Some New Trends on Cost Management to Enhance Profitability

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Generalized Concepts of Product and Product Cost

Basic Idea

- Need to exert activities to effect a product or render a service
- Activities require resources
- Cost needs to be expended to obtain resources

Product

Manufactured

- Direct Material
- Direct Labor
- Overhead- used to be very small and negligible in earlier days of manufacturing tangible products
- Not any longer with current practices

Definition of product is very general

- Product can be any cost object- may not even generate revenue

Why do we need Accuracy in Product Cost Determination?

TARGET ANALYSIS

New Product Development Example

Profit = Function (product price, product cost, product quality)

Sales volume, total revenue, total cost, reputation, customer satisfaction, repeat customers – all depend on these three fundamental characteristics

SET TARGETS

- Set target price and target quality
  - Quality includes functionality, features and failure free functioning
- Marketing in consultation with management sets price and quality
- Management chooses required profit margin
- Determine target cost = target price – chosen profit margin

Examples

- Introduction of Lexus by Toyota and Infinity by Nissan
- Cheaper than Mercedes Benz but higher price than the top of the line Toyota and Nissan cars
- Quality closer to Benz

Setting target: Market specialists and management set target price, quality

Management sets profit margin desired

Design product

- Design engineers and value engineers work on the product design to meet specified target quality
- Cost specialist studies resource requirements and estimates cost of the product. Contacts suppliers for the materials price, works with HR for labor to make sure of availability

IF ESTIMATED COST > TARGET COST

WHAT ARE THE CHOICES?

Increase price?

Reduce quality?

Take smaller profit margin?

Abandon product?

None of the above

Go back to value engineers and design engineers

IF ESTIMATED COST < TARGET COST

What are the choices?

1. Go to production and take profit > set desired profit
2. Recommend to management to reduce price
3. Go back to value engineering to see whether quality should be more than target quality

WHAT SHOULD THE CHOICE BE?

What do we know about costs and importance of quality?

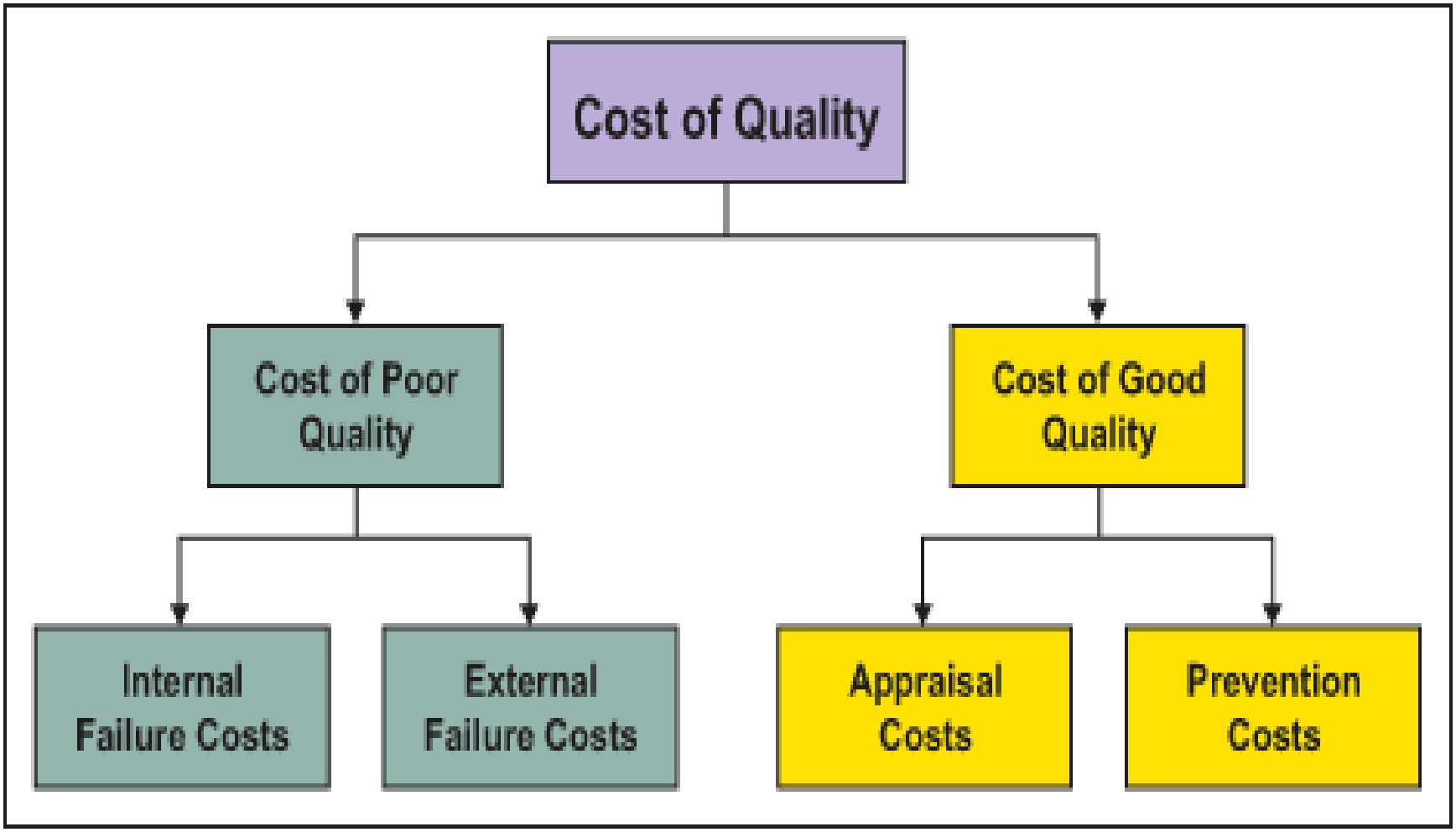
Classification of Quality Costs

The cost of poor quality affects:

- Internal and external costs resulting from failing to meet requirements.

The cost of good quality affects:

- Costs for investing in the prevention of non-conformance to requirements.
- Costs for appraising a product or service for conformance to requirements.


Cost of Quality
Cost of Poor Quality
Cost of Good Quality
Internal Failure Costs
External Failure Costs
Appraisal Costs
Prevention Costs

Cost of Poor Quality: Internal Failure Costs

- Rework
- Delays
- Re-designing
- Shortages
- Failure analysis
- Re-testing
- Downgrading

Cost of Poor Quality: External Failure Costs

- Complaints
- Repairing goods and redoing services
- Warranties
- Customers' bad will
- Losses due to sales reductions
- Environmental costs

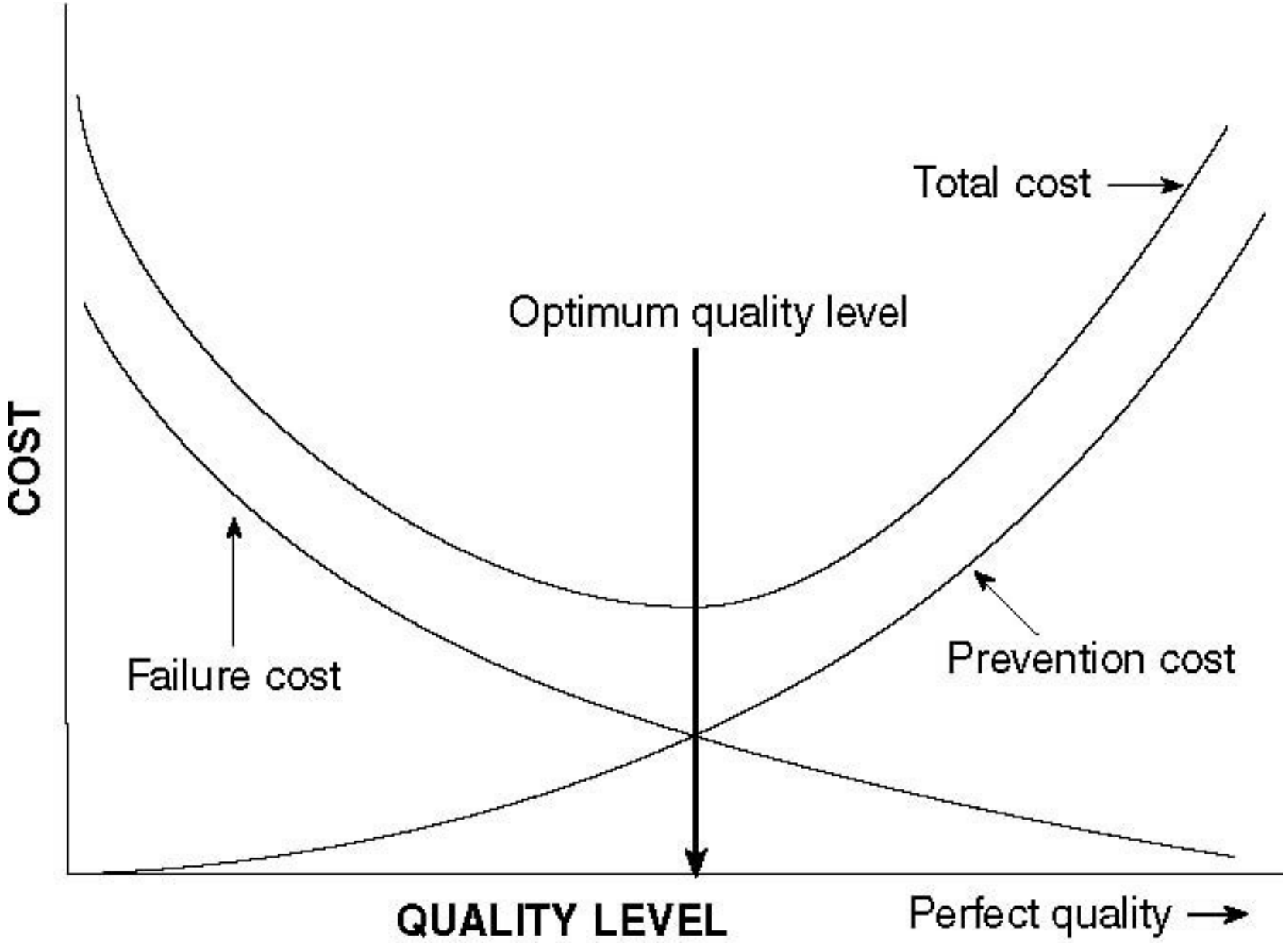
Cost of Good Quality: Prevention Costs: the only costs that add value to the product

- Quality planning
- Supplier evaluation
- New product review
- Quality improvement team meetings
- Quality improvement projects
- Quality education and training

Cost of Good Quality: Appraisal Costs

- Checking and testing purchased goods and services
- In-process and final inspection/test
- Field testing
- Product, process or service audits
- Calibration of measuring and test equipment

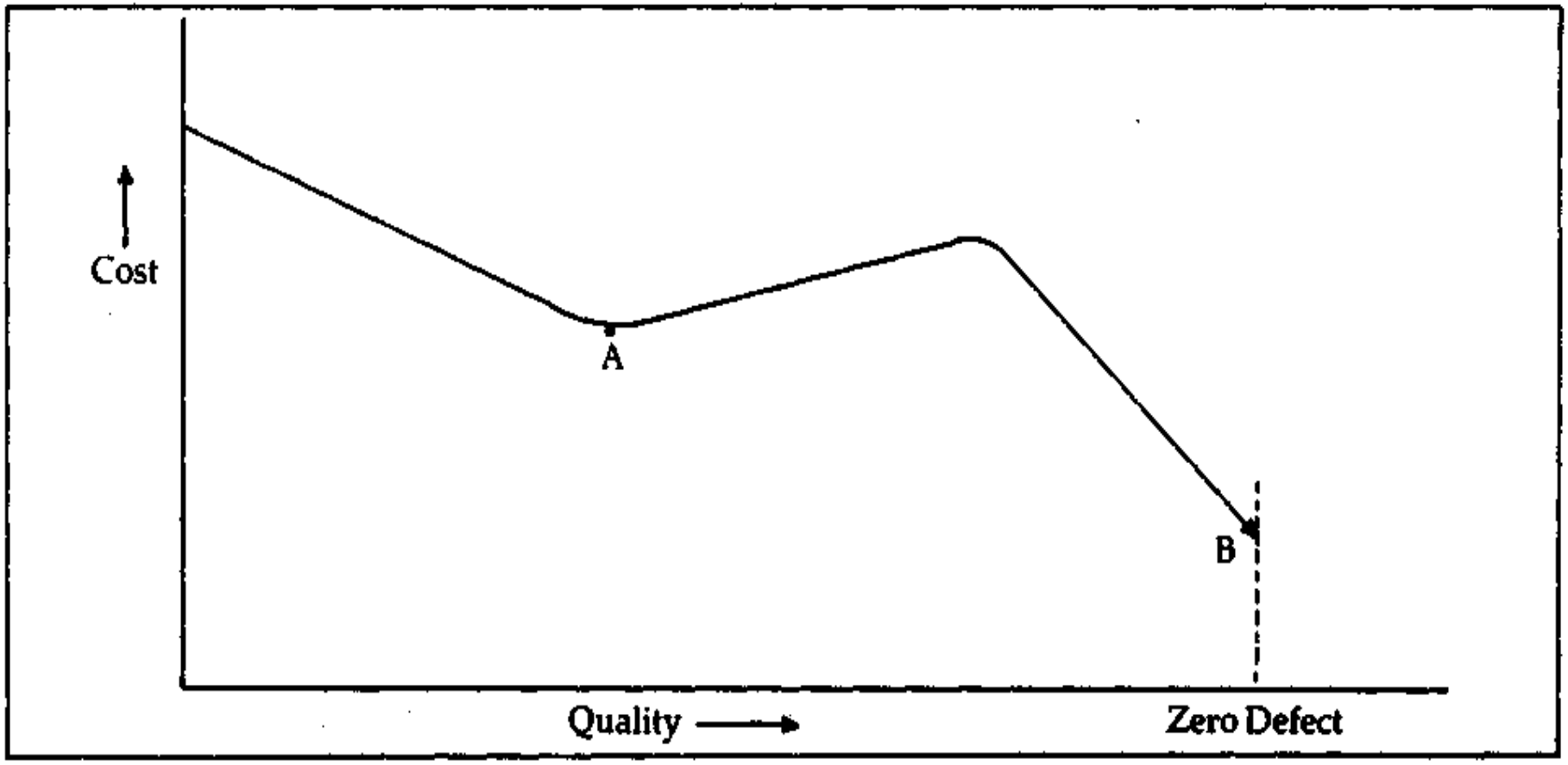
Optimal quality 95% good?



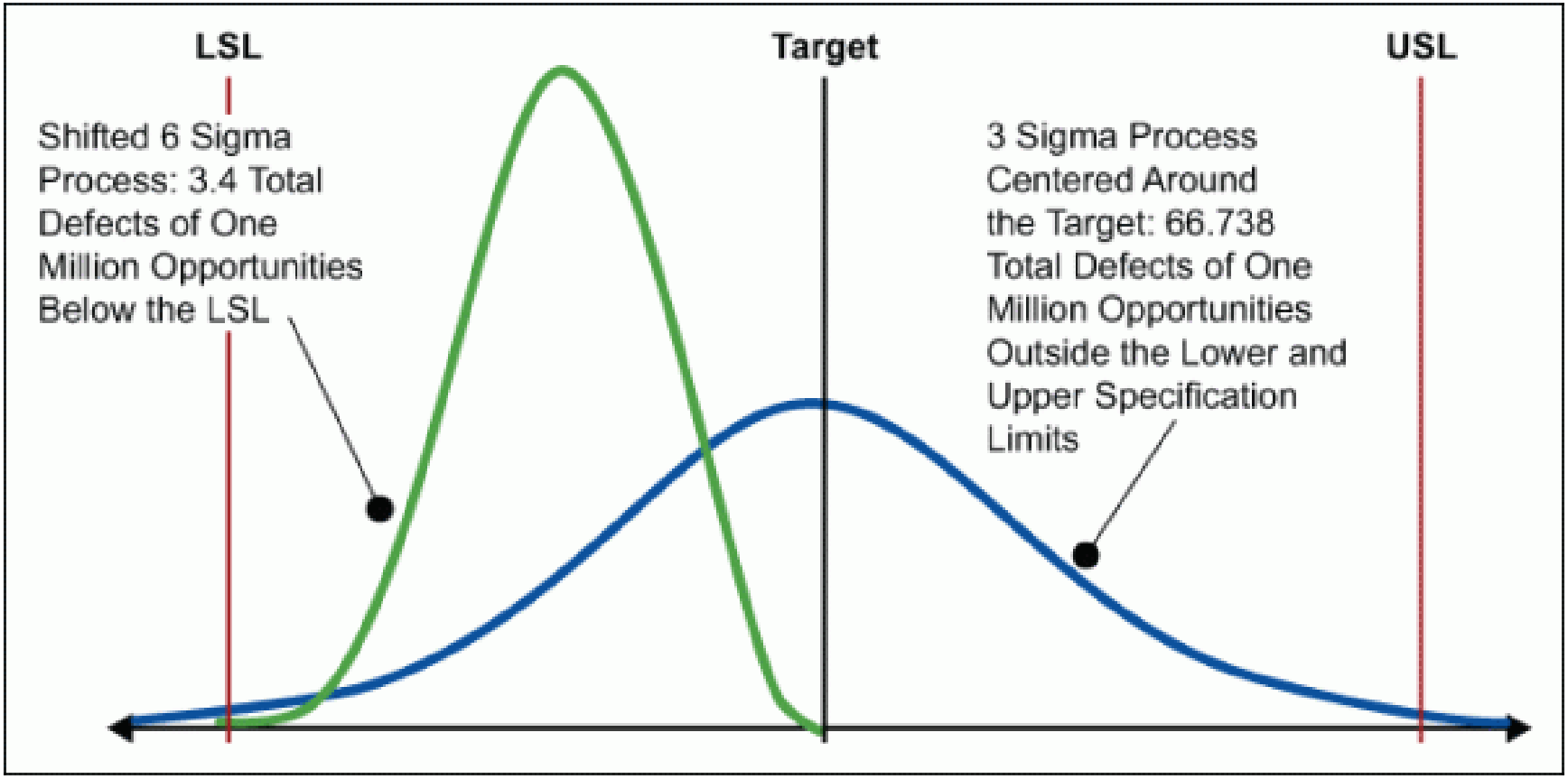
PLAN FOR 95% GOOD OR 5% BAD?

Zero Defect Quality
Robust Quality (No tolerance)

Figure 1 : Non-monotonicity of Cost-Quality Relationship



SIGMA RELATED QUALITY CONCEPT



Sigma Performance Levels –

One to Six Sigma

Sigma Level	Defects Per Million Opportunities (DPMO)
1	690,000
2	308,537
3	66,807
4	6,210
5	233
6	3.4

Examples

Number of telephone disconnections [7,000 talk minutes]

1 sigma:4,839

3 sigma: 467

6 sigma: 0.02

Erroneous business orders [250,000 opportunities per year]

1 sigma: 172,924

3 sigma: 16,694

6 sigma: 0.9

MOVE ON TO FIXED COST RESOURCES

Shared service
How to share the cost?

SAGA OF THREE DOCTORS AND A RECEPTIONIST

- One receptionist shared by three doctors
- Receptionist's cost: salary, fringe benefits, telephone, desk etc. = $160/month

- Cost driver: number of patients- doctors have 100, 50, 10 patients respectively.
- Capacity of receptionist= 160 patients per month
- Doctor’s cost absorption for receptionist activity = $1/ patient per month

- Suppose the doctor with 50 patients goes on vacation for one month.
- How to adjust the sharing of receptionist’s cost?
- Receptionist has excess capacity of 50 patients and enjoys idle time.

POSSIBLE ANSWERS

- Reduce the salary of the receptionist
- Force the receptionist to take a paid vacation
- The other two doctors split the receptionist cost in some negotiated manner
- None of the above
- What is your choice?

The doctor on vacation has to absorb the cost.

- Suppose that doctor leaves the practice.
- How to share between the two?
- Unused capacity cost is $50
- Sharing this in the ratio of 100:10 means cost per patient will go up equally for both
- No one else can absorb this cost
- ‘The buck stops with the doctors’; Patient cost varies with the doctors’ office

MOVE TO MANUFACTURING

- The buck does not stop with the products
- Why was one product line dropped?
- If the receptionist is in a manufacturing facility- the two remaining products will bear additional cost of $50/110 each.
- Results in over costing?
- How do we resolve the issue?

Common cost allocation

Centralized service
Example: Computer or design consulting

Cost for the centralized service:

Fixed cost: $80,000/year

Variable cost: $100/hour of service

Service utilized by two departments –

A and B

Expected usage: $100 hours each; 200 hours total

Cost application rates

Total expected cost/year =

80,000+ 200x100= $100,000

Predetermined rate for service=

$100,000/200 = $500/hour

Expected Cost applied to A= $50,000

Expected Cost applied to B= $50,000

Actual usage

Department A= 100 hours

Department B= 50 hours

Actual cost at service center = $97,000

<u>QUESTIONS</u>

1. What should the application rate be?
2. How much cost is applied to each department?
3. Should all the costs be applied?

Option 1

Apply $97,000

Rate = 97,000/150hours = $646.67/hour

Department A= 646.67x100 = $64,667

Department B= 646.67x50= $32,333

What is wrong with this application?

Option 1 continued

Flexible budget for the service center cost = 80,000+150x100 = $95,000

= allowance to service center

Why was the actual cost = $97,000?

$2,000 more than the allowance?

Option 1 continued

1. Due to inefficiency in service department- do not pass on costs due to inefficiency down to departments and then to products. Headquarters should absorb it and service department should bear responsibility.

2. Efficient usage but cost exceeded due to natural increase in cost or losing economy of scale.

Should this additional cost then be passed on to the departments and then to products?

YES: legitimate increase in costs should be passed on to products.

NO: if costs are passed on to departments they cannot control their costs according to budgets.

WHAT IS THE CHOICE?

Pass it on to departments with clear explanation of the increase.

Option 2

Apply $95,000

Application Rate = 95,000/150 = $633.33/hour
Applied cost to department A:
633.33x100 = $63,333.
Applied Cost to department B:
633.33x50 = $31,667.

What is wrong with this application?

Option 2 continued

For department A:

Expected hours of usage

= actual hours of usage = 100.

Expected cost for service =$50,000

< applied cost for service=$63,333

Expected application rate, $500/hour

< applied rate for service, $633.33/hour

What does this do to budget control of department A?

Department A gets charged for unused capacity due to department B

CANNOT PASS ON THIS COST TO DEPARTMENT A

OPTION 3

DUAL RATES:

Variable cost applied:

Department A: 100x100 = $10,000

Department B: 50x100= $5,000

Assign fixed costs based on predetermined formula.

Fixed cost application

Expected usage 100 hours each.

Allocate $80,000/2= $40,000 to each department.

Cost to department A= $50,000 as expected for 100 hours of usage.

Cost to department B= $45,000 for 50 hours of usage.

Long term usage basis

Use long term usage expectation for fixed cost application.

Suppose long term usage:

Department A= 150 hours

Department B = 250 hours.

Fixed cost allocated:

Department A: 80,000x150/400= $30,000

Department B: 80,000x250/400= $50,000

Fixed cost application rate = $200/ hour of usage.

Application rates

Variable cost= $100/hour

Fixed cost = $200/hour

Department A:

Allocated cost= 200x150 + 100x100= $40,000

Department B:

Allocated cost = 200x250 +100x50=

$55,000

Total service center cost allocated = $95,000

Unused capacities

Department A:
Applied to products: (200+100)x100 =$30,000
Unused capacity cost: 200x50= $10,000
Department B:
Applied to products: (200+100)x50=$15,000
Unused capacity cost: 200x200= $40,000

Total cost absorbed by products= $45,000
Total unused capacity costs= $50,000

Who is responsible for the unused capacity costs

Department A

Planned unused capacity cost

= 200x(150-100) = $10,000

Unplanned unused capacity cost = 200(100-100) = 0.

Department B

Planned unused capacity cost = 200(250 -100) = $30,000

Unplanned unused capacity cost= 200(100-50) = $10,000

Learning points on cost allocation of shared activities

1. Do not assign cost of inefficiency to user activities. Leave them with the secondary or support activity to be paid by headquarters
2. Allocated costs should reflect consumption of resource by that activity and not how other activities do or do not consume.
3. Do not allocate unused capacity costs to products.
4. With such a system, how do you price products for sale?

UNUSED CAPACITY COST

APPROACHES TO ACQUIRING FIXED COST RESOURCES

- Share fixed cost resource with others
- Contract for fixed cost resource with outside provider
- Build dedicated own resource

Reasons for unused capacity

_Long range planning

- Inability to use theoretical capacity at 24 hours x 365 days a year.
- Maximum utilization capacity: allows for needed break for maintenance and upkeep.
- Optimally planned underutilization to accommodate uncertainty
- Practical capacity (allowance for inefficiency)
- Budgeted use of capacity (market considerations)
- Actual utilization of capacity
- With multiple resources, capacity due to bottlenecks

Key issues in cost management

_To determine the costs of unused capacity in various categories

- To ascertain the responsible party for the existence of unused capacity
- To plan for reduction of unused capacity to maintain market competitiveness

What is the cost of unused or non value added capacity

Steps to follow

- Obtain the cost of the resource per year for each item (Use Activity Based Costing if necessary to allocate the costs to the resource A)
- Find an appropriate base to divide this cost to determine cost per unit of resource.
- Use this rate to determine the cost of unused capacity

Easily stated but what is the appropriate base to choose in order to resolve the issues in cost management?

Choices

- Long run theoretical capacity: unit cost is too small in comparison to consumption of the resource. No competitor can achieve theoretical utilization of any capacity. Conclusion: Too theoretical to be of any practical use in costing products.

- Maximum possible utilization of capacity: This is a good candidate if there is no uncertainty in demand for the resource. With demand, the facility will be unused for portions of time and the lost time due to remaining idle can never be caught up with. This will result in continuous buildup of waiting for the resource, ultimately leading to infinite waiting periods. Hence, we cannot operate at this capacity level under uncertainty in demands.

- Optimal utilization of capacity under uncertain timing and amount of demands: Seems like a good choice, but how do we measure the cost due to allowing for uncertainty in the demands. Where is the incentive to reduce uncertainty?

- Practical or normal capacity considered in many text books on management accounting: The unit cost determined may be too large if the resource capacity is planned for long-term growth. Also, has built in allowance for inefficiency.

Budgeted capacity: Will result in too much of fluctuation in unit cost that is not related to consumption of activity resources by products. Will also result in non-competitive high costs for the product.

- Actual utilization capacity: The information is obtained too late and also non-competitive.
- Bottle neck capacity: For non-bottle neck resources this does not relate to consumption of resource.

My choice

Maximum possible utilization of capacity

Justification of choice

- Unit cost per unit resource consumption compares with competitors' best practice.
- Coordinates well with engineering specifications of activity resource consumption with no wastage. Theoretical capacity is not achievable by anyone unless the technology changes. Other choices allows for inefficiency.

- Gives a cost figure for unused capacity for the resource in every category except the difference between long term theoretical capacity cost and the maximum possible utilization cost. This unused capacity cost is not useful for any purpose.
- Helps to create an income statement that will give all the categories of unused capacity cost for efficient cost management

Separation of unused capacity costs

- Planned unused capacity= Maximum capacity – budgeted capacity

- Unplanned unused capacity = budgeted capacity – actual capacity used

Importance of fixed cost consideration in a simple example

An example for keep or drop a product

A Company produces products A, B and C.

Product line segmented income statement is usually provided using an absorption format.

Sales

-cost of good sold

-selling and administrative costs

= operating income

Operating incomes are

Product A: $130;

Product B: $150;

Product C: $(30);

Total = $ 250

Should Product C be dropped?

Traditional analysis

Develop a variable costing format income statement.

Determine the direct fixed cost expenses that cannot be avoided if product is dropped.

Determine segment margin for each product.

Segmented direct costing format income statement ($ thousands)

Product	A	B	C	Total
Sales revenue	1800	1600	210	3610
Less: variable costs	1350	1000	140	2490
Contribution margin	450	600	70	1120
Less: direct fixed costs	(150)	(300)	(80)	530
Segment margin	300	300	(10)	590
Less: common allocated costs	(170)	(150)	(20)	340
Operating income	130	150	(30)	250

Additional data

Direct fixed expenses include depreciation costs that cannot be avoided:

For A: $20

For B: $120

For C: $25

Product	A	B	C	Total
Sales revenue	1800	1600	210	3610
Less: variable costs	1350	1000	140	2490
Contribution margin	450	600	70	1120
Less: avoidable direct fixed costs	130	180	55	365
Contribution to common and unavoidable costs	320	420	15	755
Unavoidable or sticky direct fixed costs	20	120	25	165
Less: common costs	170	150	20	340
Operating income	130	150	(30)	250

Decision

- Do not drop product C
- Product C contributes $15 towards common and unavoidable costs
- Dropping it will reduce operating income by $15.

Problems with this approach

- Difficult to differentiate variable and fixed costs in cost of goods sold and selling and administrative costs
- Too many variable expenses categories
- Assign each variable expense to every product, whether they are under study for drop or not
- Ascertain each fixed cost to determine whether it is direct and avoidable

Fixed cost analysis approach

- Study only product C under consideration for dropping.
- Do not need to analyze how all variable costs are allocated – they are too many
- Study common fixed costs allocated to Product C and add them back to operating income of Product C
- Add back direct fixed unavoidable costs that are sticky for Product C
- If the number is positive, do not drop.

- Traditional approach maintains that fixed costs that are unavoidable are sunk and should not be considered as relevant for incremental decision making
- However, they are important because they will still remain even after dropping the product
- Solution procedure is less error prone and much quicker

Irrelevant information

- Data on products that are not under consideration for analysis are not relevant
- Revenue and costs that will vanish with dropping the product are not relevant
- Sticky costs that are allocated to the product C will remain even if product C is dropped. These are to be added back to operating income to arrive at contribution.

Conclusion

- What is considered RELEVANT INFORMATION in traditional analysis is IRRELEVANT
- What is IRRELEVENANT is RELEVANT

NONVALUE ADDING ACTIVITIES AND COSTS

Conditions to be satisfied to be value added

- Produces a change of state
- change cannot be accomplished by preceding activities
- activity enables another activity to be performed.

Non value adding activities Examples

- Inspection: With zero defect manufacturing and suppliers, this activity can be avoided
- Moving: With better arrangement of work space this can be avoided
- Scheduling: with demand based just in time production
- Waiting: with proper work flow and no defects, this can be avoided

- Storing: with just in time supplier
- Reworking: with proper maintenance of machines and zero defect production
- Warranty costs: prior activity of building better quality will avoid this activity.

Non value adding costs

- With value adding activities, non value adding costs can be incurred
- Wastage of materials
- Inefficiencies in labor

How to reduce non value added costs?

- Elimination: reengineering, technology improvement.
- Activity selection when alternatives are present: make manual to automatic
- Reduction: continuous improvement to reduce costs.
- Common service to share among products: standardization of parts, reduction of parts

ACTIVITY:PURCHSING PARTS
COST DRIVER: NUMBER OF ORDERS

For a specified level of output:

Ideal quantity	Ideal cost	Budgeted quantity	Budgeted cost	Actual quantity	Actual cost
1,500	$300	2,000	$320	2,100	$310

ANAYSIS

- Actual cost = 2,100x310 =$651,000
- Budgeted cost =2,000x320 =$640,000
- Ideal cost =1,500x300 =$450,000

- Total non value added costs = $201,000
- Planned non value adding cost= $190,000
- Unplanned non value adding cost

=$11,000

Unplanned non value adding cost = 11,000

- Price effect = 2,100x310 -2,100x320

  = -21,000

- Quantity effect =2,100x320 - 2,000x320

  =32,000

Planned non value adding cost= $190,000

- Price effect =2,000x320 -2,000x300
  =40,000

- Quantity effect =2,000x300 - 1,500x300 =150,000

Actual aggregate analysis

- Actual cost = 2,100x310 =$651,000
- Ideal cost =1,500x300 =$450,000
- Aggregate price effect= 2,100x310 - 2,100x300 =21,000
- Aggregate quantity effect= 2,100x300- 1,500x300 =180,000
- Total non value adding cost =$201,000
- Excess non value adding cost over planned = $201,000-190,000 =$11,000

Question

- How effective is the budgeting process in communicating activity efficiency improvement goals?
- Did worse than planned
- Better than budget on controlling price but worse on number of orders
- Perhaps, operations seeing 310 price as achievable might have slackened on controlling number of orders.
- Or, in the tremendous zeal to reduce the price, we created inefficiencies resulting in excess orders.
- Should we have set budgeted price at $310?