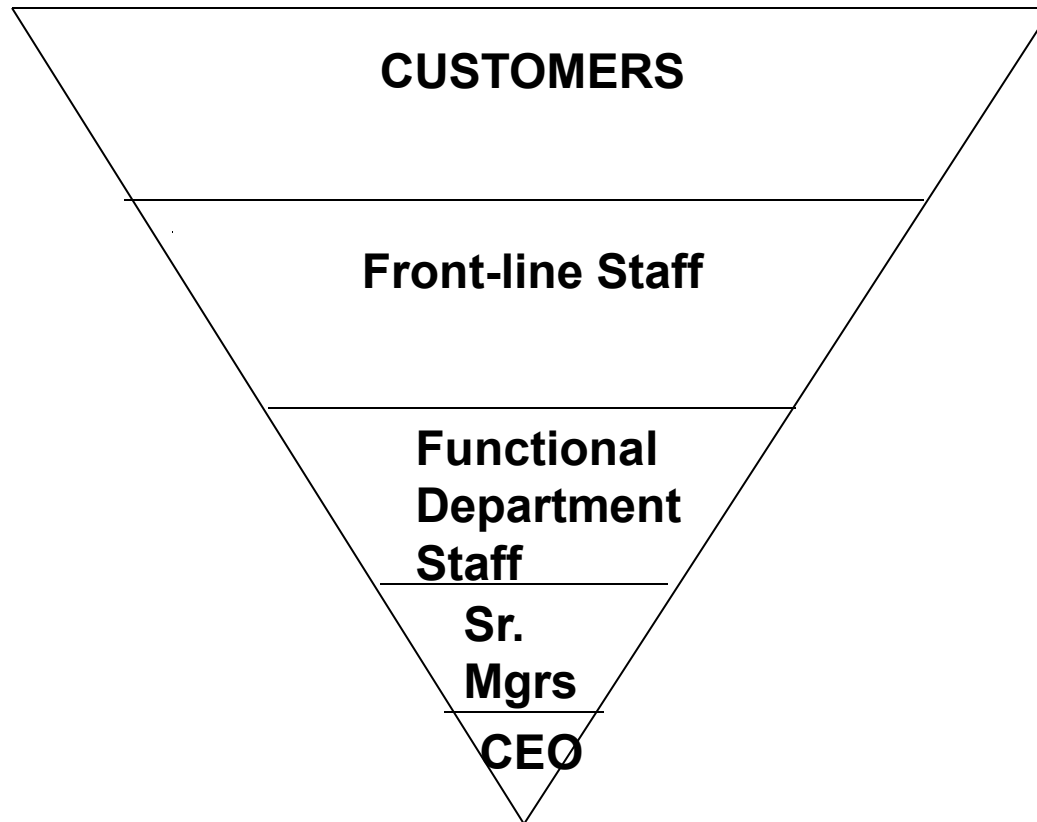
Customer Satisfaction

**Customer
Focus**

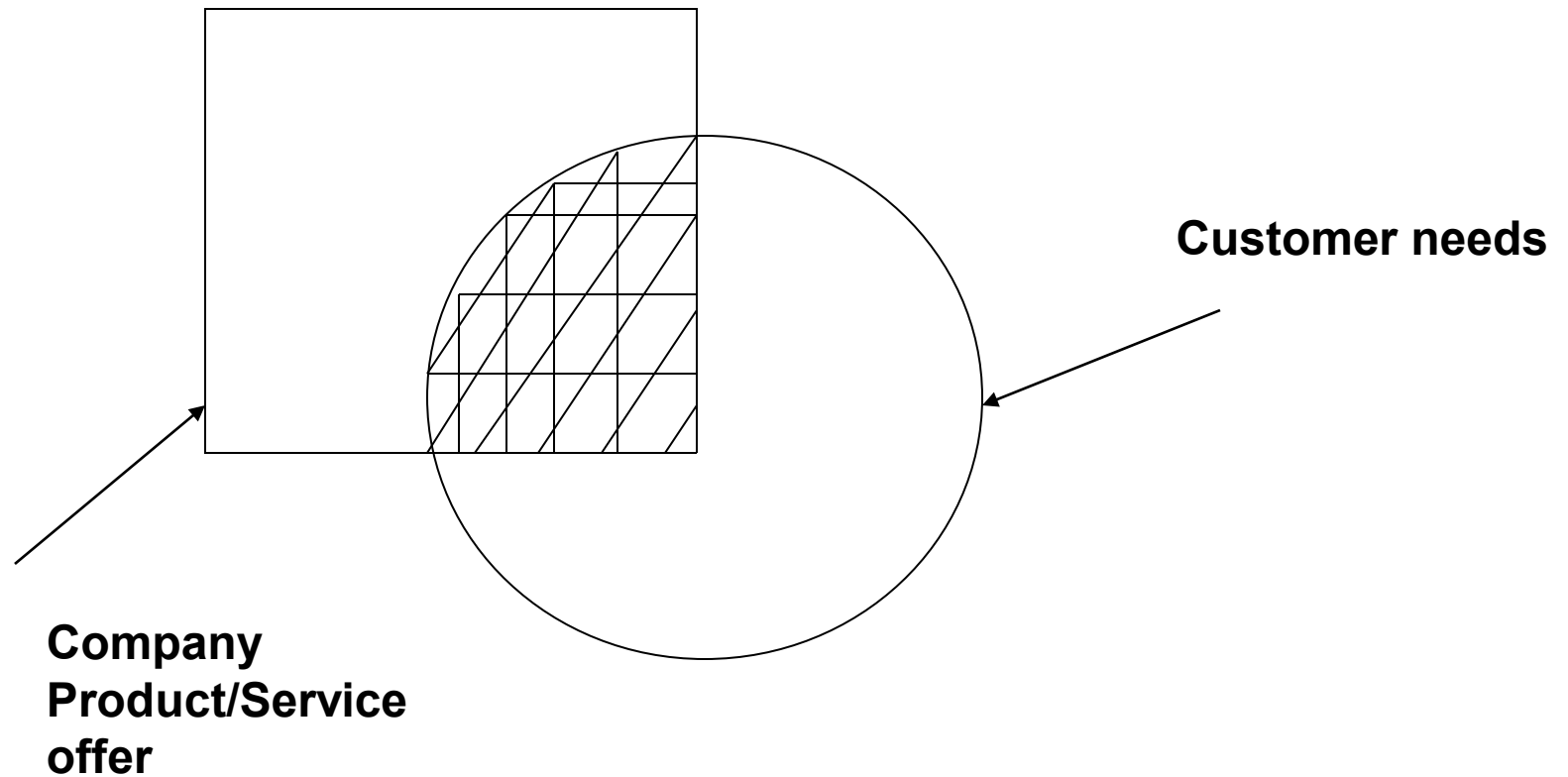


Customer Satisfaction Organisational Diagram

-



Teboul Model of Customer Satisfaction



What is customer satisfaction?

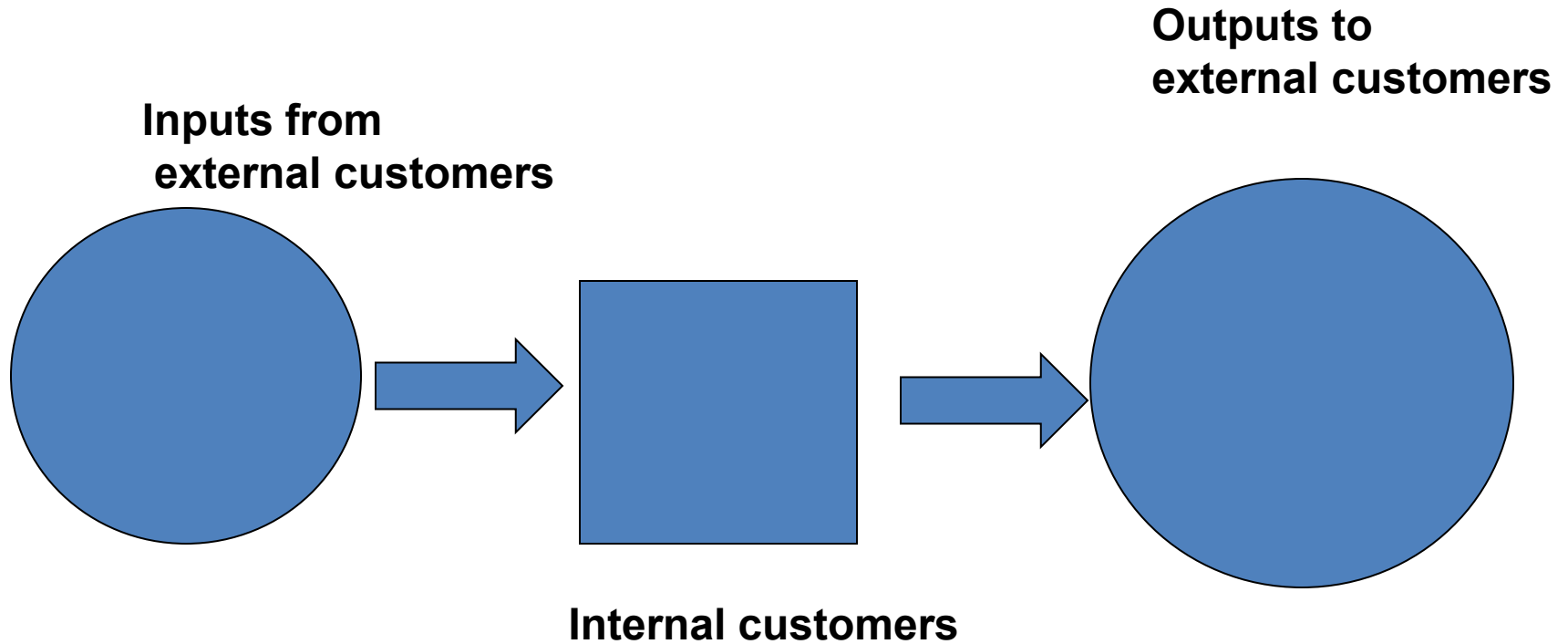
- Is it due to Product quality?
- Is it due to pricing?
- Is it due to good customer service ?
- Is it due to company reputation?
- Is it something more?

Customer types

- **External and Internal** customers
- **External – current, prospective and lost customers**
- **Internal** – Every person in a process is a customer of the previous operation.(applies to design,manufacturing,sales,supplies etc.) [Each worker should see that the quality meets expectations of the next person in the supplier-to-customer chain]
- **TQM** is commitment to **customer-focus** - internal and external customers.

Customer/supplier chain

-



Internal customer/Supplier relationships

- **Questions asked by people to their internal customers**
- **What do you need from me?**
- **What do you do with my output?**
- **Are there any gaps between what you need and what you get?**
- **Good team-work and inter-Departmental harmony is required. Also the leaders role in supervising the internal customer-supplier chain.**

TQM and customer quality percepts

- **TQM is quality management and management of quality – there is no full stop and no break in the chain!**
- **Continuous process (quality) improvement is all its about.**
- **Why? One important reason is the customer quality level is not static and his expectations keep changing and his demands too!**
- **Also plant process dynamics- how to achieve maximum efficiency , optimizing cost and performance in the process operations, minimizing waste etc.**

User purchase perceptions- from survey

- **Performance**
- **Features**
- **Service**
- **Warranty**
- **Price**
- **Reputation**
(refer pgs.72 and 73, Besterfield)

Customer satisfaction/ dissatisfaction feedback

- **Customer feedback has to be continuously sought and monitored - not one-time only! (Pro-active! Complaints are a reactive method of finding out there is a problem)**
- **Customer feedback can be relayed to Mfgr.**
- **Performance comparison with competitors can be known**
- **Customers needs can be identified**
- **Relative priorities of quality can be obtained from the horses' mouth!**
- **Areas for improvement can be noted.**

Customer feedback methods

- **Comment cards enclosed with warranty card when product is purchased.**
- **Customer survey and questionnaire**
- **Customer visits**
- **Customer focus groups**
- **Quarterly reports**
- **Toll-free phones**
- **e-mail, Internet newsgroups, discussion forums**
- **Employee feedback**
- **Mass customization.**

Customers- Handle with care!

- Employers don't pay wages but it is the **customer who pays the wages!**
- So take **good care** of your customers.
- Customer-care centres not just profit-centres!
- The entire organization must in effect revolve around the customer – whether the customer is being well served and if he is really pleased, contented and satisfied with the service you have to offer.

Service Quality

- **(i)Organisation**
- Identify each market segment
- Write down the requirements
- Communicate the requirements
- Organise processes
- Organise physical spaces

Service Quality

- **(ii) Customer Care**
- Meet the customer's expectations
- Get the customer's point of view
- Deliver what is promised
- Make the customer feel valued
- Respond to all complaints
- Over-respond to the customer
- Provide a clean and comfortable customer reception area.

Service Quality

- **(iii) Communication**
- Optimize the trade-off between time and personal attention
- Minimize the number of contact points
- Provide pleasant, knowledgeable and enthusiastic employees
- Write documents in customer-friendly language.

Service Quality

- **(iv) Front-line people**
- Hire people who like people
- Challenge them to develop better methods
- Give them the authority to solve problems
- Serve them as internal customers
- Be sure they are adequately trained
- Recognise and reward performance

Service quality

- **(v)Leadership**
- Lead by example
- Listen to the front-line people
- Strive for continuous process improvement
(Pgs. 88-93 Besterfield)

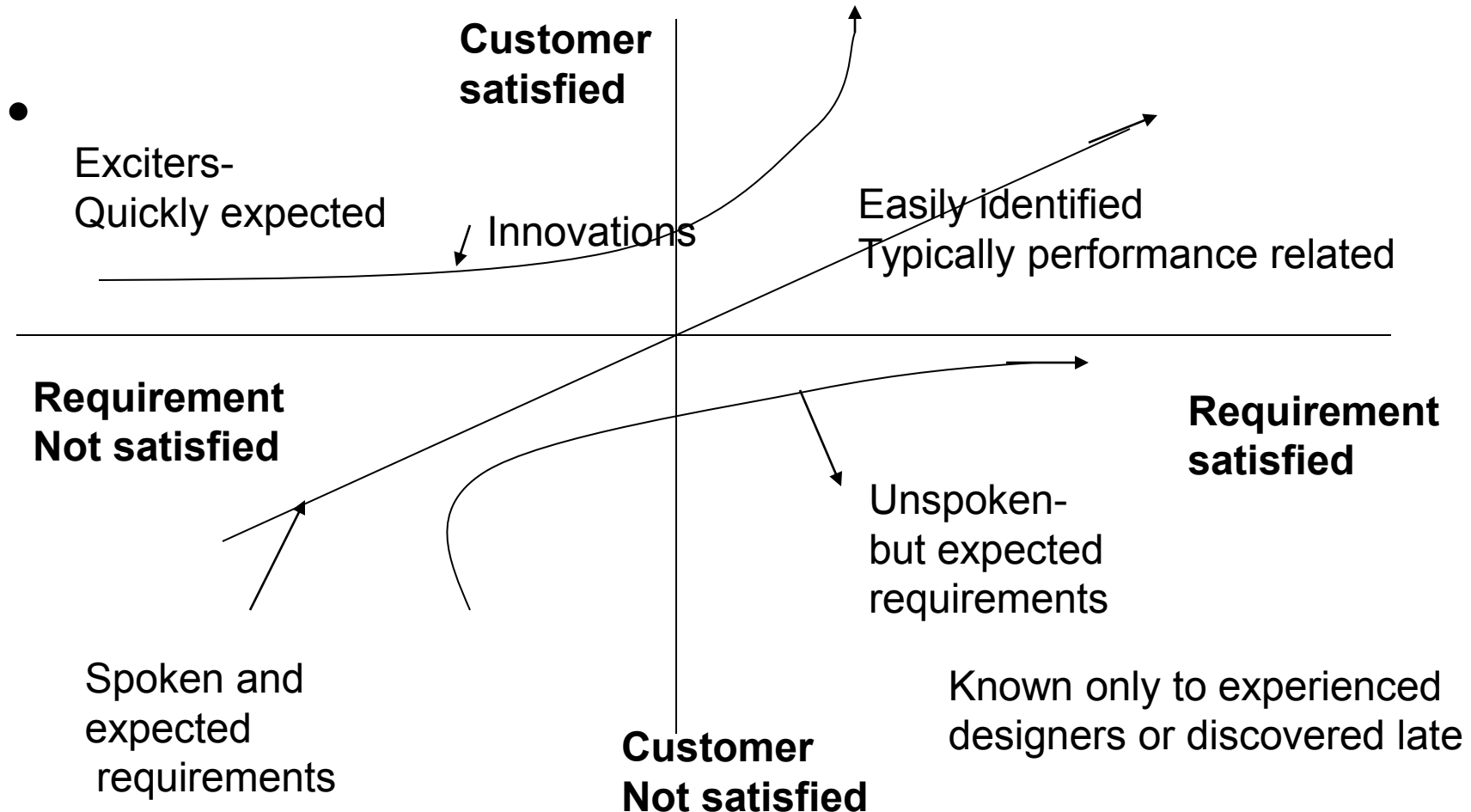
Customer Care

- **Keep promises to customers**
- **Return customer calls promptly**
- **Allot staff to handle customer problems**
- **Treat customers with courtesy, respect and professionalism always**
- **Evaluate customer satisfaction regularly**
- **Search for customer-related improvements continuously**
- **Deliver Products/Service promptly and efficiently**
- **Give every customer complete and personal attention.**

Customer Care

- **Maintain a neat and clean appearance of self and work-place,at all times**
- **Review and implement customer feedback and suggestions into current procedures when needed**
- **Training and education to enhance job performance and commitment to customer care**
- **Treat every customer as we would treat ourselves.
(Pg. 90, Besterfield)**

Kano Model-conceptualises customer requirements



Customer Retention

- **Customer satisfaction should lead to customer loyalty and customer retention.**
- **This is the acid test and bottom line- when the customer repeatedly comes back to you for repeat orders and to purchase new products mfgd. by you. (In spite of stiff competition and multiple Suppliers/Sources!)**
- **Firm orders received or cash payments registered , market share, customer referrals and customer retention are an indication of your customer success and penetration .**

Motivation

- **Maslow's Hierarchy of Needs**
- **Herzberg's Two-Factor Theory**
- **Achieving a motivated task-force**
(Pgs.104-105 Besterfield)
Know thyself, Know your employees, Establish a positive attitude, share the goals, Monitor progress, Develop interesting work, Communicate effectively, Celebrate success.

Empowerment

- **To invest people with authority –to tap the potential in every worker (avoid the wastage of unrealised capacity)**
- **People have the ability, confidence and commitment to take the responsibility and ownership to improve the process, and initiate the necessary steps to satisfy customer requirements within well-defined boundaries in order to achieve organisational goals.**

Conditions for empowerment

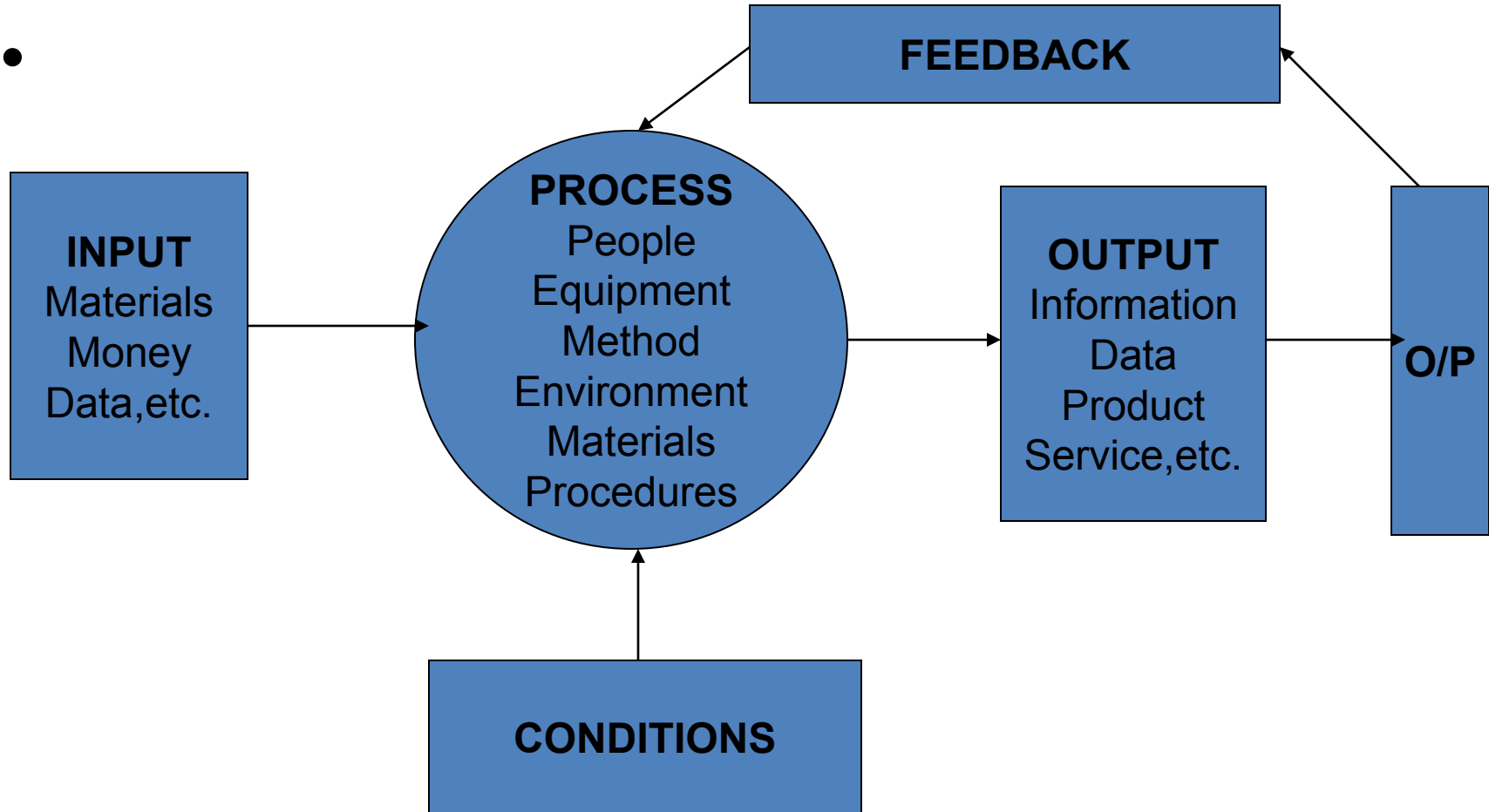
- **Everyone must understand the need for change**
- **The system needs to change to the new paradigm**
- **The organisation must enable its employees.**
- **Teams (Pgs. 109-124 Besterfield)**

Continuous Process Improvement

- **Process** refers to business and production activities of an organisation
- **Business processes**-Manufacturing, Design, Sales, Purchase, Stores etc. are areas where non-conformance can be reduced and processes improved

Continuous Process Improvement

-



Five ways to Improve a Process

- **Reduce resources**
- **Reduce errors**
- **Meet or exceed expectations of internal/external customers**
- **Make the process safer**
- **Make the process more satisfying to the person doing it.**

Continuous Process Improvement

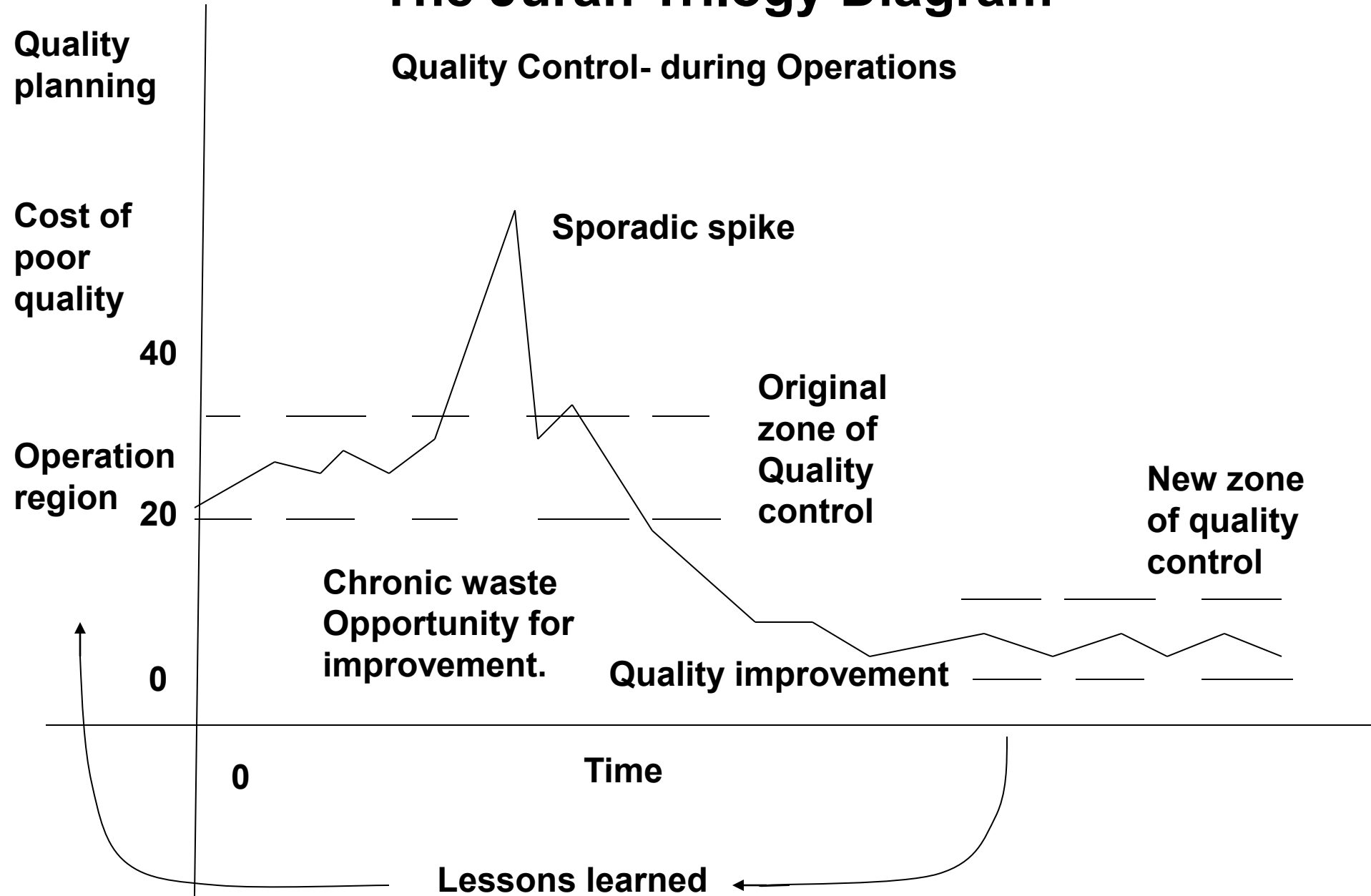
- **Juran's Trilogy**
- **Shewhart's Plan-Do-Study-Act cycle**
- **Kaizen- making small incremental improvements to the individual and the organisation. (Pgs. 140-160, Besterfield)**

Juran's Trilogy

- **Three components - PLANNING, CONTROL AND IMPROVEMENT**
- **Based on financial processes ,such as budgeting(planning), expense measurement(control), and cost reduction (improvement)**

The Juran Trilogy Diagram

Quality Control- during Operations



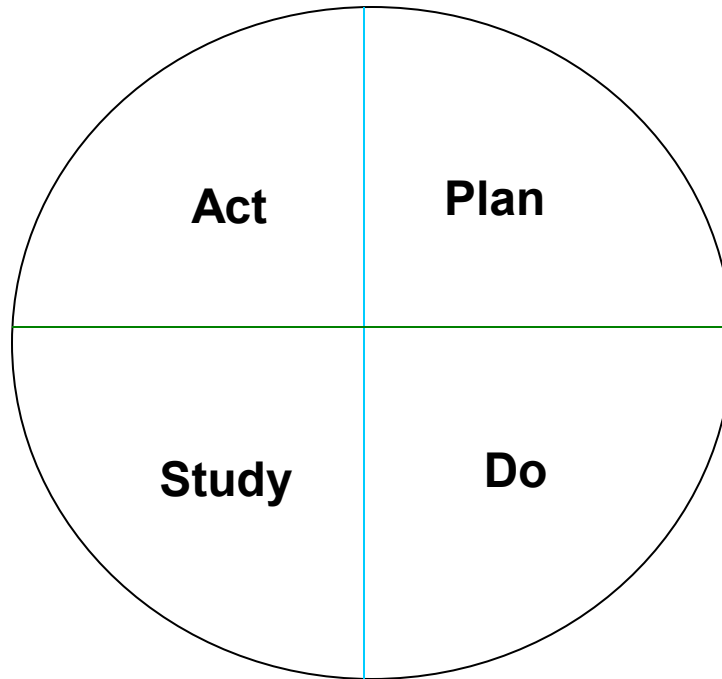
Four Improvement Strategies

- **Repair**
- **Refinement**
- **Renovation**
- **Re-invention**

Five types of Problems

- **Compliance**
- **Unstructured**
- **Efficiency**
- **Process Design**
- **Product Design**

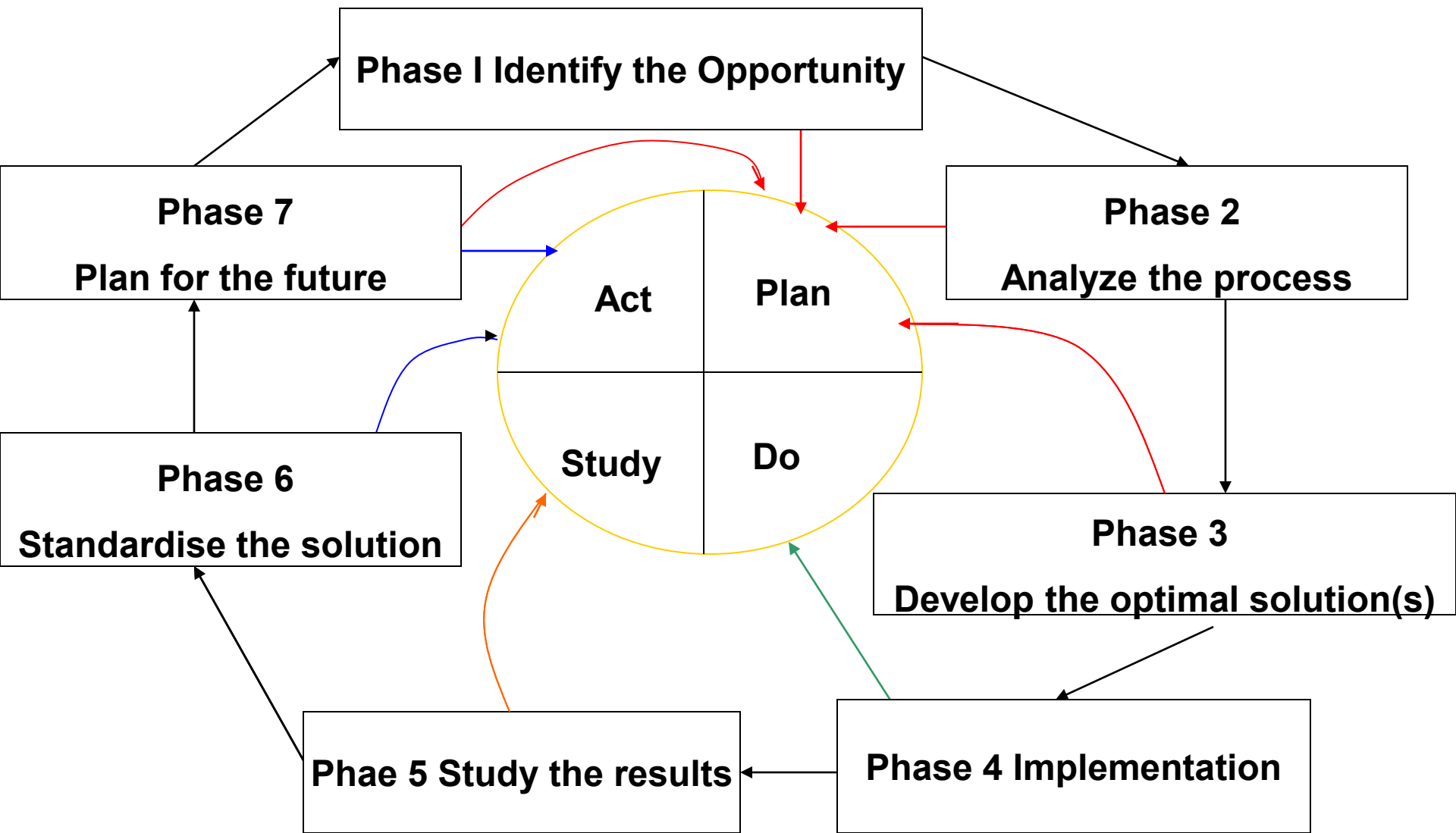
THE PDSA cycle



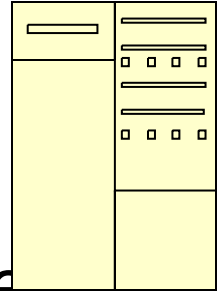
PDSA cycle- seven steps or phases

- **Identify the opportunity**
- **Analyze the current process**
- **Develop the optimal solution(s)**
- **Implement changes**
- **Study the results**
- **Standardise the solution**
- **Plan for the future.**

Continuous Process Improvement cycle

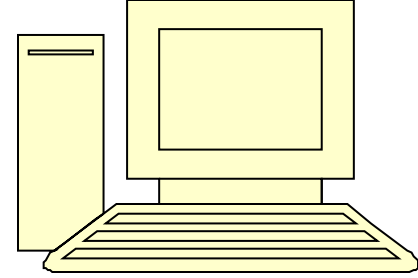


TQM principles from the Japanese



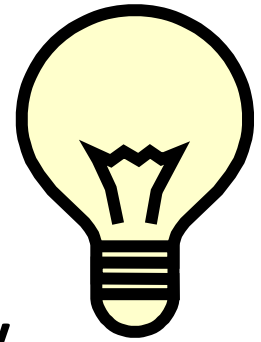
- **The 3 K Method**
- **Kimerareta Kotoo** – What has been decided
- **Kimerareta Tori** – must be followed
- **Kichim to Mamorukoto** – as per standard.

The 5S Method



- **Seiko** - **Sort (Proper arrangement)**
- **Seiton** - **Set (Systematic or
Orderliness)**
- **Seiso** - **Shine (Sweep or clean-up)**
- **Seiketso** - **Standard (Personal
cleanliness)**
- **Shitsuke** - **Sustain (Self-discipline)**

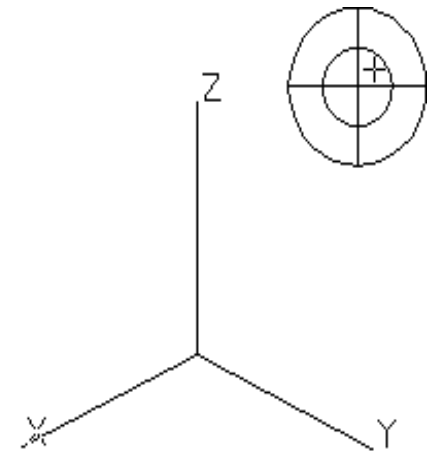
Kaizen Technique



- **Kaizen- defines the managements role in continuously encouraging and implementing small improvements in the individual & organization.**
- **Break the complex process into sub-processes and then improve the sub-processes.**
- **Continuous improvements in small increments make the process more efficient ,controllable and adaptable.**
- **Does not rely on more expense,or sophisticated equipment and techniques.**

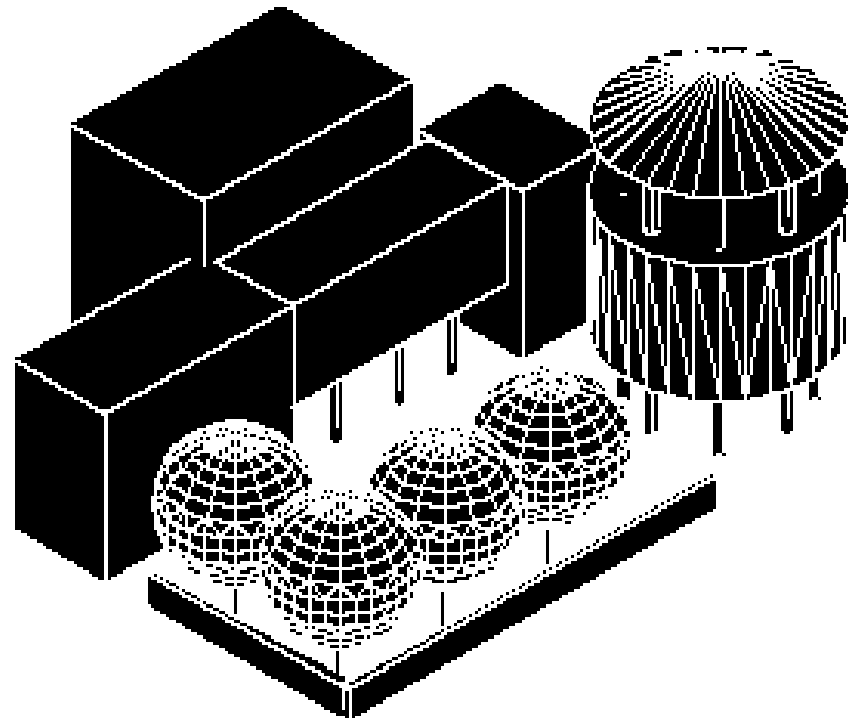
Kaizen

- Value and non-value added work activities
- Muda-seven classes of waste
- Principles of motion study and work-cell use
- Principles of materials handling and use of one-piece flow
- Documentation of standard operating procedures
- The 5S's
- Visual displays for communicating to factory personnel
- JIT- to produce right quantities at right time and with right resources
- Poka-yoke to prevent or detect errors
- Team dynamics – problem solving ,comm.,conflict resln.

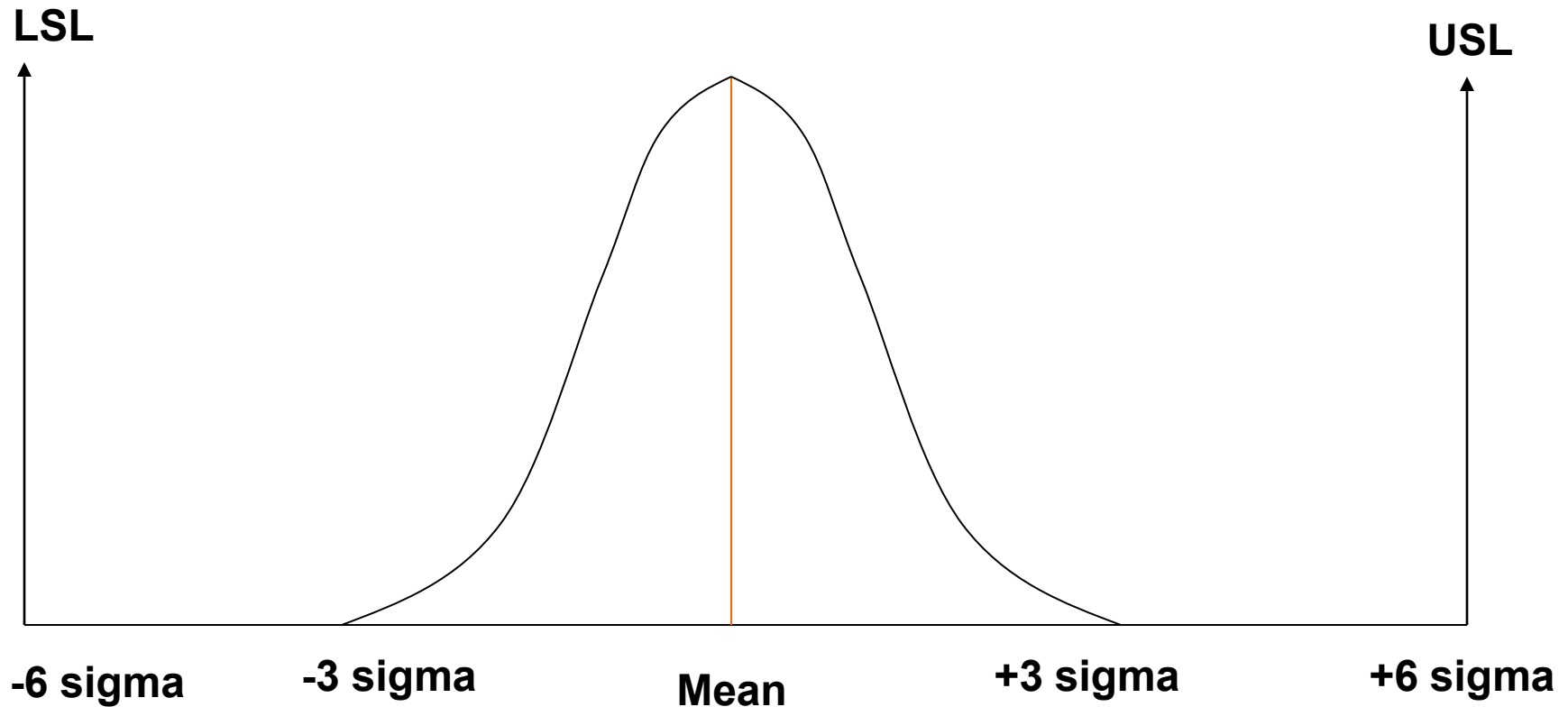


Kaizen Technique- change for good

- **Kaizen**
- **Heijunka**
- **Kairetsu**
- **Kokusunka**



Non-conformance rate when Process is centred



Six sigma method

- **Six sigma method is a TQM process that uses process capability analysis as a means of measuring progress.**
- **The smaller the standard deviation, the lesser the deviation of the product characteristic from its mean value. If the process has a normal distribution, the upper and lower specification limits are ± 6 sigma from the mean μ . The non-conformance is 2ppb and the process capability C_p is 2.0 (1.33 C_p is de facto standard.)**
- **A normal process with mean shifted ± 1.5 sigma from the target value desired has non-conformance of 3.4ppm and process capability index $C_{pk} = 1.5$, with 1.0 being the de facto standard.**

References

- **Total Quality Management - Dale H. Besterfield et al. ,Pearson education LPE**
- **Total Quality Management - R.S.Naagarazan and A.A Arivalagar, New Age International Publishers.**